Unit CPM, Fort Songadh, Dist. Tapi (Gujarat)

Pre-Feasibility Report

for

the Proposed Modernization and Expansion Plan (MEP)

of

Existing Paper/Board Manufacturing Plant at JKPL Unit: CPM, Fort Songadh, Dist Tapi, Gujarat

Submitted to

MINISTRY OF ENVIRONMENT FOREST &CLIMATE CHANGE (MoEF&CC)

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The Coal supply agreement between Western Coalfield Limited and JKPL, Unit CPM	3
The water withdrawal permission letter from Narmada Water Resources & Water Supply and Kalpasar Department, Government of Gujarat	4
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Overall mill layout indicating the usage of project facilities	6

Appendix -1: Certified compliance report for Environmental Clearance 2008 from MoEF&CC Regional Office

Appendix -2: Proposed Terms of Reference for EIA studies

1 Introduction

1.1 Overview of JK Organization

J.K. Organization is a multinational group head-quartered in India with a heritage of more than 125 years. The Group has multi-business, multi-product and operating at multiple locations with its foot prints in various countries across the globe. It has overseas manufacturing operations in Mexico, Indonesia, Romania, Belgium, Portugal and UAE. JK Organization includes companies such as JK Tyre, JK Paper, JK Lakshmi Cement, JK Fenner, Umang Dairies, JK Insurance etc. Products of the JK Group have a strong brand recall with significant market share in their respective segments.

1.2 Overview of JK Paper Ltd

JK Paper Ltd. has two large integrated paper manufacturing units namely JK Paper Mills at Rayagada, Odisha and Central Pulp Mills (CPM) at Songadh, Gujarat with a combined capacity of 4,55,000 TPA. It is the market leader in Branded Copier paper segment and among the top players in Coated Paper and high-end Packaging Boards and is a leading exporter of Branded Copier Papers from India with exports to almost 35 countries. It is the first paper manufacturing company in India to get *TPM Certificate* from JIPM, Japan.

Unit CPM, Songadh commenced production in 1968 and was acquired by JK Group in 1992. The packaging board plant was commissioned in the year 2007. The products manufactured in the unit are writing and printing paper, cut size multipurpose office paper, multi-layer packaging boards and security paper.

1.3 Existing Facility

Unit CPM, Songadh is spreading in an area of 363 acres of land comprising main plant and its supporting facilities, colony, green belt and plantation area. The existing facility is permitted and consented to produce 1,60,800 TPA of writing and printing paper and packaging board (Writing and printing paper - 60,000 TPA, Duplex Coated Board – 1,00,800 TPA) and pulp production capacity of 60,000 BD TPA as per the *Environmental Clearance* obtained from *Ministry of Environment, Forest & Climate*

Change (MoEF&CC). The public hearing was held on 26/10/2005 as per the process stipulated under notification S.O.318 (E) & S.O.319 (E), dt 10/04/1997 issued by *MoEF&CC*. The copy of *Environmental Clearance* is attached as **Annexure-1**. The chronology of the Environmental Clearances obtained in the existing facility is presented in the **Table 1.1.**

Table 1-1 Chronology of the Existing Environmental Clearances

SI. No.	EC No.	Dated	Details on Environmental Clearance
1	F. No. J-11-13/61/2005-IA II (I)	October 10, 2005	• Environmental Clearance of Duplex Board Plant from MoEF&CC, Delhi
2	F. No. J-11013/61/2005 IA-II	May 2, 2005	• Environmental Clearance for Coated Duplex Board Project- 5000 TPM and Chlorine Dioxide Plant- 45 TPM.
3	F.No. J-11011/416/2008-IA-II	October 17, 2008	• Expansion of pulp and paper plant (4200 MT/Month to 5000 MT/Month) by installing Oxygen Delignification Plant (ODL) • Public Hearing was exempted as per the para 7 (ii) of EIA notification, 2006.

The facility is granted with *Consolidated Consent and Authorization (CC&A)* from GPCB vide their Consent No. AWH-63794 dated 21.08.2014, valid up to 10.04.2019 under *Water (P & CP) Act 1974* and *Air (P & CP) Act 1981* as amended and under *Hazardous Waste (M &H and TM) Rules 2008*. The copy of the *Consolidated Consent and Authorization (CC&A)* is enclosed as **Annexure-2.** JKPL, Unit CPM is regularly submitting the compliance report to Regional Office, MoEF&CC, and the facility has obtained certified compliance report for *Environmental Clearance* 2008 from *MoEF&CC* Regional Office, Bhopal vide letter No. 5-266/2008(ENV)/316 dated 07/08/2018. The copy of the same is attached as **Appendix-1.**

1.4 Project of Interest

In the view of upgrading the existing paper and pulp mill at unit CPM, the management of JKPL has proposed to increase the paper/board production capacity from 1,60,800 TPA to 3,60,800 TPA by installing a new board manufacturing unit of capacity 2,00,000 TPA. The existing pulp mill of capacity 60,000 BD TPA will be replaced with ECF based Chemical Wood Pulp (CWP) mill of capacity 1,60,000 BD TPA

which will be shifted from JKPL, Rayagada unit and re-installed. A new Bleached Chemi Thermo Mechanical Pulp (BCTMP) of capacity 1,00,000 AD TPA, De-Inking Plant (DIP) of capacity 150 BD TPD and Secondary Fibre Treatment (SFT) Plant of capacity 400 BD TPD are proposed to cater to the fibre demand of the varieties of Boards for the proposed new Board machine. The supporting facilities for the proposed increase in capacities such as chemical recovery section, power plant, effluent treatment plant (ETP) will be augmented/upgraded based on the requirement.

The proposal under the Modernization and Expansion Plan (MEP) of existing Paper/Board Manufacturing Plant at JKPL Unit: CPM includes the following;

- Installation of One New Board Machine
- Installation of Chemical Wood Pulp Mill (To be Shifted from Rayagada unit and re-installed). The existing old pulp mill will be kept as standby without increasing the intended overall production capacity.
- Installation of BCTMP Mill, DIP and SFT Plants.
- Installation of New Chemical Recovery Boiler. (Existing Chemical Recovery Boiler will be kept as standby)
- Augmentation/upgradation of Co-generation Plant
- Augmentation/upgradation of Water Treatment Plant
- Augmentation/upgradation of Effluent Treatment Plant
- Augmentation/upgradation of supporting infrastructure

1.5 Existing Plant Location

The existing plant is situated at Village Gunsada, Bhimpura, Singalkhanch, Fort Songadh Taluk, Tapi District in the State of Gujarat (**Figure 1.1**). The plant is located in the Southern side of the Gujarat State near to the Maharashtra border which is about 5 km (aerial distance) away from the plant boundary towards southeast direction. There is a State Highway (SH-174) passing through the main plant and colony/plantation area. The nearest International Airport is located in Surat which is about 75 km (aerial distance) away from the plant.

The existing plant, its associated infrastructure and facilities is extended up to 363 acres of land including green belt and plantation of about 120 acres covering 33% of

total area. The site is located at the intersection of latitude 21°12'N and longitude 73°34'E and falls under the Survey of India Topography Map No. 46G/7, 46G/8, 46G/11 and 46G/12. The toposheet showing the 10 km radius of the existing project site is presented in the **Figure 1.2**. The Google Earth Imagery showing the boundary of the total facility is presented in the **Figure 1.3.** The ecologically notified Poorna Wildlife Sanctuary (The Gazette of India, S.O. 1259 (E)) is located at 19 km (aerial distance) from the project boundary.

Figure 1-1 Location of the Project Site

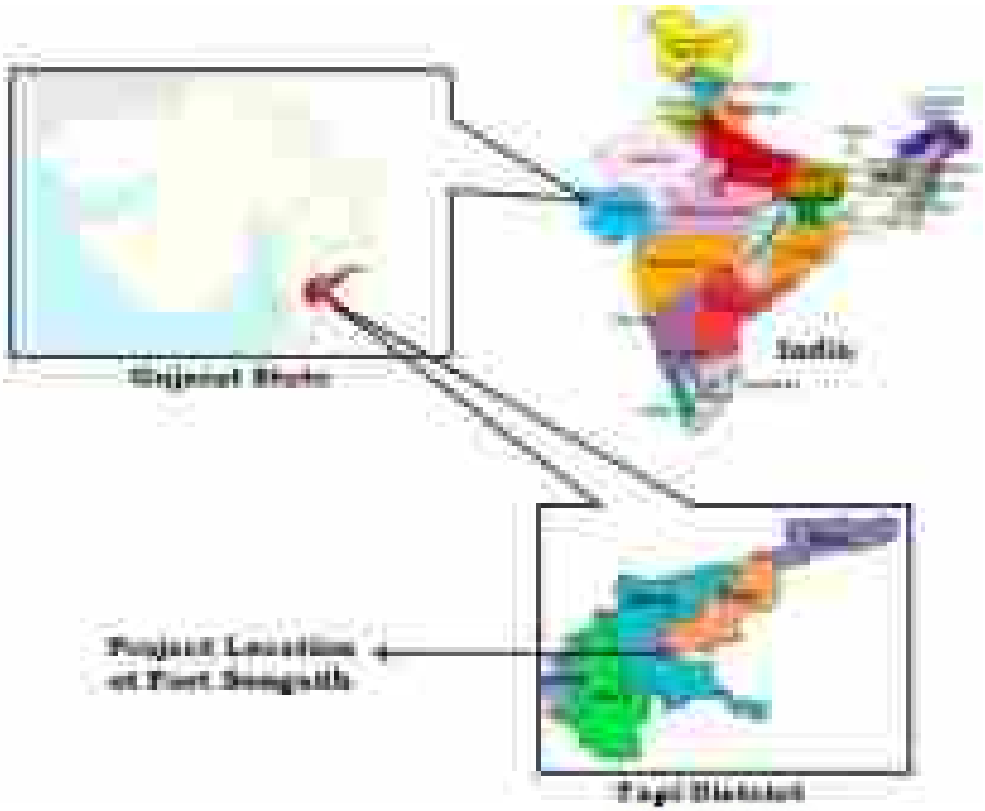


Figure 1-2 Toposheet Showing 10 km radius of the Project Site

Figure 1-3 Google Earth Imagery showing the boundary of the Existing Plant Mill

The environmental setting of the project site is presented in the **Table 1.2.**

Table 1-2 Environmental Setting of the Project Site

S. No.	Particulars	Details
1	Latitude	21°12'N
2	Longitude	73°34'E
3	Present land use at the site	Industrial
4	Nearest highway	State Highway SH-174 adjacent to the project site
5	Nearest railway station	Ukai Songadh Railway Station-6.3 Km, South Surat Railway Station- 75 km, W
6	Nearest airport	Surat Airport – 86 Km, W
7	Nearest town / city	Town- Songadh-4.3 Km, S Nearest City/District Head Quarters– Vyara- 21 km
8	Water body	Ukai Dam- 5 km, N Tapi River- 5 km, N

S. No.	Particulars	Details
9	Archaeologically important places	Nil in 10 Km radius
10	National parks / Wildlife Sanctuaries	Nil in 10 Km radius
11	Reserved / Protected Forests	Nil in 10 Km radius
12	Seismicity	Seismic zone-III as per IS-1893 (Part-1) - 2002
13	Defense Installations	Nil in 10 Km radius
14	Major Industries Located around the area	Ukai Thermal Power Plant- 600 m to West of the Project Site.

1.6 Awards and Achievements

Various initiatives have brought in recognition for the company and awarded with several accolades. The industry has well-defined policies including *Environmental Policy*, *Quality Policy*, *Energy Policy*, *Occupational Health & Safety Policy* which are adopted in operational practices.

