

# Recovery of Caustic, After Boil out in Paper Machine

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## ABSTRACT

The paper machine uses caustic (NaOH) for system cleaning, once in 45 days. Slime and impurities taken wash from the machine is drained to the effluent. A method was devised to generally utilize the spent caustic wash in the Soda Recovery causticiser plant. The implementation process, recovery and reuse in SRP are discussed in this paper. This reduces pollution load and chemical wastage.

**Key words :** Boilout, approach flow , recycling, recovery

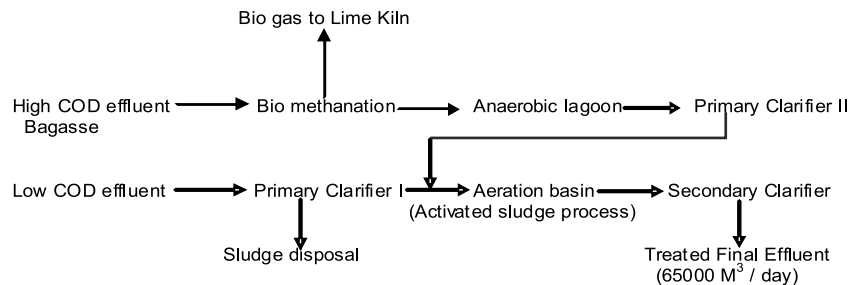
## INTRODUCTION

In India, pulp and paper mills are facing environmental and economical challenges due to stringent environmental regulations. New techniques are available for the treatment of waste water from pulp and paper industry, to improve the quality of effluent and make it conform to pollution control board standards. Many mills in India have switched over to cleaner technologies to reduce the level of pollutants in the effluent. Conservation of resources like water, chemicals and energy is the order of the day. TNPL with two paper machines, produces 750 T / day of writing and printing paper. A 300 TPD capacity hardwood fiber line consisting of superbatch, oxygen delignification and ECF bleaching sequence and 500 tpd chemical bagasse ECF line, a 1300 tpd solids firing capacity recovery boiler and a new falling film evaporator are in the commissioning stage, as a part of Mill Development Plan.

## ENVIRONMENT PROTECTION MEASURES AT TNPL

## WATER POLLUTION CONTROL MEASURES

TNPL is a forerunner in the generation of renewable energy. A bio-gas plant producing 18000M<sup>3</sup> / day of methane gas ( used as a green fuel in Lime kiln), from bagasse wash water and a windfarm of 35 MW capacity were installed, thus contributing towards clean development mechanism (CDM) and sustainable development. A second Lime Kiln is being commissioned to reuse the lime sludge generated in the new causticising plant to produce burnt



lime. As a part of environment related activities, this paper is aimed at to reduce the pollution load in the effluent water.

## AIR POLLUTION CONTROL MEASURES

- To reduce the emission of carbon particles from forklifts in Finishing House area, water mufflers were installed in the exhaust pipe. The emission was reduced to the extent of 75%.
- To reduce the fugitive emission in chemical additive plant, Pneumatic Handling System (for fillers) was installed to remove the solid dust particles.
- Online system for monitoring stack emission in power boilers, SRP boilers and lime kiln is being installed.
- Online system for measuring ambient air quality being installed.
- Provision is made for incinerating non condensable gases in the new lime kiln.

The aim of this paper is to recover and reuse caustic after boil out in paper machine, for pollution abatement and cost savings.

