



By Justin Toland, Editor

## Andhra Pradesh Paper Mills (APPM) is starting up India's first ECF pulp line with continuous cooking

# A PULPING PIONEER

**H**IGH-QUALITY PULP is a given if you want to make high-quality paper. Over the years, the quality of fiber produced in India has not kept pace with the best available internationally. But, in the new, more competitive Indian pulp and paper environment, matching the best from elsewhere is becoming a necessity.

One company quick to realize this has been Andhra Pradesh Paper Mills (APPM), a privately owned company (chairman and major stakeholder: LN Bangur) with two mills (Unit APPM and Unit CP – formerly Coastal Papers) located in and around the city of Rajahmundry in eastern Andhra Pradesh. This month, Unit APPM was set to start up a new, 185,000-tonne/yr elemental-chlorine free (ECF) pulp line with a continuous digester, supported by a high thermal efficiency, low emissions, low odor recovery island, both supplied by Andritz. The new pulp line is only the third in India with continuous cooking and the first of its kind to incorporate ECF bleaching. It will also be the largest single fiber line in the country. "Andritz has a very big basket and if

I put all my eggs in the same basket I am confident none of them will break," says Bangur of the choice of supplier.

Since November 2005, up to 1,200 people (including contractors) have been involved in the installation of the new fiber line, which will feed the mill's five paper machines. Some 200 tonnes/day of wet-lap pulp from Unit APPM will also be transported to the nearby Unit CP.

### QUALITY AND EFFICIENCY

Raw material for the new fiber line, which replaces an existing 280 tonne/day system, is 10-15% bamboo, 10% mixed tropical hardwood and 75-80% casuarina, subabul and eucalyptus from APPM's farm forestry program (see pp. 29-32).

The new chipper house contains a control room from where three people per shift can monitor the chipping process. Each of the two new Pallmann PHT 520x1250 drum chippers with centrifugal wedge clamping 4-knife rotor can handle 40 bone dry tonnes/hr.

The Andritz chip screening system is designed to provide uniform chip quality to the digester, lower knoter and screen rejects and higher pulp yield.

The new line will make use of the mill's existing 800 tonne chip storage silos. Initially, the new and old pulp line will run side-by-side before the latter is phased out.

APPM has chosen Andritz's Lo-Solids Continuous Cooking Process. "A continuous digester is advantageous," says APPM's general manager, P&D (planning and development), M Surya Rao. Among the advantages the mill is hoping to garner are a reduction in the steam requirement of up to 50%, lower kappa spread and therefore lower bleach demand, fewer knoter/screen rejects (higher yield), minimal odor thanks to cold blowing/digester discharge by pumping, and enhanced physical properties of the pulp.

The new brownstock washing system is based on DD washers and is expected to result in lower carry over of spent chemicals to the bleach plant, which in turn will lower bleach demand and reduce the pollutant load from

One of two Pallmann chippers at the start of the fiber infeed line



the bleach plant. Other benefits include an increase in the solids content of black liquor going to the evaporators, thereby reducing steam consumption, and lower soda losses, resulting in higher recovery efficiency.

The new line features a closed screen room with four ModuScreen fine-slotted screen baskets that will reduce shives content in the pulp, cut the pollutant load, reduce fiber losses and soda losses through screen room rejects and lower water consumption.

Andritz has installed two-stage oxygen delignification after screening to reduce kappa without fiber degradation, cut the chemical oxygen demand of the pulp to the bleach plant, increase black liquor solids to recovery and reduce the color of bleach plant effluent.

The ECF bleach plant (bleaching sequence: D-Eop-D) is designed to improve pulp quality as well as being gentler on the environment.  $AO_x$  levels in the mill's effluent are set to be "much less" than the 1 kg/tonne from the old pulp line, says Surya Rao. Water consumption will also be reduced. Pulp brightness is predicted to rise from 86-88 ISO to more than 88 ISO, while the pulp's strength properties will also improve, adds the general manager, P&D.

The complete recovery island has been supplied by Andritz and its Indian joint venture partner, Enmas Andritz. The black liquor evaporation plant includes a falling film multiple effect evaporation line, designed for higher solids concentration, segregation and re-use of process condensate. The 1,300-tonne/day chemical recovery boiler is the largest in India and will fire gases from brownstock washing and black liquor processes, as well as solid waste from the chipper. The Andritz boiler is designed for high solids firing (75% dry solids concentration) at high steam pressure (65 ata). Benefits of both technologies should include lower total reduced sulfur (TRS) emissions, higher thermal efficiency and a lower effluent load. The recovery boiler is fitted with electrostatic precipitation chambers to ensure availability and emission levels of no more than 50 mg/Nm<sup>3</sup>.

The new CD filter for white liquor clarification is also a first for India and will result in pure white liquor at a higher temperature and with stable quality and concentration levels. An upgrade to the recausticizing unit will also help cut water consumption and increase the dryness of the lime mud going to the rotary limekilns. The capacity of the recausticizing unit is 3,300 m<sup>3</sup>/day.

The mill is adding a second rotary lime kiln with a high efficiency ESP and the ability to burn non-condensable gases (NCGs). This too will cut emissions, as well as eliminating solid waste disposal. The new lime kiln will have a capacity of 160 tonnes/day and will run in parallel to the existing (100 tonne/day) kiln (installed in 1996).