Figure 1-4 Photographs of Awards and Achievements

Golden Peacock Environment Management Award 2012

Greentech Environment Gold Award 2013

Greentech Safety Gold Award 2013

1.7 Structure of the Report

This Pre-feasibility report consists of four chapters:

Chapter 1: Introduction about the existing plant and proposed project

Chapter 2: Details of Existing Facilities and its Environmental Compliance

Chapter 3: Details of Proposed Project

Chapter 4: Details of Proposed Environmental Management Plan

2 Details of the Existing Facilities and its Environmental Compliances

2.1 Overview

The existing facility consists of paper machines, board machine, pulp mill, captive power plant, chemical recovery section, lime kiln, effluent treatment plant and other supporting facilities. The capacity of each existing unit is presented in the **Table 2.1.**

Table 2-1 Overview of the Various Units in the Existing Facility

SL No.	Description	Units	Existing Capacity	Remarks
1	**Paper/Board Machine Section**			
1.1	Paper Machine-1&2 (PWP)	tpa	60,000	-
1.2	Duplex Coated Board	tpa	1,00,800	-
1.3	Total Paper/Board Production	TPA	1,60,800	-
1.4	Secondary Fibre Treatment (SFT) Plant	BD tpd	200	-
2	**Pulp Mill**			
2.1	Bleached Chemical Wood Pulp Mill	BD tpa	60,000	3 stage bleaching using C/D-EoP-D (chlorine, chlorine dioxide, caustic, oxygen and hydrogen peroxide)
2.2	Chlorine Dioxide plant	tpd	2	-
2.3	Oxygen Generation Plant	Nm^3/hr	200	-
3	**Recovery Plant**			
3.1	Evaporator	tph of water evaporation	70	-
3.2	Black liquor solids fired recovery boiler	tpd of black liquor solids	335	-
3.3	Rotary Lime Kiln	tpd of lime	90	-
3.4	Recausticising plant	Whilte liquor cum/day	1,000	-
4	**Steam Generation from Coal Fired Boilers**			
4.1	CFB#1	TPH	20	Spreader Stoker Boiler, Standby
4.2	CFB#2	TPH	30	AFBC Boiler, Standby
4.3	CFB#3	TPH	50	AFBC Boiler
4.4	CFB#4	TPH	70	CFBC Boiler
4.5	Total Steam Generation	TPH	170	
5	**Captive Power Generation**			
5.1	TG#1	MW	3.125	Standby
5.2	TG#2	MW	3.125	Standby
5.3	TG#3	MW	12	-
5.4	TG#4	MW	12	-
5.5	Total Captive Power Plant Capacity	MW	30.25	-

SL No.	Description	Units	Existing Capacity	Remarks
6	Others			
6.1	Producer Gas (PG) Plant	Nm^3/h	3000	
6.2	Precipitated Calcium Carbonate (PCC) Plant ($CaCO_3$)	tpm	1200	utilizes CO_2 gas from Lime Kiln Flue gas which is used as filler in paper manufacturing
6.3	Silicate Nano Fibers ($CaSiO_3$)	TPM	1500	To increase filler loading and reduce the specific energy consumption.
7	Water and Wastewater			
7.1	Water Intake and Treatment Plant	m^3/day	35,000	Water allocation from Narmada W.R.W.S and Kalpasar Department is about 5 MGD (22,700 m^3/day).
7.2	Wastewater Treatment Plant	m^3/day	30,000	-

2.2 Process Description

2.2.1 Manufacturing Process of Paper

Raw Material Preparation

Raw material (Wood/bamboo) is cut into small chips of 20-25 mm size by Chipper. Chips are screened in vibrating screen and washed to remove dust. Chip dust generated is used in coal fired boiler as fuel along with coal.

Pulp Mill Section

Wood Chips are fed to digesters with the help of belt conveyor wherein the chips are cooked with caustic soda solution containing sodium Sulphide. The temperature of this solution is gradually increased to remove lignin to produce the pulp. Unbleached pulp is washed in brown stock washers to remove cooking chemicals. Washed pulp is screened in a 3-stage pressure screening system. Screened pulp is then sent to Oxygen Delignification (ODL) Plant where pulp is reacted with oxygen to further remove lignin which is washed in subsequent washing stages. Pulp after Oxygen Delignification is sent to bleach plant wherein it is bleached to the desired level using bleaching chemicals like Chlorine, Caustic Soda, Hydrogen Peroxide and finally with Chlorine Dioxide.

Chemical Recovery Section

Spent liquor containing cooking chemicals is collected from brown stock washers and pumped to recovery process where it is concentrated in evaporators and burnt in

recovery boiler to get smelt which is mostly sodium carbonate. Caustic soda is recovered with the help of lime in the Causticizing section and again reused for cooking wood/bamboo chips in pulp mill digesters. Sludge will be burnt in lime kiln to recover alkali.

Paper Making Section

Bleached pulp is taken to two Nos. of paper machine section where it is refined. Paper making chemicals like alum, rosin, starch, soapstone powder and dyes etc are added to pulp slurry which is passed over wire to remove water. Wet paper sheet is then passed through presses and rotating steam heated dryers to remove moisture from paper sheet. Finally, paper is made in the form of reels or sheets as per customers' requirements. The process scheme of paper plant is presented in the **Figure 2.1.**

2.2.2 Manufacturing Process of Coated Packaging Board

Packaging Board is used for packaging of variety of products including cosmetics, pharmaceuticals, consumer goods, food products etc.

The packaging board consists of three layers of boards made of different types of pulp. The raw material used for the product is Virgin pulp/secondary fiber pulp which is treated in Secondary Fiber Treatment (SFT) plant having three different streets namely A, B & C for treatment of different types of pulp.

The pulp from SFT is used for stock preparation where it is made suitable for manufacturing board. Chemicals like Alum, Rosin, Soap Stone powder, dyes etc. are added to pulp slurry.

After stock preparation, pulp of different quality will be fed to paper machine for manufacturing of coated packaging board.

Figure 2-1 Pulp and Paper Manufacturing Process Scheme

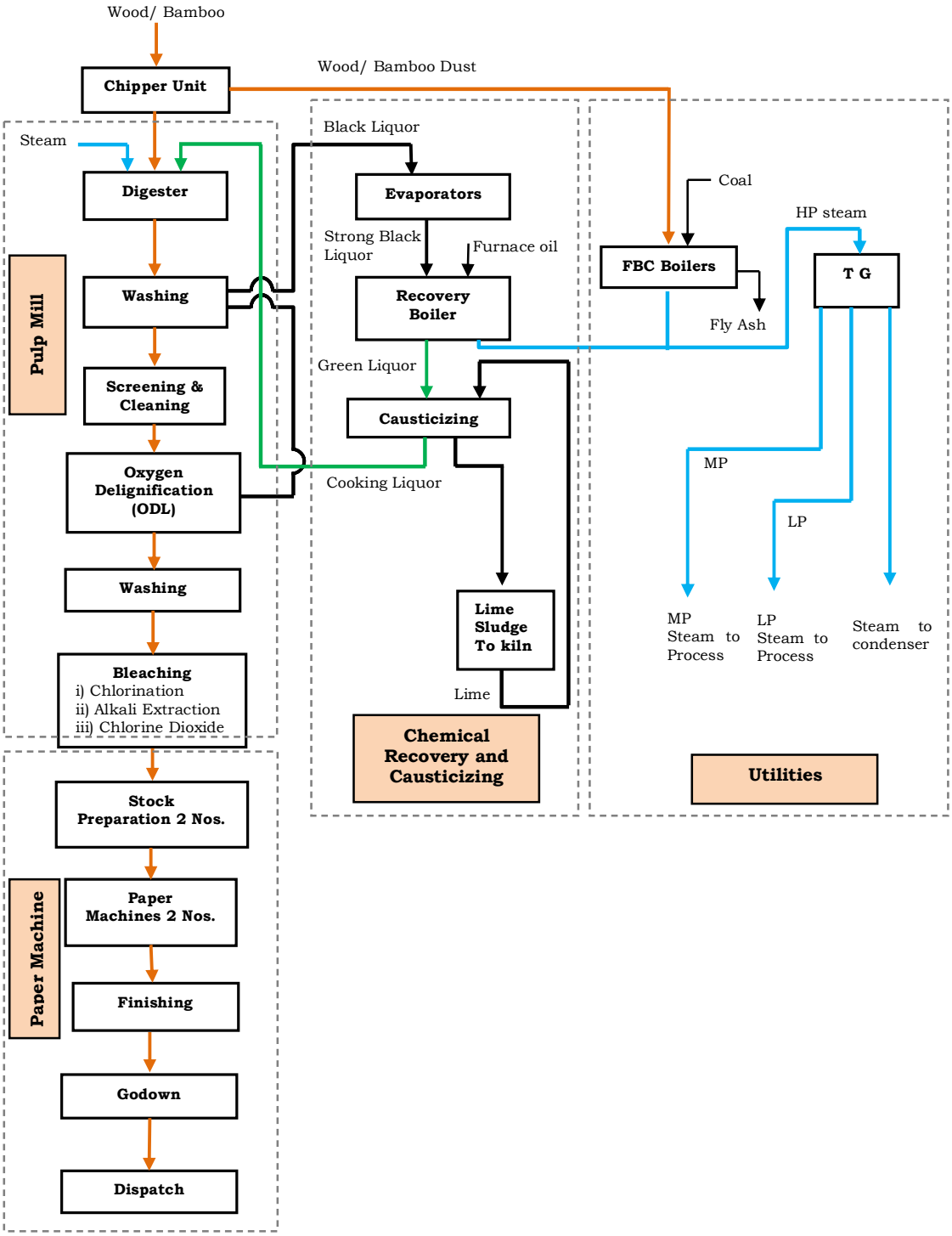
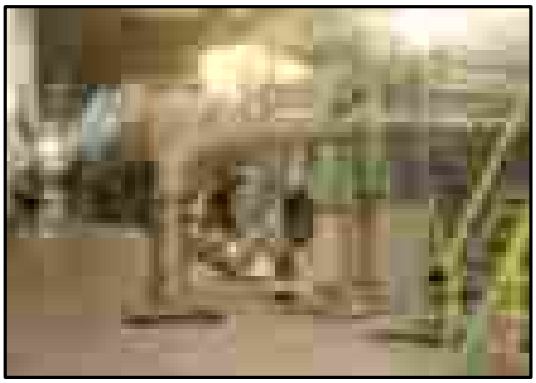
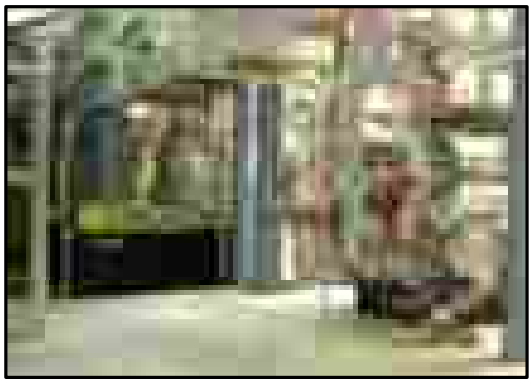


Figure 2-2 Typical view of Paper, Pulp and Board Plant at the Existing Facility

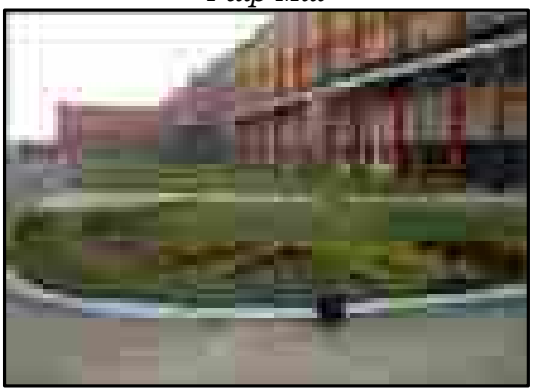


Paper Machine



Pulp Mill

Board Machine



Outside of Board Machine

2.3 Steam Requirement and Generation Facilities

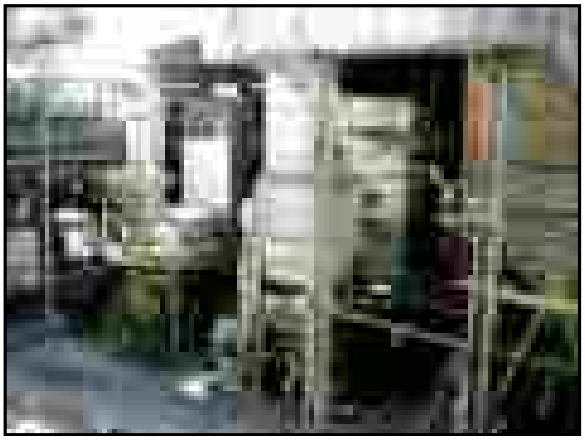
The existing facility consists of one stoker fired boiler, a CFBC boiler, and two AFBC boilers and a recovery boiler that are catering to the steam requirements for the process, main plant and power generation needs. Details of the boilers are presented in **Table 2.1**. Necessary permits and consents have been obtained for all the existing boilers. The total installed steam generation capacity of all the coal boilers is about 170 TPH. Currently power utilisation in the existing facility mill is about 18 MW. About 130 TPH of steam is being generated. One AFBC coal fired boiler and one CFBC coal fired boiler along with one Recovery Boiler are operated to meet the steam demand. One AFBC coal boiler and one Stoker Fired coal boiler are kept on stand-by operation mode. Typical view of the co-generation boilers is presented in **Figure 2.9**.

The coal required for the existing plant is sourced from Western Coal Fields Limited. The fuel supply agreement between Western Coalfield Limited and JKPL is attached as **Annexure-3**. The types of fuel used for power boilers, its characteristics and consumption at the existing facility are presented in the **Table 2.2** and the typical photographs of the existing boilers with ESPs are shown in the **Figure 2.3.** Apart from coal, wood dust and debark waste is fired in the power boilers which reduces the consumption of coal.

Table 2-2 Fuel used in Existing Facility and their characteristics

SI. No.	Fuel Used	Existing Consumption (tpa)	Calorific Value (Kcal/kg)	Moisture Content (%)	Total Ash Content (%)	Sulphur Content (%)
1	Indian Coal	70,000	4000	12	38	0.6
2	Imported Coal	1,00,000	5500	33	7.4	0.8
3	Lignite	70,000	5000	36	15	1.5

Figure 2-3 Typical View of Boilers in the Existing Facility



Coal Fired Boiler 1&2

Coal Fired Boiler 3

Coal Fired Boiler-4

Chemical Recovery Boiler

2.4 Power Requirement and Generation Facilities

The facility is permitted to generate 30.25 MW of power from the captive power plant. The existing plant has totally four steam turbo generators (TG). Out of which, two TGs of capacity 12MW each are operated continuously and other two TGs of capacity 3.125 MW each are kept as standby. The details of TGs are presented in the **Table 2.1**.