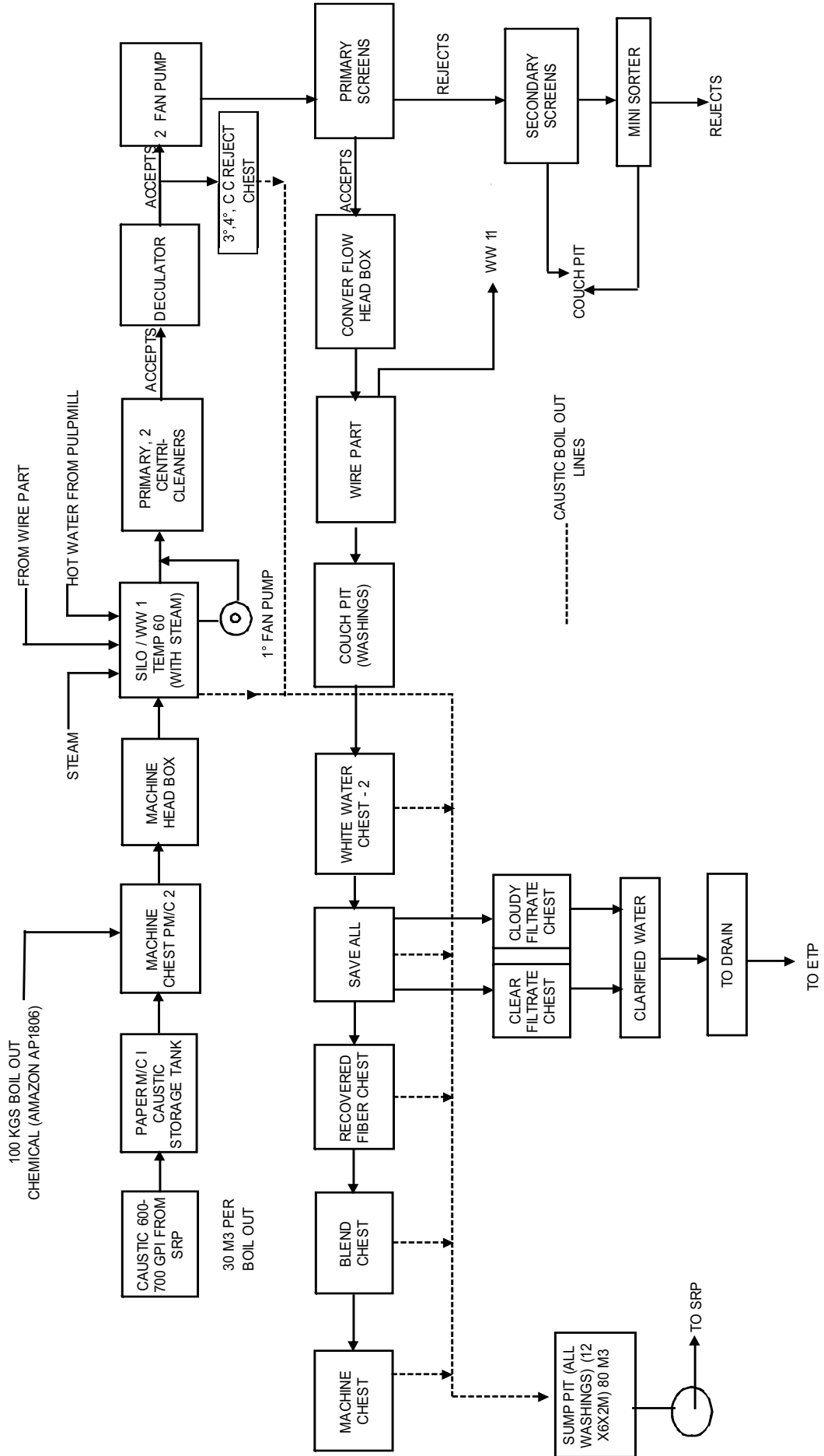
This project was conceived in TNPL and is in operation from September, 2004.

## BOIL OUT PROGRAM IN TNPL

Caustic boil out is carried out in paper machine, for system cleaning, once in 45 days. Around 20-25 T of raw caustic is transferred from SRP to paper machine storage tank. It is then taken to Machine chest, diluted and sent to the approach flow system (as shown in annexure 1 & 2). Steam and hot water are given in Silo to maintain the required concentration and temperature. 100 kg. of dispersing agents is used to remove the scales and deposits in machine chest. The Concentration of caustic 50-60 gpl, pH of 12 and temperature of 50°C are maintained during the boil out. Concentration of caustic and temperature in boil out and effluent is monitored every 15 minutes. The Wire part is kept running and caustic is kept under circulation for effective cleaning of the system for about 2 to 3 hours. The ETP plant is kept informed before draining the boilout. The caustic wash is then drained into the effluent channel. Final concentration of the wash is around 15 to 20 gpl. The effluent treatment plant is informed before drainage. 800 kgs of hydrochloric acid is used in effluent treatment plant to bring down the pH of the effluent from 12 to 7. All of these chemicals increase the TDS and sodium content. The boil out wash characteristics are as follows



FLOW CHART NO. 2 - ANNEXURE 2  
CAUSTIC BOILOUT IN PAPER MACHINE 2





#### ANNEXURE - 4

##### Recovery of caustic after Boilout

Year	Caustic to PM/c tons	Caustic recovered tons	Recovery %
2004	69	34	49.3
2005	230	98	42.5
2006	222	89	40.2
2007	286	103	36.0
	807	324	42.0

- Shower water dilution is controlled to maintain concentration of caustic.
- Cloudy and clear filtrate level tanks were maintained at 60% to avoid overflow and loss of caustic.
- Knock-off showers at the wire part opened intermittently to maintain the concentration level of boil out.
- A butterfly valve was installed across the paper machine effluent channel to avoid passing of boil out to effluent, during pumping.

#### RESULTS AND DISCUSSION

The quantity and the percentage of caustic recovered, from 2004 to 2007 is shown in **annexure 4**. The recovery %

is 36-49% at present. It can be increased further to 60 % by making use of some tanks after completion of MDP, for additional storage.

#### ENVIRONMENTAL BENEFITS

- Reduction in sodium in effluent
- Reduction in TDS
- Reduction in COD
- Reduction in HCl consumption for neutralisation
- Waste minimisation by recycling
- Improvement in Chemical recovery efficiency
- Apart from the environmental benefits, approximately Rs.58 lakhs worth of caustic is recovered from the waste till date.

#### CONCLUSION

TNPL spares no efforts to abate pollution. The above process helps in chemical savings, better quality of effluent with minimum investment, lesser load to ETP plant, reduction in the cost of treatment, and other environmental benefits such as lesser damage to soil fertility in the irrigated areas.

This recycling process also covers the Environment protection act, 1986 schedule : VI which stresses about "Minimisation of waste by recycling and reuse".

#### ACKNOWLEDGEMENT

We are grateful to the Management of TNPL for giving us permission to prepare and present this paper.

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