In 2002, APPM was the first mill in India to install an NCG incineration system. This dedicated Andritz NCG boiler comes into use when the lime kilns are not running.

**The mill uses as furnish mainly hardwood tree species grown by local farmers**

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## ONE VISION

The whole pulping and recovery process (except the chipper house) will be monitored from a single air-conditioned control room. ABB has supplied the DCS for the new pulp line (as well as feed pumps for the recovery boiler).



**The Andritz recovery boiler under construction**

Unit APPM, general manager (P&D), M Surya Rao



Eka is in the midst of constructing an on-site  $ClO_2$  plant. Other suppliers to the new project have included Sulzer Pumps, WMI Cranes and Thermax Ltd.

To power the expansion, there is a new, high thermal efficiency, low emissions coal-fired boiler and a double extraction condensing 34 MW turbo generator that will increase thermal efficiency and lower fuel/energy costs.

FROM BETTER PULP,  
BETTER PAPER

The new pulp line is just one aspect of APPM's 'Mill

## APPM's two mills

### Unit APPM:

2,750 employees

Mill area: 74 ha (inc. 26 ha for housing)

Current paper capacity: 98,500 tonnes/yr

- PM 1 – 90-175 m/min; 7,000 tonnes/yr; 40-100 g/m<sup>2</sup>. Main grades: MG poster, MG ribbed kraft
- PM 2 – 45-190 m/min; 23,000 tonnes/yr; 90-300 g/m<sup>2</sup>. Main grades: MG cover; coating base
- PM 3 – 110-370 m/min; 30,000 tonnes/yr; 40-250 g/m<sup>2</sup>. Main grades: surface-sized maplitho; copier
- PM 4 – 90-130 m/min; 3,000 tonnes/yr; 21-58 g/m<sup>2</sup>. Main grades: MG poster
- PM 5 – 160-500 m/min; 35,500 tonnes/yr; 47-180 g/m<sup>2</sup>. Main grades: creamwove; DLX maplitho

Projected capacity after PM 3 rebuild (2007): 109,000 tonnes/yr.

### Unit CP:

1,419 employees

Mill area: 61 ha

Installed capacity: 64,000 tonnes/yr

- PM 1 – 75-200 m/min; 3,600 tonnes/yr; 45-110 g/m<sup>2</sup>. Main grades: creamwove; azurewove/laid; misc. printing/writing
- PM 2 – 60-200 m/min; 18,400 tonnes/yr; 100-220 g/m<sup>2</sup>. Main grade: MG kraftliner
- PM 3 – 450-650 m/min; 42,000 tonnes/yr; 44-80 g/m<sup>2</sup>. Main grades: DLX maplitho; newsprint

Projected capacity after PM 3 rebuild (2007): 85,000 tonnes/yr.

Development Plan' (MDP), a Rupee 6.35 billion (\$145 million) investment program with the following aims:

- To expand the combined capacity of APPM's two mills to 194,000 tonnes/yr of paper
- To bring about cost competitiveness through reduction in variable costs and higher productivity
- To upgrade quality and increase sales by having more value-added products
- To become globally competitive in product quality and cost
- To be ahead of the regulators on environmental compliance.

To increase paper output, Voith Paper has been selected to upgrade PM 3 (aka 'Anuja') at Unit APPM and PM 3 ('Ananya') at Unit CP, 18 km from Rajahmundry in the village of Kadiyam. Both projects are set to take place in the first quarter of 2007.

Unit APPM's PM 3 will be fitted with a new diffuser block in the headbox, a Duoformer for the wire section, a new size press, four new dryers and pocket ventilation. The machine's steam and condensate system will also be upgraded and the calender stack rebuilt. The changes will boost output on the 30,000-tonne/yr printing/writing paper PM by 10,500 tonnes/yr and raise quality, with a view to increasing exports.

Although Unit APPM's existing effluent treatment plant is adequate for 'post MDP' operations, further improvements are planned. These include: the installation of a cooling tower ahead of the aeration basin; replacement of the existing aerators with a diffused aeration system; and a dewatering system for solid waste to facilitate burning in the boiler.

Voith will modify the wire and press sections of Unit CP's PM 3, increasing capacity from 42,000 to 66,000 tonnes/yr and reducing water consumption to 70 m<sup>3</sup>/tonne of paper and also reducing the effluent load. The machine will also be converted into a swing machine, producing newsprint as well as printing/writing paper. Unit APPM will supply 200 tonnes/day of wet-lap pulp to Unit CP, enabling the closure of the latter's rice straw pulp and DIP lines. The end of straw pulping will mean the end of the twice yearly discharge of untreated spent chemicals from the mill.

This is one of a number of environmental benefits of the MDP. As well as the elimination of elemental chlorine in bleaching, fresh water consumption will decrease from 125 m<sup>3</sup>/tonne of product to less than 100 m<sup>3</sup>/tonne, the hydraulic load will be 15% lower in absolute terms (50% lower on a per tonne product basis); suspended solids will be 10-15% lower, BOD levels 35-40% lower, COD levels 40-45% lower, and effluent color reduced by 30-50%. PPA