The photographs of the Turbo Generators at the existing facility are presented in the **Figure 2.4.**

Figure 2-4 Typical View of TGs at the Existing Facility

TG-3 (12 MW)

TG-4 (12 MW)

2.5 Water Requirement and Treatment Facilities

Water is a vital component for manufacturing of paper. The facility is permitted to draw 5 MGD (22,700 m^3/day) of water from Ukai Left Bank Main Canal. The water withdrawal permission letter from Narmada Water Resources & Water Supply and Kalpasar Department, Government of Gujarat is enclosed as **Annexure 4.**
Raw water intake and pre-treatment scheme is presented in **Figure 2.5.**

Currently the fresh water consumption is about 20,500 m^3/day including domestic and industrial applications. The specific water consumption is in the order of 40 m^3/T of paper production. The water consumption details of the existing facility is presented in the **Table 2.3.**

Figure 2-5 Water Distribution System at Existing Facility (April 2017 to March 2018, Annual Average Values)

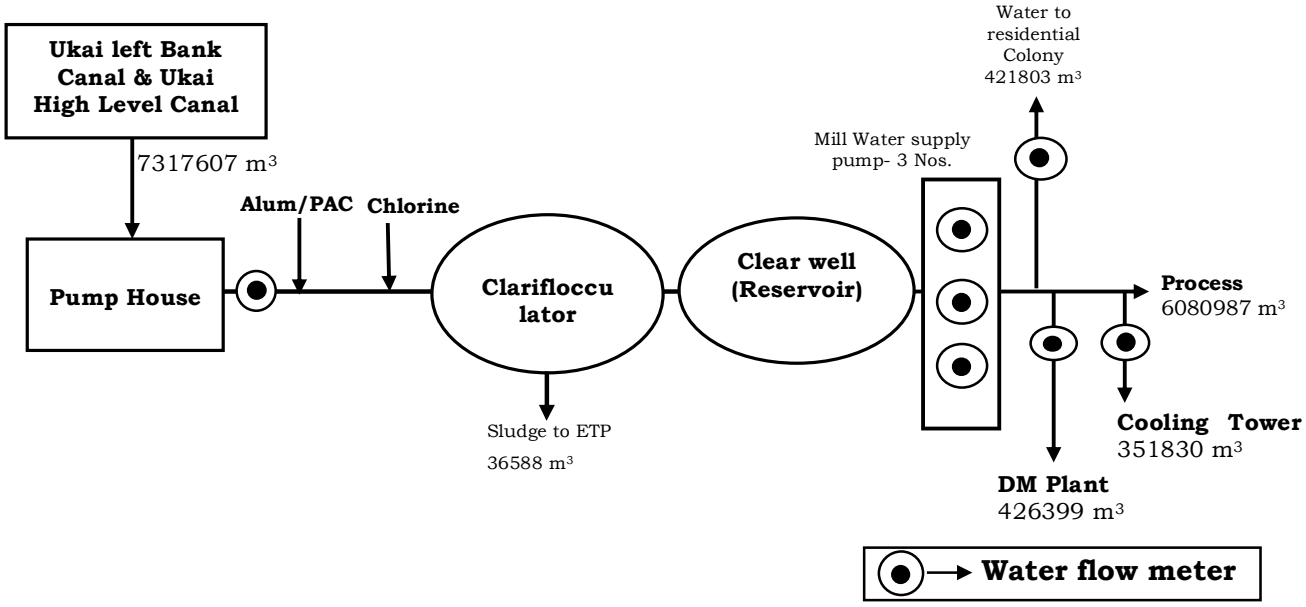
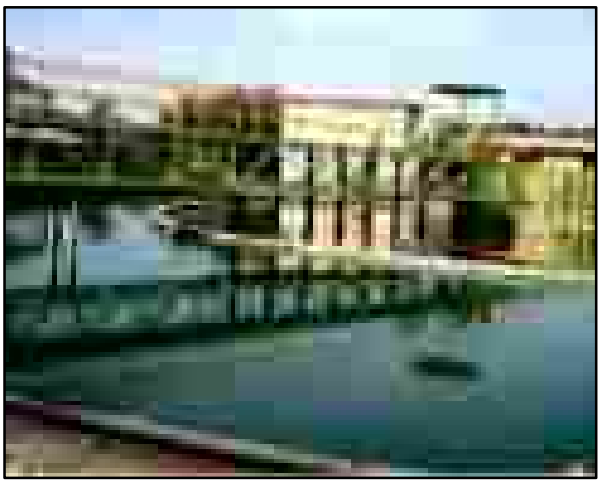
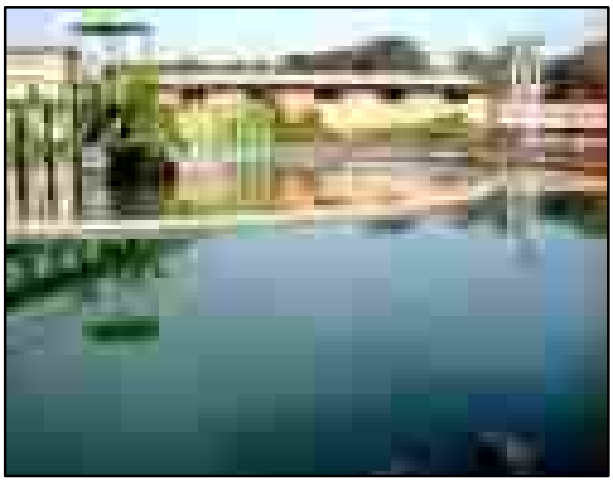


Figure 2-6 Water Treatment Facilities at Existing Plant





Water Clarifier

Table 2-3 Water Consumption in the Existing Facility

Sl. No.	Description	Fresh Water Consumption (m^3/day)
1	Utilities	1800
2	Paper Machine	7100
3	Board Machine	3000
4	Pulp Mill	6300
5	Misc.	500
6	Domestic	1800
	Total for Plant	
	Total	**20,500**
Specific water consumption per tonne of paper production		40

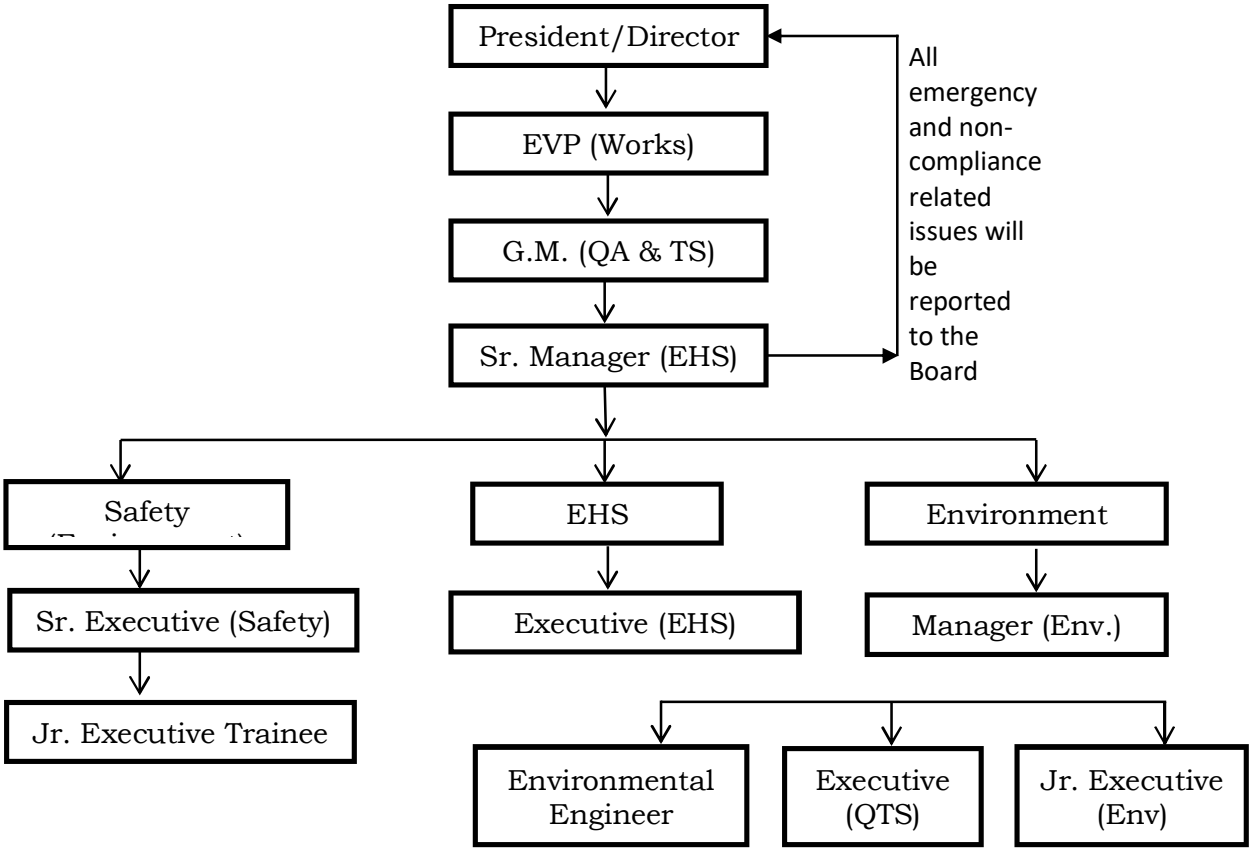
2.6 Summary of Existing Environmental Management Plan

The facility has been inspected by MoEF&CC regional office and latest certified compliance report issued by MoEF&CC, Bhopal office is attached as **Appendix-1**.

The facility has a full-fledged environmental cell headed by qualified senior personnel to ensure Environmental Management Systems that have been designed to implement Environmental Management Plans in the existing facility by adopting ISO-14001 certified system. JKPL is committed to implement environmental management programs on continual basis. The environmental department work towards ensuring 100% compliance with stipulated regulations and guidelines. The facility has been

accorded with ISO 14001:2004 certification for environmental management program. The emissions and treated wastewater quality are continuously being monitored at the site. A full-fledged R&D lab is established within the facility for effective monitoring. The organogram of environmental management cell is presented in the **Figure 2.7.**

Figure 2-7 Environmental Management Cell

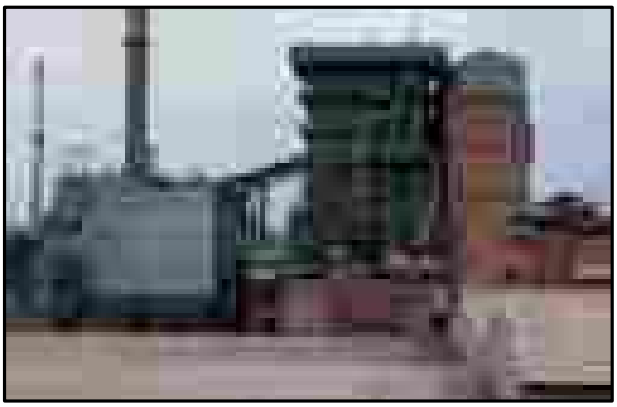


2.6.1 Air Quality Management Aspects

Electrostatic Precipitators (ESP) are installed on all 4 power boilers, recovery boiler and also lime kiln to control the dust emissions to levels below the stipulated norms of GPCB. Two combined stacks are provided for boiler 1&2 and boiler 3&4 respectively and dedicated stacks are provided for chemical recovery boiler and lime kiln. Continuous emission monitoring systems are being installed on all the stacks. The recent test reports of GPCB for stack monitoring are attached as **Annexure 5.**

In order to control the fugitive emissions from the coal and ash handling areas, water sprinkling systems are installed. All coal transfer points are provided with dust extraction and collection systems. CO_2 from the Lime Kiln flue gases is utilized in Precipitated Calcium Carbonate (PCC) plant which is used as filler in paper manufacturing. The typical view of various pollution control systems in the existing facility are shown in **Figure 2.8**.

Figure 2-8 Typical View of Existing Air Pollution Control Systems



ESPs for Boilers

ESP for Boiler

Closed Coal Storage Yard

2.6.2 Wastewater Generation, Treatment and Disposal

As a part of conservation of water, JKPL has undertaken various steps of recycling and reuse of water over the period of last 15 years. This has resulted in drastic reduction in water consumption. The existing specific water consumption and wastewater

generation is in the order of 40 m^3/T and 36 m^3/T of paper production respectively which are lower than charter norms as stipulated by CPCB. The total wastewater generated from the existing facility is about 17,500 m^3/day which is treated in the existing Activated Sludge Biological Treatment plant of capacity 30,000 m^3/day. Wastewater quality parameters are monitored on daily basis at the JKPL, Unit CPM central laboratory. An online wastewater quality monitoring system is installed to monitor the final treated wastewater quality which is connected to GPCB server. In addition, treated wastewater is being analyzed by a third party NABL approved environmental laboratory once in every three months. Latest GPCB test reports (i.e. April, 2018) indicated that the TSS, COD and BOD levels in the treated wastewater was found to be in the order of 16 mg/l, 90 mg/l and 20 mg/l respectively. The test report is attached as **Annexure 5**.

All the recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the pulp and paper sector is being implemented at the existing facility. AoX levels in the treated wastewater is maintained at 3.2 mg/l[1] as against the GPCB limit of 8 mg/l.

The typical view of the ETP is shown in **Figure 2.8** and the flow sheet of ETP is presented in the **Figure 2.9**

Figure 2-9 Typical View of Existing ETP Facilities

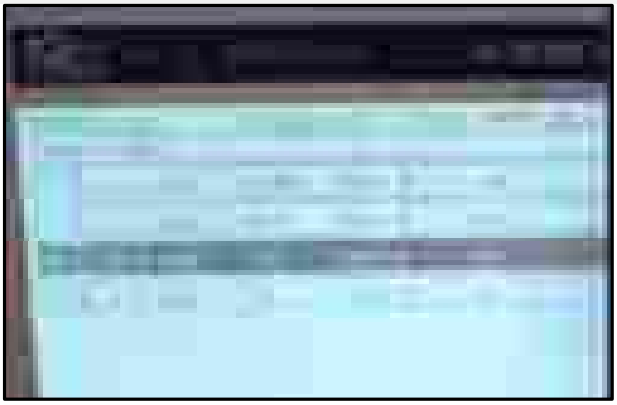
[1] *Test Report of AoX Assessment of treated wastewater from existing facility, conducted by Central Pulp and Paper Research Institute dated 24.02.16.*

Primary Clarifier

Secondary Clarifier

Surface Aeration Tank

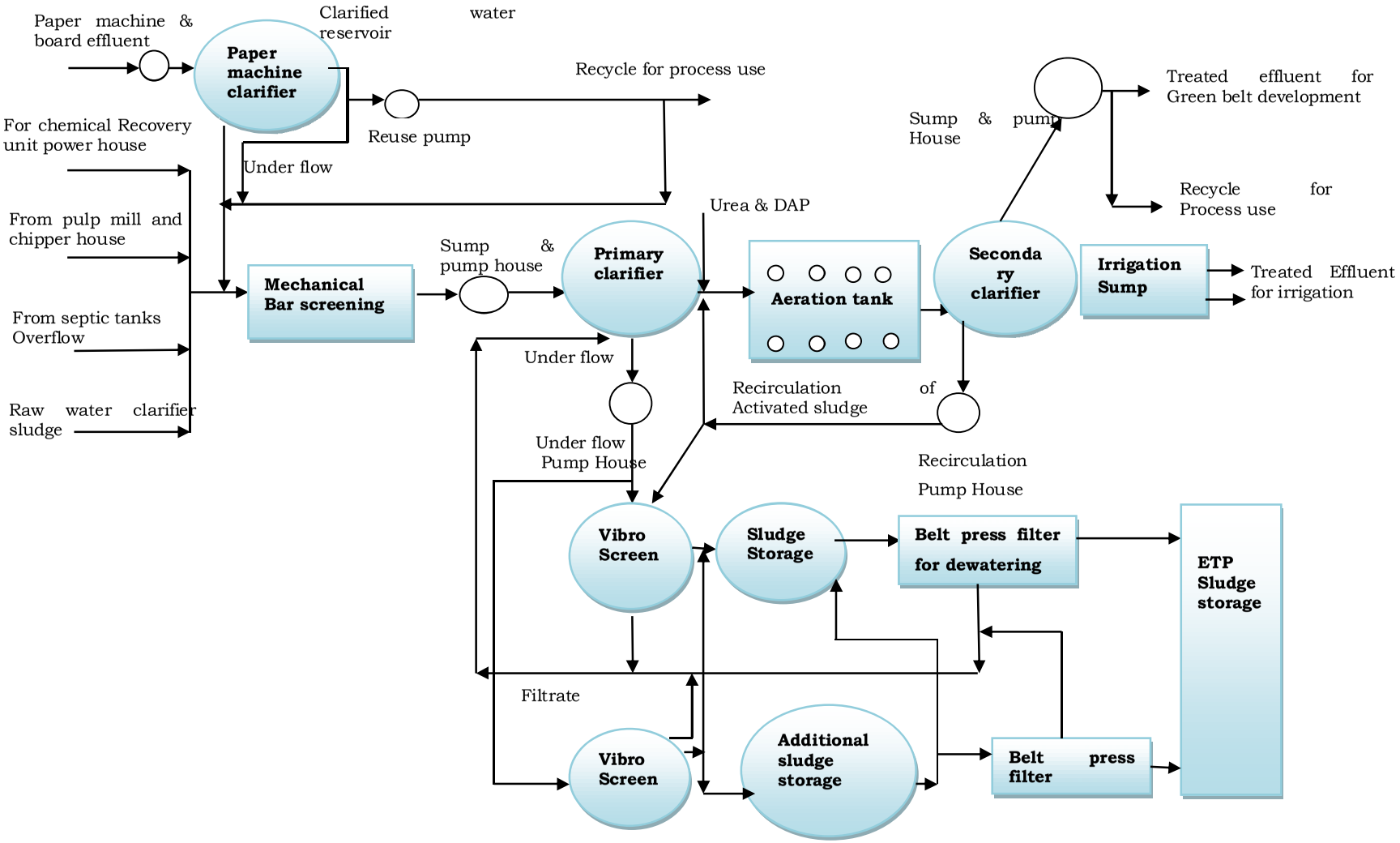
Belt Filter



Online Treated Effluent Monitoring

Aerial View of ETP

Figure 2-10 Flow Diagram of Existing Effluent Treatment Plant

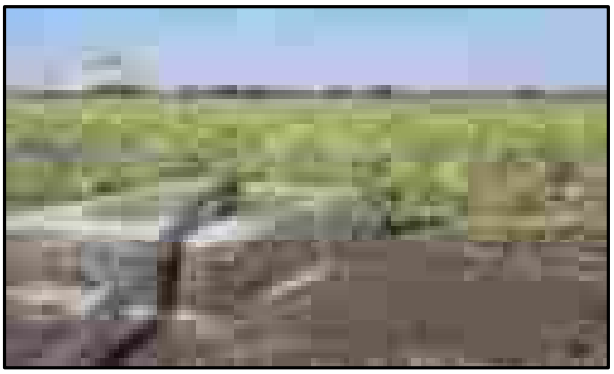


2.6.3 Utilization of Treated Effluent

JKPL is utilizing treated effluent in various areas like horticulture, plantation, chips washing, coal dust scrubbing, bamboo wetting, ash silo and floor washing and in lime kiln and evaporator direct condenser. Apart from utilizing the treated wastewater for the existing greenbelt and plantation in the company owned lands, it also being supplied to irrigation needs of the local farmers. About 1050 acres of land in the nearby areas is getting benefitted due to utilization of treated wastewater in the area.

JKPL had engaged Navsari Agriculture University (NAU) to carry out the assessment study of the quality of treated effluent and its effect on soil and crop pattern by its utilization for agricultural crops. Based on the study, it was concluded that treated wastewater is most suitable for irrigation in the area. Therefore, after a detailed engineering study, JKPL has laid pipelines for the supply for treated wastewater to the farmers. The irrigation scheme was implemented in three phases wherein currently 1050 acres of land is being utilized for irrigation of treated wastewater. About 223 farmers in the nearby areas who are dependent on the rainwater for agriculture are being benefitted due to the scheme. JKPM is making all efforts to extend the pipe line network to utilize 100% of treated wastewater for irrigation needs. About 85% of the treated wastewater is utilized for irrigation needs and unutilized excess treated wastewater is discharged into Goda Nala, which joins Tapi River. River water quality data of the upstream and downstream of the Goda Nala confluence was reported be in line with water quality objectives stipulated by CPCB Photographs of utilization of treated wastewater for land irrigation are presented in the **Figure 2.11.**

Figure 2-11 Utilization of treated wastewater for Irrigation and Plantation

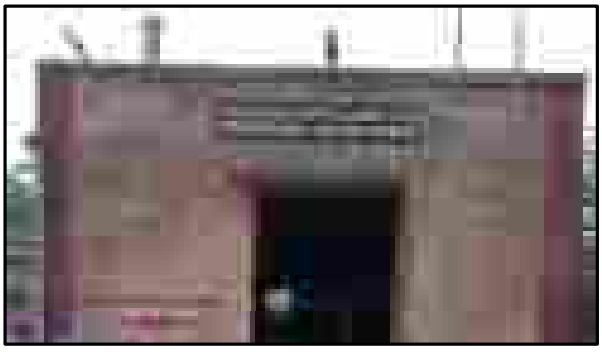



Utilization of treated effluent of JKPL for irrigation

Sugarcane cultivation by using Treated Effluent

Groundnut Cultivation by using Treated Effluent

Pipelines Laid for the supply of treated effluent from JKPL



Pumps House at ETP to utilize the treated effluent for irrigation

2.6.4 Noise Management

The noise levels at the facility are maintained well within the stipulated norms. The ambient noise levels at the facility are being monitored at 21 locations in the plant facility periodically by third party laboratory assessment.

2.6.5 Solid and Hazardous Waste Management

Wood dust generated during the process of wood chipping which has calorific value around 2000 Kcal/Kg is used as a fuel along with coal in coal fired boiler. This reduces the consumption of coal in the boiler. Fly ash from boilers is 100 % utilized for the manufacturing of bricks and cement.

A dedicated bio gas plant is installed for plant canteen that utilizes biodegradable wastes generated from canteen to generate bio gas.

Hazardous waste generated from the existing facility includes ETP sludge and used oil. The Authorization for the *Management & Handling of Hazardous Wastes* vide No AWH-63794 dated 28/07/2014 (consolidated consent authorization) is attached as **Annexure 2**. The details of the quantity of solid and hazardous waste generated within the facility are presented in the **Table 2.5.**

Figure

Table 2-4 Solid and Hazardous Waste Generation and Disposal

Sl No	Particulars	Quantity TPD	Recycling/Reuse
1	Bamboo/Wood Dust	20	Used as fuel in Boiler
2	Fly Ash	120	Used in Cement/Brick manufacturing plants
3	Lime Sludge	60	Lime mud is reused in Lime Kiln installed in plant Lime sludge generated is used for backfilling abandoned stone quarry which is taken on lease located about 5 km from the facility.
4	ETP Sludge	15	Sold to board manufacturers
5	Spent Oil	9 KL/year	Given to authorized recyclers

2.7 Greenbelt and Plantation

Out of the total 363 Acres of the entire facility, about 120 Acres of the land has been developed under greenbelt and plantation. Plantation programme is being carried out surrounding the vacant mill area with pulpable species like Eucalyptus, Subabul, Casurina etc for increasing raw material availability and green cover. Typical view of the plantation in and around the existing plant is shown in **Figure 2.12**.

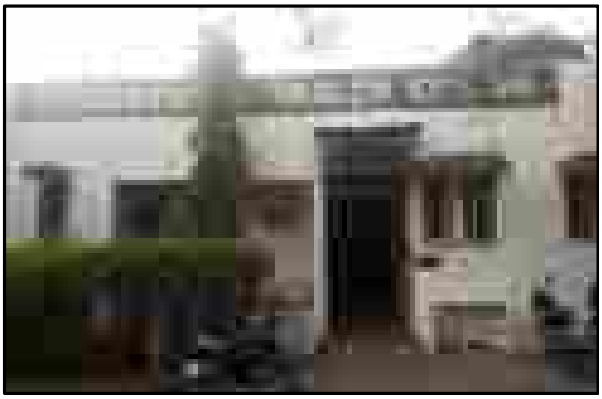
Figure 2-12 Typical View Greenbelt and Plantation within the Facility

2.8 Occupational Health Programs

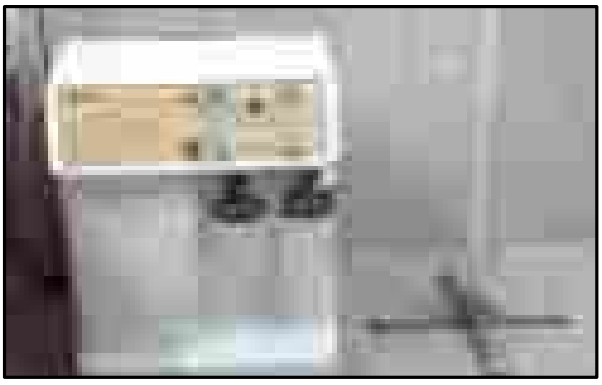
A dedicated Occupational Health Centre (OHC) is located within the existing facility which consists of 5 bed hospital, X-ray machine, ECG, lung function test facilities, pulse oximeter, audiometric test facilities and general lab facilities including an ambulance. Two dedicated doctors assisted by two nurses and other supporting staff. All employees and workers undergo annual health checkup such as blood tests, lung function test (PEFR), vision test and audiometric tests other physical fitness tests.

The photographs of the existing OHC are presented in the **Figure 2.13.**

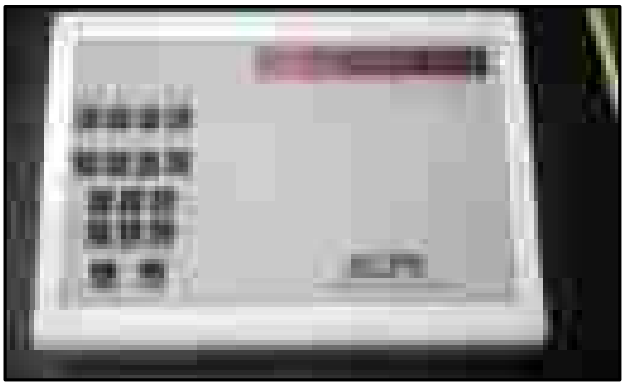
Figure 2-13 Photographs of the Existing OHC



OHC located inside JKPL



Oxygenator



Audiometer

2.9 Industrial Safety Management

In order to ensure safety of all the employees, infrastructure and environment, the company has set up a fully equipped safety department consisting of highly qualified and trained professionals. The company has positioned fire hydrants at strategic locations throughout manufacturing unit. Firefighting systems are designed and implemented as per National Building Code and applicable state regulations. The following firefighting facilities are installed at the facility:

(i). Electrical fire pump: 137m^3/hr & 250 m^3/hr, diesel pump: 137 m^3/hr & 250 m^3/hr and Jockey pump: 1080 m^3/hr,

(ii). Fire water ring main system has been provided across the plant, storage area etc.,

(iii). About 119 number of fire hydrants are installed as per building codes,

(iv). 15 water sprinklers were installed at coal storage area,

(v). 220 fire extinguishers are installed across the facility,

(vi). 20 numbers of first aid facilities are placed at all critical locations,

(vii). Necessary vacuum system and scrubbers are provided at Chlorine tonner area,

(viii). Chlorine gas detectors are placed near the chlorine plant, and three self-breathing operators (oxygen masks) are made available,

(x). Fire engine vehicle is in place.

The photographs of the installed firefighting systems in the unit are presented in the **Figure 2.14**.

Figure 2-14 Fire Safety Systems in the Existing Unit

2.10 Summary of Various CSR Programs

The existing facility is providing a direct employment to around 1100 people (Including workmen & staff) and indirect employment to around 1200 people in the area. Being one of the largest industries in the area, the facility is contributing to the significant economic growth in the area.

As a part of the corporate social responsibility of the organization, JKPL, Unit CPM has been implementing various community development programs and about **Rs. 39.68 Lakhs** was spent on various community development activities during the year 2017 - 18. Some of the CSR programs implemented in the area are highlighted in the following:

- **Adult Literacy –**

  Adult literacy Program was started in the year 2004 and under robust efforts, JKPL, Unit CPM has opened 207 Nos. of centres successfully. The unit is directly working for this initiative i.e. for identifying illiterates, finding teacher, place for conducting ALP Classes for 6 months, providing books & stationery and arranging for learning assessment followed by "Dikshant Samaroh".

- **Adoption and upgradation of ITI Ukai under Public Private Partnership (PPP) mode**

  To improve infrastructure for skill development and training faculties the unit is working with ITI Ukai in PPP mode to further ensure better employability for tribal youth at the Institute.

- **Promotion of Health Care Services**

  Periodic Health check-up / diagnosis/Treatment camps in nearby selected villages are organized by the unit. This program works on the principal of 'Preventive Health Care' and enhances the health status and perpetuates consciousness amongst all sections of the society. Total 14 villages were selected in Songadh and Ucchhal Taluka as a project area for integrated health care activities.

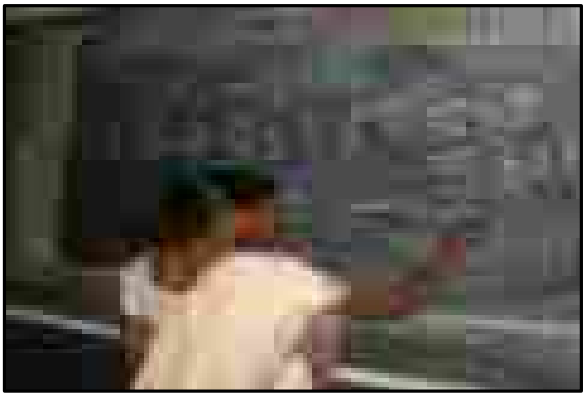
- **Blood Donation Camps**

  Blood Donation Camp was organised by JKPL on 20.06.2017 at Occupational Health Centre, JK Paper Ltd, Unit: CPM. About 133 People got themselves

registered for blood donation and 107 people donated their blood in this camp during the event.

- **Erection of Multi-Purpose Shed at Govt. Primary School, Parchuli Village, Ucchhal**

Figure 2-15 Corporate Social Responsibility Initiatives and Activities

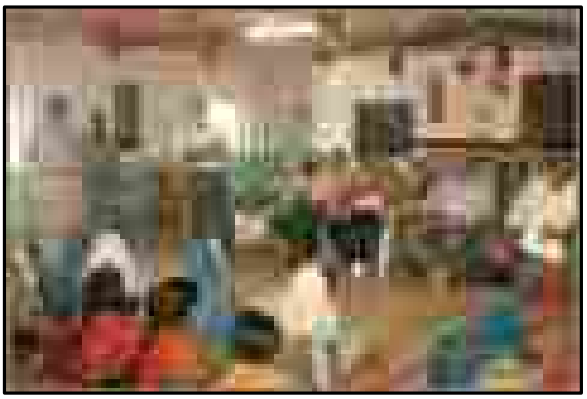


Adult Literacy Programs

Mobile Medical Camp

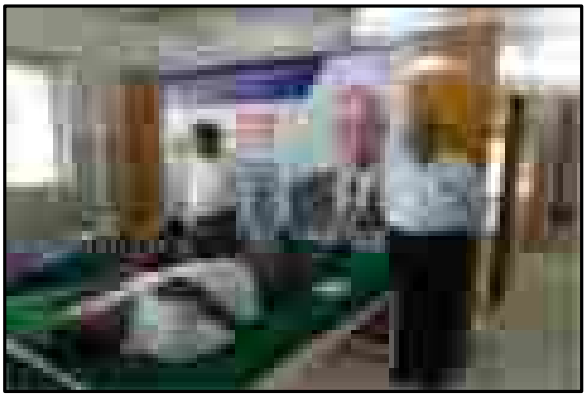
Subsidized Computer Training

ITI, Ukai adopted under Public Private Partnership



Livelihood Generation through Self Help Groups

Multi-Purpose Shed at Govt. Primary School, Parchuli Village, Ucchhal



Blood Donation Camp held on 20.06.17

3 Details of the Proposed Activities

3.1 Overview of the Proposal

3.1.1 Highlights of the Proposal

The mill currently has facilities to produce paper/board with capacity of 1,60,800 tpa and pulp mill of 60,000 BD tpa capacity with utilities.

The proposed Mill Modernisation and Expansion Plan (MEP) is conceptualized to increase the mill's paper/board capacity to 360,800 tpa (increase by 200,000 tpa) with Bleached Hard Wood Pulp (HWP) and Bleached Chemi Thermo Mechanical Pulp (BCTMP).

The MEP proposals are:

- Addition of one (1) multi-layer coated board machine with capacity of 200,000 tpa
- Replacing the existing 60,000 BD tpa Bleached Hard Wood Pulp (HWP) mill with Rapid Displacement Heating (RDH) Elemental Chlorine Free (ECF) Hard Wood Pulp (HWP) mill of capacity 1,60,000 BD tpa (to be shifted from JKPL Rayagada unit and re-installed with upgradation). The existing HWP mill will be kept as standby without increasing the intended overall production capacity.
- Installation of a new Bleached BCTMP mill of 100,000 AD tpa capacity with White Liquor Oxidation.
- Installation of a new ClO_2 plant of 15 tpd while the existing non-integrated ClO_2 will be retired
- Installation of new Oxygen generation plant of capacity 500 Nm^3/hr
- Relocation and reinstallation of Evaporation plant from JKPL, Rayagada unit at JKPL, unit CPM and its upgradation.
- Installation of a new 950 tpd of Black Liquor (BL) solids Chemical Recovery Boiler while the existing Chemical Recovery Boiler will be kept as standby.
- Relocation and reinstallation of causticising plant from JKPL, Rayagada unit at JKPL, unit CPM and its upgradation to produce 3000 m^3/day of white liquor.
- Non-Condensable Gases (NCG) collection system to collect Non-Condensable Gases and fire in Lime kiln

- Installation of new Producer Gas (PG) plant of capacity 7000 Nm^3/h to fire gas in lime kiln
- Ground Calcium Carbonate (GCC) plant of capacity 100 tpd to produce filler for Board making
- Installation of new De-Inking Plant (DIP) of capacity 150 tpd and new Secondary Fibre Treatment (SFT) plant of capacity 400 tpd
- Increasing captive power plant capacity from 30.25 MW to 78.00 MW by adding a new 30 MW TG, 18 MW TG and 150 tph CFB boiler. The existing two TGs of capacity 3.125 MW each and existing two boilers of capacities 20 tph and 30 tph will be retired.
- Upgradation of Water intake and Treatment Plant (WTP)
- Upgradation/Augmentation of Existing Effluent Treatment Plant (ETP)
- Up-gradation/Augmentation of the existing utilities and services to support the post MEP operations

The MEP has been drawn up in a comprehensive manner to meet the requirement of the Ministry of Environment and Forests climate change (MoEF&CC) Charter on Corporate Responsibility for Environmental Protection (CREP) as applicable to pulp and paper industries.

The modernization and capacity building will also help to consolidate and further improve on the operational and financial performance. Thus, meeting the increasing demands of paper board, and developing into a more environmentally friendly technology. Modernization and Expansion of existing plant includes adopting Best Available Technologies (BAT) which will help to enhance to environmental performance coupled with sustainable economic growth of the plant.

As per the Environmental Protection Act (EPA) 1986 and EIA notification 2006 published by MoEF&CC, the proposed MEP shall undergo Environment Impact Assessment (EIA) studies.

3.1.2 Salient Features of the Project

Some of the salient features of the proposed MEP are as below;

- Replacing existing chlorine-based pulp mill with ECF pulp mill
- Replacing existing conventional old digesters with state-of-the-art RDH cooking

- Replacing old recovery boiler with new high pressure and efficient recovery boiler
- Installation of new BCTMP plant to substitute costly imported pulp
- Making the mill more self-reliant on pulp for board/paper making
- Generating more bio-fuel (black liquor solids) based energy
- State-of-the-art Multilayer Coated Board Machine with energy efficiency
- High pressure, high efficiency FBC boiler for better power generation through co-generation
- Higher efficiency turbo generators with low specific steam/t kWh
- ESP for power boiler, Recovery boiler and Lime kiln to maintain Particulate Matter (PM) within prescribed norms
- Non-Condensable Gases (NCG) collection system to collect Non-Condensable Gases and fire in Lime kiln
- Producer Gas (PG) plant to fire gas in lime kiln to reduce consumption of costly furnace oil.
- Adopting water conservation and efficient water management
- Wastewater treatment, recycle and management to reduce specific fresh water consumption

3.2 Details of MEP Proposals

3.2.1 Board Machine Section

Proposals - Board machine will be the state-of-the-art machine to produce quality boards like Grey Back (GCB), White Back (WCB), Folding Box Board (FBB), Solid Bleached Board (SBB) etc., consisting of following facilities:

- Fiber preparation
- Stock preparation and approach flow system
- Board machine
- Converting and finishing house

Secondary fiber preparation (SFT):

Secondary fibers are charged in Hydra pulper with addition of water and same is processed till waste paper is converted into slurry form onto high consistency pulp.

Figure 3-1 Stock Preparation Process Scheme

The slushed pulp is cleaned in high density cleaner followed by turbo separator for heavy weight and light weight impurities respectively. Then it is continuously forwarded to centricleaner after passing through screen. At centricleaner, the sand is separated due to centrifugal force. The pulp is then taken to Decker thickener where the water is drained and pulp is thickened and stored in chest.

Deinking Plant (DIP)

A double loop DIP of capacity 150 tpd is also proposed for usage as top and back layers.

The major raw material required for the DIP is Recycled Fibre (Waste Paper). Sodium Hydroxide, Sodium Silicate and Sodium Hydrosulfite are the major bleaching agents that will be used in the DIP process.

Different grades of pulps are stored in separate HD tower for onward pumping to approach flow system. However, the furnish mix and the raw material will be adjusted with reference to the quality of end product.

Stock Preparation cum Approach Flow System

The stock preparation cum approach flow system for each layer is to prepare the stock suitable for making the multilayer sheet. From the storage chest, the thickened pulp is passed through refiner by which the pulp is fiberized as per process requirement and stored in chest. The pulp is diluted with recycled machine back water.

Board Machine

The cleaned dilute pulp is fed to the board machine through the head box.

Water drained from the wire part is collected in a silo pit and is continuously recycled back to dilute the pulp fed into the board machine.

A typical schematic diagram of coated board making is shown in **Figure 3.2**.

Further dewatering is carried out in press to increase the dryness to about 48%. The board is finally dried through indirect steam dryers. The dried board is coated with chemicals, dried and is wound in rolls as the final product.

The Multi-layer board machine is a first-floor machine and will produce around 600 tpd of finished board.

Figure 3-2 Schematic Diagram of Coated Board Making

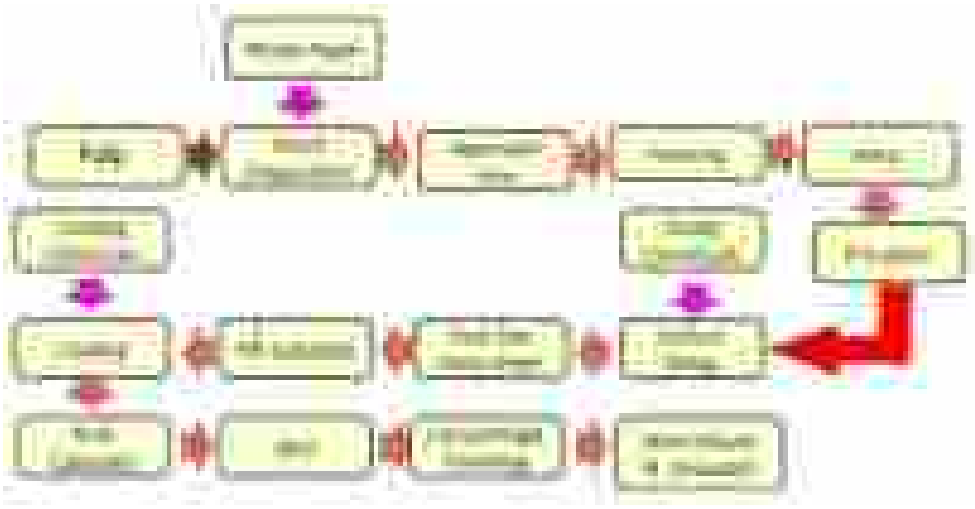


Figure 3-3 Typical board machine configuration

3.2.2 Chemical Wood Pulp Mill

Proposal - Existing chemical wood pulp mill is of older generation and in order to be in line with current regulations, it is proposed to replace the pulp mill by relocating and re-installing of ECF pulp mill of capacity 1,60,000 BD tpa from JKPL, Rayagada unit. It will be re-installed with necessary upgradation. The existing pulp mill of capacity 60,000 BD tpa will be kept as standby without

increasing the intended overall production capacity. Hence the total capacity of Bleached Chemical Wood Pulp Mill during Post MEP will be 1,60,000 BD tpa.

The new Chemical wood pulp mill consists of;

- Wood chipping and chip screening
- Cooking and screening
- Brown stock washing
- Oxygen generation and delignification
- Bleaching
- New 15 tpd Integrated ClO_2 plant
- Chemicals preparation plants

The process steps and schematic diagram of the pulp mill is presented in the **Figure 3.4**.

Figure 3-4 Schematic Diagram of the Pulp Mill

Wood is debarked and chipped in chippers. The wood chips are then taken into digester(s), where it is cooked. The pulp from rapid displacement heating (RHD) type digester is screened and then washed in washers. The RDH process has extended delignification with significant reduction in energy consumption and lower chemical costs. The process also reduces the steam consumption significantly. Due to the increase in lignin removal efficiency in RDH process than a conventional system, the chemical consumption in the bleaching section will also reduce which in turn reduces the pollution load on ETP.

After washing the pulp is taken for oxygen delignification which is performed with oxygen (O_2) and caustic (NaOH) serving as the active chemicals

Pulp, after oxygen delignification, is led to a post oxygen washer and then bleached to a brightness level of minimum 88% ISO, by employing "A/D-EOP-DP (chlorine dioxide, caustic, oxygen and hydrogen peroxide)" sequence comprising of Acid treatment for pH adjustment, Chlorine dioxide, Caustic, Oxygen and peroxide bleaching. The pulp bleaching is elemental chlorine free process and thereby encounters reduced specific water consumption and also lower pollution load on the system.

The pulp mill will be having following auxiliary plants;

***Oxygen generation plant**:*

The oxygen generation plant is based on Vacuum Swing Adsorption (VPSA) which operates on two molecular sieves vessels in a cycle. One of the vessel remains for oxygen production while second vessel remains under vacuum regeneration. The temperature of the feed air will be around 30°C. The produced oxygen is collected in a surge storage vessel before feeding to a compressor for pressurizing up to 25 bar and further stored in storage tanks. The gas pressure will be reduced to around 14 bar in pressure reducing station before using in the process.

***White liquor oxidation plant**:*

White liquor from the chemical recovery section is fed into a reaction vessel where oxygen is supplied through a sparger pipe for oxidation. Steam will be used for heating purpose through indirect heating coil system. Sodium sulphide in the white liquor after oxidation is converted to inactive sodium thiosulphate and sodium hydroxide. Thus, oxidized white liquor is used in digestor.

***Chlorine dioxide plant**:*

Chlorine dioxide is produced based on integrated technology with HCL synthesis using either Cl_2 for make up as raw material or a new integrated technology using sodium chlorate as raw material. After the washing stage, the pulp is bleached by chlorine dioxide.

Caustic soda, Hydrogen peroxide, Sulphuric acid, etc. preparation systems

3.2.2 Bleached Chemi Thermo Mechanical Pulp (BCTMP)

BCTMP has higher bulk, higher pulp yield, higher opacity but has lower strength. The brightness of BCTMP pulp required is 70% for board manufacture and the bulk

should be ± 3.0 cm^3/g. The BCTMP pulp should be 400 ± 50 ml CSF. The yield is expected to be 87% on BD chips. The process steps involved in BCTMP pulping are: Chip washing system, Impregnation system, HC refining, washing, LC refining, screening, reject refining and Thickening & storage.

Proposals

New BCTMP plant with auxiliaries as below.

- BCTMP plant of 1,00,000 tpa capacity
- BCTMP waste liquor evaporation plant (Existing will be used if feasible or a new evaporator plant will be installed)
- White liquor oxidation plant
- Augmentation of wood handling and chipping plant
- New chip washing plant

BCTMP has higher bulk which is suitable for board manufacture.

Along with the new BCTMP plant, a new white liquor oxidation plant will be installed. The waste liquor from BCTMP needs to be evaporated before sending to the Chemical Recovery plant. Existing evaporation plant will be used with necessary modifications.

The new chipper house and utility area will be suitably designed to cater to the requirement of BCTMP plant.

The process steps involved in BCTMP pulping are as follows:

Chipper - Raw material wood is chipped to desired dimensions

Chip Washing - Chips are washed to remove sand particles and foreign materials

Impregnation - Cleaned chips are steam heated to remove the air from the chips and chemicals are added. These chemicals are absorbed by chips.

Refining- The impregnated chips passed through refiners to convert into chips to the pulp.

Bleaching - The refined pulp is treated with bleach chemicals to raise its brightness

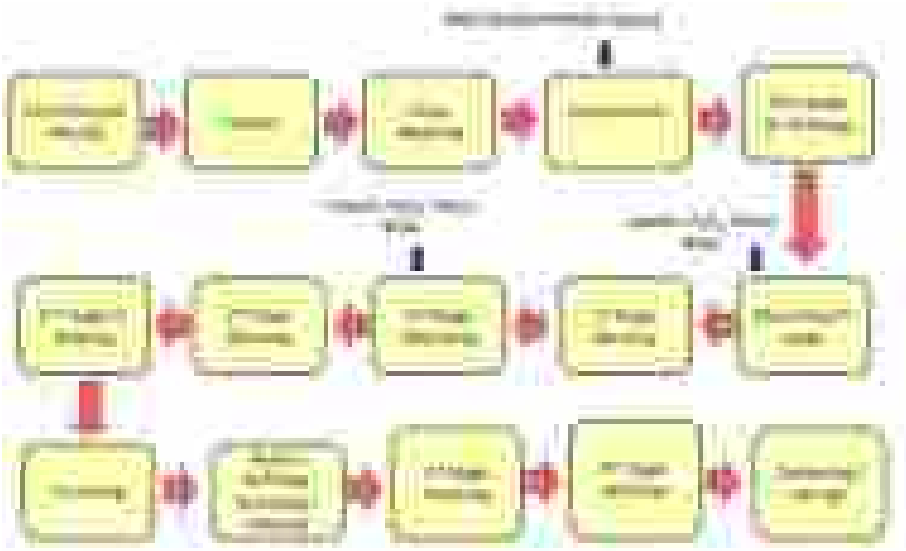
Washing - Bleached pulp is washed to remove the residual/spent liquor/chemical

Refining – The pulp is refined in low consistency refiners to improve the quality of pulp

Screening - The bleached pulp is cleaned so as to be suitable for the end product

Thickening and Storage - The washed pulp is thickened and stored in the towers

Figure 3-5 Schematic Flow Diagram of BCTMP Pulp Mill



3.2.3 Chemical Recovery Island

Proposals

- Replacing existing Recovery Boiler with a New Recovery to fire black liquor solids at 75% concentration, to generate steam at 62 kg/cm^2(g). The boiler will be able to process 950 TPD of black liquor solids. The steam thus generated will be used for power generation.
- Relocating and reinstallation of existing evaporation plant from JKPL Rayagada unit to JKPL Unit CPM of capacity 120 tph water evaporation with capacity upgradation to 300 tpd and increasing output concentration from 65% to 75%.
- Relocating, reinstallation and modernization of existing Recausticizing plant from JKPL Rayagada unit to JKPL Unit CPM.
- In addition to the existing lime kiln of capacity 90 tpd, a Lime Kiln of capacity 230 tpd of lime will be relocated and reinstalled from JKPM Rayagada unit with necessary upgradation.
- Existing evaporator plant of capacity 70 tpd will be utilized for handling waste liquor from BCTMP
- Installation of a new Producer Gas Plant (PGP) of capacity in 7000 Nm^3/hr to substitute high cost furnace oil in lime kiln.

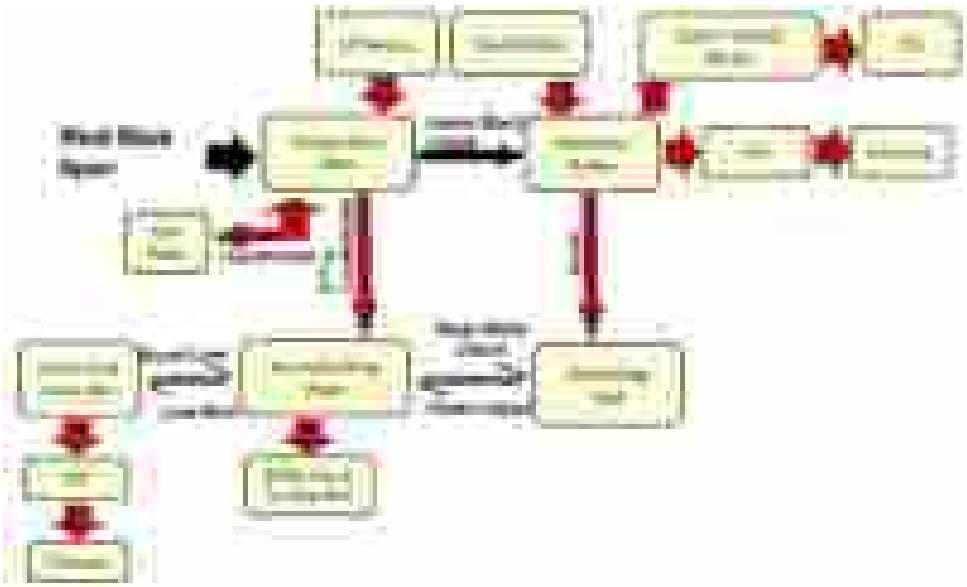
- Necessary provisions will be provided to collect and fire the Non-Condensable Gases (NCG) generated from digester, evaporator areas
- Chemical recovery plant is to recover the cooking chemicals and to generate the energy need in the process from the biomass (black liquor) in a very efficient way.

Chemical recovery cycle consists of four major process steps which are closely related together.

Evaporator - Evaporation of water in Black liquor to concentrate to 75% for efficiently firing in Recovery boiler

Recovery boiler - New 950 tpd BL solids firing Recovery Boiler with ESP Multilevel combustion air system to minimize Total Reduced Sulphur (TRS) and NO_X emissions with ESP designed for a particulate emission of 50 mg/Nm^3. The existing recovery boiler will be kept as standby.

Figure 3-6 Typical Flow Scheme of Chemical Recovery Island



Recausticiser plant - New causticising plant with CD filter for WL clarification and LM filtration. Some existing equipment in CPM unit will also be used as required.

Lime kiln - Energy efficient and environment friendly limekiln to burn Lime mud from Causticizing and recover and recycle Lime back for Caustizing.

NCG System - Non-Condensable Gases (NCG) generated from cooking and washing plants, evaporators, stripper, tank vents etc will be separately collected by an NCG collecting system and fired in lime kiln or recovery boiler

3.2.4 Captive Power Plant (CPP)

The existing CPP consist of four boilers with a total capacity of 170 tph and two Turbo Generators of total capacity 30.25 MW.

Proposals

The new captive power plant consists of

- Installation of a new 150 tph FBC boiler (110 bar, 540°C) and 90 tph boiler (standby) along with a 30 MW Turbo Generator Set.
- Existing two Power Boilers (CFB#1-20 tph and CFB#2-30 tph) will be retired. Existing two TGs (TG#1-3.125 MW and TG#2- 3.125 MW) will be retired.
- Installation of new Turbo Generator of capacity18 MW which will be connected to Recovery Boiler.
- Auxiliaries - Coal handling plant to new boiler, ash handling plant, augmentation of boiler water treatment plant, etc.

Steam from recovery boiler and power boilers will be synchronized and used for power generation and main plant applications. LP and MP steam will be used in main plant for processing. About 70 to 75% of entire condensate will be recovered and reused as boiler feed. A dedicated closed-circuit Cooling Tower will be installed with a minimum 5 to 6 Cycle of Concentration (COC) for water conservation purpose.

3.2.5 Water Intake and Treatment

The fresh water requirement after MEP will be around 37,000 m^3/day. The existing facilities can handle 30,000 m^3/day of water and hence will be upgraded to mill's requirement after MEP.

Proposals

Water intake and water treatment plant will be upgraded to meet requirement, after MEP, with following additional facilities.

- Intake water pump

- Water clarifier
- Water reservoir

3.2.6 Wastewater Treatment

The wastewater generation at the existing facility is about 17,500 m^3/day. The capacity of the ETP at existing facility is about 30,000 m^3/day. In order to treat the total wastewater generation of about 30,000 m^3/day during Post MEP, the existing ETP will be upgraded with addition of required new pollution abatement equipment and processes to meet the discharge norms as prescribed by CPCB/GPCB.

Currently, the treated wastewater generated from the existing mill is utilized for land irrigation to a maximum possible extent. All efforts will be made to utilize the additional wastewater generated from the expansion project for irrigation in the nearby areas during the post project scenario. The existing treated effluent supply pipe network will be augmented to meet the additional hydraulic volumes. Considering the challenges in utilizing 100% of the treated wastewater quantity for irrigation due to variations in the cropping pattern, JKPM requests MoEF&CC to grant permission to discharge treated wastewater into Goda Nala during off crop seasons and monsoon.

3.2.7 Infrastructure

The site is already well developed with necessary infrastructure and any additions like storages, roads, drains, firefighting, weigh bridges, material handling etc. will be added.

3.2.8 Plant capacities

The existing and post MEP mill capacities are presented in the **Table 3.1**;

Table 3-1 Existing and Post MEP Mill Capacities

S.No	Description	Unit	Existing	Post MEP	Incremental	Proposal
1	**Paper/Board Machines section**					
1.1	PM#1&2 (PWP)	tpa	60,000	60,000	-	Existing will continue
1.2	PM#3 (Board)	tpa	100,800	100,800	-	Existing will continue
1.3	PM#4 (New Board)	tpa	-	200,000	200,000	New Unit
1.4	Total Paper/board Production	tpa	160,800	360,800	200,000	-
		tpd	480	1,080	600	-
1.5	Deinking Plant	BD tpd	-	150	150	New or Existing SFT will be

S.No	Description	Unit	Existing	Post MEP	Incremental	Proposal
						converted to DIP
1.6	Secondary Fibre Treatment (SFT) Plant	BD tpd	200	600	400	Existing will be used with New 400 tpd SFT plant
2	**Pulp Mill**					
2.1	Bleached Chemical Wood Pulp mill	BD tpa	60,000	160,000	100,000	Relocating and Reinstallation from JKPL unit, Rayagada, Orissa, with Upgradation. The existing pulp mill of capacity 60,000 BD tpa will be kept as standby without increasing the intended overall production capacity.
		BD tpd	175	460	285	
2.2	BCTMP mill	AD tpa		100,000	100,000	New Unit
		AD tpd		300	300	
2.3	ClO_2 plant	tpd	2	15	15	Existing Nonintegrated ClO_2 plant will be retired and New integrated ClO2 plant will be installed.
2.4	Oxygen Generation Plant	Nm^3/hr	200	500	500	Installation of new O_2 generation plant of capacity 500 Nm^3/hr. The existing O_2 generation plant will be kept as standby.
2.5	Pulp Wet lapping machine	tpd		150	150	New wet lap machine
3	**Recovery plant**					
3.1	Evaporator	tph of water evaporation	70	300	230	Existing Evaporator will be used for BCTMP waste liquor evaporation along with Reinstalled evaporator with upgradation
3.2	Recovery boiler	tpd of black liquor solids	335	950	950	Existing recovery boiler will be kept as standby and a new Recovery boiler will be installed
3.3	Lime kiln	tpd of lime	90	230	140	Existing will be used along with re-installed lime kiln from JKPM or JKPM lime kiln will be re-installed with upgradation.
3.4	Recausticising plant	Whilte liquor cum/day	1,000	3,000	2000	Existing plant will be upgraded with additional equipment.
4	**Power Plant**					
4.1	Power Boilers	tph of steam	170	360	190	CFB#1-20 (To be Retired) CFB#2 - 30 (To be Retired) CFB#3-50 (Operating), CFB#4 - 70 (Operating) New CFB#5 - 150 tph (Operating) New CFB#6 - 90 tph (Standby)
4.2	Turbo Generators	MW	30.25	72.00	41.75	TG#1 - 3.125 (To be Retired), TG#2 - 3.125 (To be Retired) TG#3 - 12 (Operating), TG#4 - 12 (Operating) New TG#5 - 30 MW and New TG#6 18 MW will be installed
5	**Others**					
5.1	PG Plant	Nm^3/hr	3000	10000	7000	New 7000 Nm^3/h will be installed
5.2	Precipitated Calcium	tpm	1200	1200	-	Existing capacity is adequate. No change

S.No	Description	Unit	Existing	Post MEP	Incremental	Proposal
	Carbonate (PCC) Plant ($CaCO_3$)					
5.3	Silicate Nano Fibers ($CaSiO_3$)	tpm	1500	1500	-	Existing capacity is adequate. No change
5.4	GCC plant	tpd	--	100	100	New 100 tpd GCC plant will be installed
6	**Water and Wastewater**					
6.1	Water Intake and Treatment Plant	m^3/day	35,000	45,000	10000	Intake pump station and WTP will be upgraded.
6.2	Waste Water Treatment	m^3/day	30,000	45,000	15000	The existing ETP will be upgraded to meet the additional hydraulic volumes during the post project scenario

3.3 Input Requirements and Sources

3.3.1 Major Inputs

The major inputs for the production of the pulp and paper/board are

- Wood/bamboo for chemical wood pulp and BCTMP
- Wastepaper for SFT and DIP
- Imported pulps as supplementary fibre
- Chemicals for pulping, recovery and paper/board
- Steam
- Power
- Water

Major inputs requirement for MEP and Post-MEP during the operation will be as below

3.3.2 Raw Material Requirement

The raw material required for the Proposed MEP are presented in the **Table 3.2.**

Table 3-2 Raw Materials Requirement

S. No	Raw material	Unit	Existing	Post MEP	Incremental	Source
1	Wood/Bamboo	Tpa	163,000	515,000	352,000	Local
	Wood – Plantations	Tpa	130,000	450,000	320,000	Local
	Wood - Market	Tpa	-	50,000	50,000	Local
	Bamboo - Forest area	Tpa	33,000	15,000	(18,000)	Local

S. No	Raw material	Unit	Existing	Post MEP	Incremental	Source
2	Waste Paper	AD tpa	-	82,000	82,000	Local
3	Hard Wood Pulp (HWP)	Tpa	26,000	-	(26,000)	Captive after MEP
4	Soft Wood Pulp (SWP)	Tpa	1,900	9,900	8,000	Import
5	Bleached Chemi Thermo Mechanical Pulp (BCTMP)	Tpa	58,700	-	(58,700)	Captive after MEP

Sourcing of Wood:

JKPL, Unit has implemented social and farm forestry plantations of Eucalyptus, Subabul and Casuarina within 350 Km radius of the mill covering different parts of Gujarat, Maharashtra and Madhya Pradesh in about 1,35,000 acres of land. Gujarat state forest department is also promoting social & farm forestry plantations. They are also providing financial assistance for the farmers for their agro forestry plantations in their regime. In line with the same, JKPL unit CPM has distributed about 2556 lakhs of saplings to the nearby farmers from the year 2002 to 2018. The unit has already developed year wise for contract farming plantation program up to year 2028 covering 314000 acres of land to implement agro forestry and farm forestry in order to meet the wood demand in the future.

In addition, JKPL unit CPM has developed an action plan for enhancing captive plantation by planting saplings within the facility.

3.3.3 Chemicals

The MEP proposals in the pulp mill are more focused on eliminating elemental chlorine in bleaching, conservation of energy, water and reduction in specific chemical consumption in bleaching.

The major process chemicals required to be used and procured for the production is given in the **Table 3.3**. The materials will be transported by trucks.

Table 3-3 Chemicals Requirement

Sl. No	Chemical	Unit	Existing	Post MEP	Incremental /Reduction	Source
1	**Pulping**					
1.1	Caustic	tpa	2,100	7,500	5,400	Local
1.2	Hydrogen Peroxide	tpa	1,500	5,400	3,900	Local
1.3	Chlorine for bleaching	tpa	2,700	-	(2,700)	No chlorine required for bleaching as new pulp mill will be with Elemental Chlorine

Sl. No	Chemical	Unit	Existing	Post MEP	Incremental /Reduction	Source
						Free (ECF) bleaching
1.4	Chelating agent	tpa	-	300	300	
1.5	Diethylene Triamine Penta acetic Acid (DTPA)	tpa	-	300	300	
1.6	Sulphuric Acid	tpa	600	1,930	1,330	Local
1.7	Chlorine dioxide	tpa	500	3,500	3,000	In-house
1.8	Oxygen	tpa	2,200	4,500	2,300	Purchase and captive generation.
2	**Chlorine dioxide chemicals**					
2.1	Caustic	tpa	-	105	105	Local
2.2	Chlorine gas (for make-up)	tpa	-	2,600	2,600	Local
2.3	Sodium chlorate	tpa	900	-	(900)	-
2.4	Hydrogen Peroxide	tpa	300	-	(300)	-
2.5	Sulfuric acid	tpa	1,400	-	(1,400)	-
3	**Recovery chemicals**					-
3.1	Caustic as make-up	tpa	400	800	400	Local
3.2	Salt cake (Na2SO4) as make-up	tpa	2,800	5,300	2,500	Local
3.3	Lime stone make-up for lime kiln	tpa	2,100	11,000	8,900	Local
3.4	Purchased lime for recausticizing	tpa	13,000	-	(13,000)	After project total lime will be produced from lime mud in the inhouse lime kilns.
4	**Paper/Board chemicals**					
4.1	Stock preparation chemicals (Alum, PAC, Rosin)	tpa	6,000	13,000	7,000	Local
4.2	Filler, Sizing, Coating Chemicals (PCC, GCC, Starch)	tpa	9,000	20,000	11,000	PCC and GCC captive and others local

Note: Values in parenthesis indicates reduction quantities during post MEP.

3.3.4 Steam and Power Scenario

The steam and power requirement for the existing and proposed MEP is given in **Table 3.4.**

Table 3-4 Steam and Power requirement

Parameter	Units	Existing scenario	Post MEP	*Remarks*
Power boiler installed capacities	tph	170	360	New CFB#5 - 150 tph (Operating) and New CFB#6- 90 tph (Standby) The existing boilers (CFB#1 20 tph and CFB#30 tph) will be retired
Recovery boiler capacity	tph	35	120	New Recovery boiler of capacity of 950 tpd of BL solids
Total installed steam generation capacity	tph	205	480	-
Total steam demand	tph	145	360	Additional steam requirement for power generation and process steam requirement for pulp mill and board machine
Specific steam demand	t/t	7.4	8.2	Specific steam consumption increases due to higher condensation to generate power for BCTMP
Specific coal consumption	t/t of paper	1.5	1.4	Higher efficiency new power boiler, due to high pressure new recovery boiler and new power boiler more power generated per tonne of steam through co-generation.
Total TG capacity	MW	30.25	72	New TG#5 - 30 MW and New TG#6 18 MW will be installed. Existing two TGs (TG#1-3.125 MW and TG#2- 3.125 MW) will be retired
Actual electrical energy needed	MW	21	60	-
Specific electrical energy	kWh/t	1060	1330	Higher specific consumption due to high power consuming BCTMP

Note:

- The specific electrical energy consumption in the existing facility is about 1060 kWh/t of paper production which is less than the **PAT cycle II** value of 0.7195 TOE/Ton of product. JKPL will be making all best efforts to consume the energy as per the PAT guidelines issued by Ministry of Power, Govt of India.
- JKPL has already conducted carbon footprint assessment through certified auditors and is making all best possible efforts to reduce energy consumption and CO_2 generation/tonne of product.

  Based on the GHG emission estimations, it is observed that during the past three years, the scope 1 CO_{2eq} emissions (Fuel consumption and company owned vehicles) has been reduced from 3,04,820 Tons to 2,17,377 Tons. Thus, the specific scope 1

emissions have reduced to 1.46 Tons of CO_{2eq} per Tons of paper production from 2.12 Tons of CO_{2eq} per Tons of paper production. As the dependency on electricity (power grid) increased, the scope 2 (purchased electricity for internal use) emissions have been increased from 1322 Tons of CO_{2eq} to 2137 Tons of CO_{2eq} over past three years. However, the total emissions (scope 1 & 2) have been reduced significantly.

3.3.5 Fuel

Black liquor (generated in-house), indigenous, imported coal, lignite, furnace oil and pet coke are the fuels. Furnace oil with producer gas or with pet coke will be used in lime mud reburning kiln and furnace oil will be used in start-up and stabilising the operations of chemical recovery boiler. Necessary permission will be obtained for the usage of pet coke during MEP. Pet coke when burnt in lime kiln, the sulphur in pet coke will be absorbed and reacts with calcium of lime mud. Hence SO_2 emissions from the stack will be minimal. Coal/lignite is used for power and steam generation. Additional fuel oil and coal/lignite requirements are given in the following **Table 3.5**.

Table 3-5 Fuel Requirement

S.No	Fuel	Unit	Existing	Post MEP	Incremental	Source
1	Indian local (Linkage and Open Market)	Tpa	70,000	200,000	130,000	Existing coal linkage of 73,804 tpa with Western Coalfield is available. Additional coal linkage shall be obtained locally/open market.
2	Imported coal	Tpa	100,000	200,000	100,000	Coal is imported from Indonesia through open market.
3	Lignite	Tpa	70,000	100,000	30,000	Additional lignite linkage shall be obtained locally from Rajpardhi mines as per the existing procurement.
4	Furnace oil for lime kiln and recovery boiler	Kl	170	3,200	3,030	Local Market
5	Pet coke for lime kiln	tpa	-	9,600	9,600	Local Market

3.3.6 Water

In the current operations, JKPL, Unit CPM could bring down the fresh water consumption for the plant to a level of 20,500 m^3/day equivalent to around 40 m^3/t of paper/board. As part of MEP some more proposals are being planned to reduce further the fresh water requirement for the plant and to be well within the stipulated norms during the post project scenario.

Mill has permission to draw 5 MGD (22,700 m^3/day) of water from Ukai Left Bank Main Canal. During the post MEP scenario, the total fresh water requirement will be increased to 8.7 MGD (37,000 m^3/day) whereas the specific water consumption will reduce to 32 m^3/t of paper/board production. Necessary permission from the concerned authority will be obtained for the drawl of additional fresh water. The water balance for the proposed MEP is presented in the **Table 3.6.**

Table 3-6 Water Balance for the Proposed MEP

SL. No	Description	Fresh Water make-up (m^3/day)	Evaporation (m^3/day)	Wastewater to ETP (m^3/day)
1	Existing Board machine and paper machine	9,600	600	9000
2	New Board machine	6,000	700	5,300
3	Chemical Pulp Mill	12,000	1200	10,800
4	BCTMP	2,000	2000	No wastewater from BCTMP
5	Chemical Recovery Plant	2,000	500	2,500
6	Power Plant	3,000	900	2,100
7	Others	400	100	300
	Total for Plant	**35,000**	**5900**	**30,000**
8	Domestic	2,000		Sewage to Proposed STP
	Total water requirement	**37,000**		

3.3.7 Wastewater Generation, Treatment and Utilization of Treated Wastewater

The wastewater from the mill, post MEP will be divided mainly into two separate streams. One stream from pulp mill and recovery section and the other stream from existing paper/board machines, new board machine, power plant and other utilities. Total wastewater generation from the plant, post MEP will be about 30,000 m^3/day.

The wastewater treatment and discharge quantities during Post MEP is presented in the **Table 3.7**.

Table 3-7 Wastewater Treatment and Discharge after MEP

S.No.	Category	Wastewater Generation (in m³/day)
1	Wastewater to ETP	30,000
2	ETP sludge loss	200
3	Treated wastewater from ETP	29,800
4	Treated wastewater Recycle to Process	2,000
5	Treated wastewater discharged for Land Irrigation	27,800

3.4 Land Use Planning

Since the available free space in the mill will be used for project facilities, no additional land is required. The mill has total land area of 363 acres (Plant area 212 acres and Colony area 151 acres). For MEP project, around 70 acres will be utilised from existing plant area. The land use break-up Post Project is given in the **Table 3.8.**

Table 3-8 Land Use Break up during Post MEP

S.No	Category	Post MEP
A	**Plant area**	
A.1	Plant & Building	40
A.2	Materials storage	60
A.3	Roads/Drains	10
A.4	Vacant area (for future development)	25
A.5	Green belt/ green cover within mill area	66
	Total Plant area	**201**
B	**Colony area**	
B.1	Built up area	54
B.2	Vacant area	33
B.3	Green belt/Green cover	75
	Total Colony area	**162**
	Total (A+B+C)	**363**

Overall mill layout also indicating the usage of project facilities is enclosed as **Annexure 7.**

Figure 3-7 Views of areas earmarked for Project facilities

3.5 Project Schedule and Project Cost

3.5.1 Project Schedule

The proposed Mill Modernization and Expansion Plan will be implemented twenty seven (27) months from the date of receipt of necessary permits and clearances from various statutory agencies.

3.5.2 Project Cost

Total investment for the installation of project is **Rs 1500 Crore** as per broad break up given in the **Table 3.9**.

Table 3-9 Project Cost Break Up

Sl. No	Description	Cost in Crore
1	Civil Works	250
2	Plant & Machinery Cost (including Erection and Engineering)	1050
3	Other Capitalisation Cost (pre-operative expense, escalation and contingency, startup expenses and interest during construction)	200
	Total	**1500**

3.6 Socioeconomic Benefits

Some of the socio-economic benefits are presented below

3.6.1 Improvement in the Infrastructure

This being a mill modernization project, most of the infrastructure like water intake system, power in take system, roads, drains, hospitals schools, etc are already available in the vicinity of the plant location. However, the above infrastructure / amenities / facilities available near the plant will be assessed based on need based survey and will be taken up under CSR scheme for development.

3.6.2 Employment

The project will create direct employment to about 300 persons. In addition, it would generate indirect employment to about 500 persons in the industries and service organizations and material handling, etc., which will be supported by the operations of the mill.

During the implementation and construction stage of the project, it will generate employment to about 1000 in direct persons for about a year.

3.6.3 Development of ancillary industries

The implementation of the project will undoubtedly provide stimulation for added growth to a number of other industries some of which are given below;

- Trucking industry, which will load and haul raw materials, coal, and other supplies to the mill and also mill outputs. The haulage requirement due to project would be around 0.8 million tonnes per annum comprising both inputs and outputs.
- Establishment of ancillary industries such as core for paper reels, core plugs, machining and welding units, etc.
- Indigenous machinery suppliers / manufacturers.
- Construction industry during erection and construction period of Ancillary Business

4 Proposed Environmental Management Plan

Based on the details presented in the Section 3 of this report, a comprehensive environmental management plan against the possible environmental risks associated with the proposed MEP has been developed in respect of various environmental aspects such as air, water, noise, land etc.

4.1 Air Quality Management

The Proposed MEP of JKPL, unit CPM involves shifting and re-installation of bleached chemical wood pulp mill from JKPL, unit Rayagada, Orissa and a new BCTMP mill. The existing recovery boiler will be kept as standby and a new recovery boiler of capacity 950 tpd of black liquor is proposed to be installed. Along with existing lime kiln of capacity 90 tpd, an additional160 tpd capacity lime kiln from JKPL, Rayagada unit will be re-installed in the CPM unit. Also, the existing power boilers (CFB#1- 20tph and CFB#2- 30 tph) will be retired and new power boilers of capacity 240 tph (CFB#5- 150 tph, operating and CFB#6- 90 tph, standby) is proposed to be installed. The incremental steam generation capacity is 190 tph. Necessary efficient air pollution control equipment will be installed to control air emissions from the above-mentioned sources.

Dedicated Electrostatic Precipitators (ESP) will be installed for control of Particulate Matter (PM) emissions from the proposed boiler in the captive power plant. ESP will be designed to achieve new Thermal Power Plant emission norms of 30 mg/Nm^3 as per MoEF&CC, December 2015 regulations. Imported coal and Indian coal with sulphur content less than 1% will be utilized to reduce the SO_2 emissions along with lignite. In addition to this, A dry limestone injection system shall be installed to meet the new SO_2 emission norms of 100 mg/Nm^3. Pet coke will be used with furnace oil in the lime mud reburning kiln. Pet coke when burnt in lime kiln, the sulphur in pet coke will be absorbed and reacts with calcium of lime

mud. Hence SO_2 emissions from the stack due to the burning of pet coke will be minimal. The proposed boiler will be designed with necessary NO_x control system such as NO_X burners to meet the new NO_X emission standards of 100 mg/Nm^3. Stack(s) with adequate height will be installed as per the CPCB guidelines for the proposed boiler emissions. Continuous online stack emission monitoring unit will be installed to monitor particulate matter, SO_2 and NO_X emissions from the proposed boilers.

ESPs will be installed for the control of Particulate Matter (PM) from new recovery boiler and new lime kiln. Stacks of adequate height will be installed for the recovery boiler and lime kiln as per the minimum stack height norms by CPCB for efficient dispersion of gases.

To control the wind-borne coal dust fugitive dust emissions, closed type storage sheds and coal conveyer will be provided with water sprinkling system arrangement. Necessary dust collection systems will be installed at coal handling, conveyors and storage areas.

As a part of MEP, it is proposed to install ECF Chemical Wood Pulp Mill for cooking processes. Non-Condensable Gases (NCG) generated in pulp and recovery sections will be controlled by installing NCG gas extraction system to collect the NCGs and Mercaptans which will be fired in the lime kiln.

4.2 Water Quality Management

4.2.1 Water Consumption

The specific water consumption per tonne of paper/board production will reduce considerably from 40m^3/T to 32 m^3/T during the post MEP scenario due to the adoption of ECF Bleaching technologies and other efficient water use processes and water conservation operations.

Total fresh water requirement for the post MEP is about 37,000 m^3/day. The additional fresh water required for the proposed project (16,500 m^3/day) will also be sourced from Ukai Left Bank Canal as per the existing scenario after

obtaining necessary permission from the concerned authority before commencing the project.

4.2.2 Wastewater Generation and its Treatment

The specific wastewater generation per tonne of paper/board production will reduce from 36 m^3/T to 29 m^3/T during the Post MEP scenario. In addition to this, due to the adoption of ECF Bleaching operations, the specific COD load on the ETP will reduce considerably. The total wastewater generation during the post MEP scenario will be in the order of 30,000 m^3/day. The existing ETP of capacity 30,000 m^3/day will be upgraded with addition of required new pollution abatement equipment and processes to meet the additional hydraulic volumes during the post MEP.

The treated wastewater quality will be maintained within the standards as prescribed by GPCB/CPCB. Dedicated STP is proposed to be installed to treat the domestic sewage generated from the colony and plant.

4.2.3 Treated Wastewater Utilization

The treated wastewater will be utilized for various applications as per the existing practices such as chips washing, coal dust scrubbing, bamboo wetting, ash dust suppression and floor washing and reusing in process areas such as pulp mill, re-causticizing unit, utilities including cooling tower etc.

Currently, the balance treated wastewater generated from the existing mill is utilized for land irrigation to a maximum possible extent covering about 1050 acres of land in the nearby areas. All efforts will be made to utilize the additional wastewater generated from the expansion project for irrigation in the nearby areas during the post project scenario. The existing treated effluent supply pipe network will be augmented to meet the additional hydraulic volumes. About 28,000 m^3/day of treated wastewater will be generated during post MEP. Considering the rate of application as 35 m^3/ha

as per the recommendations from CPCB, about 1950 acres of land is required for the land irrigation. Therefore, additional land of 900 acres is required to discharge the additional treated wastewater for land irrigation. Thus, CPM unit shall approach nearby farmers to meet the additional land requirement for reusing the treated wastewater for irrigation. Additional pumping and pipeline systems will be installed for disposal of additional treated wastewater for irrigation in the area. However, considering the challenges in utilizing 100% of the treated wastewater quantity for irrigation due to variations in the cropping pattern, JKPM requests MoEF&CC to grant permission to discharge treated wastewater into Goda Nala during off crop seasons and monsoon after conforming to the discharge standards prescribed by GPCB.

4.3 Noise Management

Noise will be from new Board machine, Turbo Generator and Chipper. Board Machine will be housed inside building and Entire Turbo Generators will be housed in co-generation power house with suitable acoustic enclosure. Hence, the expected noise levels outside the room will be maintained around 70 dB (A). Existing noise management practices will be continued to limit the noise levels at the facility to comply the stipulated norms of CPCB. Necessary PPE (ear plugs etc.) will be provided to the workers at the noise prone zones.

4.4 Solid and Hazardous Waste Management

The expected increase in the solid and hazardous waste due to proposed MEP and the respective proposed disposal practices are presented in the **Table 4.1.**

Table 4-1 Solid and Hazardous Waste Generation and Disposal

Sl No	Particulars	Existing Quantity (TPD)	Additional Quantity (TPD)	Post MEP Quantity (TPD)	Disposal
1	Bamboo/Wood Dust	20	40	60	Considering the carbon content, the wood dust will be used as alternative fuel in Boiler as per existing practice
2	Fly Ash	120	300	420	Will be used for Cement/Brick manufacturing as per existing practice
3	Lime Sludge/Grit	60	-	40	Due to the installation of new lime kiln along with existing one and operating lime kiln with full capacity, only lime grit will be generated which will be used as backfilling material at abandoned stone quarry as per existing practice
4	ETP Sludge	15	40	55	Will be sold to board manufacturers as per existing practice.
6	Spent Oil	725 kg/Month	1000 kg/Month	1725 kg/Month	Will be disposed to authorized recyclers as per existing practice

4.5 EMP Budget

About Rs. 55 crore is allocated towards pollution control and monitoring systems.

SL. No	Pollution Control Systems	Capital Cost in Lakhs
A	**Air Pollution Control**:	
1	Closed storage sheds for coal with water sprinklers arrangements	250
2	Dust collection systems for coal handling, conveyors, silos and storage areas	120
3	ESP for the proposed power boiler with stack	600
4	In order to meet the new power plant standards, provision for blending of lime stone powder shall be included	40
5	ESP for the proposed recovery boiler with stack height of 70 m	300
6	ESP for proposed limekiln with stack	300

SL. No	Pollution Control Systems	Capital Cost in Lakhs
7	Dust collection systems for handling of lime mud and lime stone	80
8	NCG gas collection and firing in lime kiln. Dedicated scrubber for NCG emissions from pulp mill (low volume NCG gases)	200
	Sub Total (A)	**1890**
B	**Water Conservation and Wastewater treatment facility:**	
1	Paper/board machine water recycling facilities including SAVE all clarifier system	900
2	Existing ETP upgradation/augmentation	1550
3	Tertiary treatment facility for removing colour (chemical treatment with DAF) in the pulp mill stream wastewater	500
4	Sludge from biological treatment units (existing and proposed ETP) will be treated in a new sludge decanter	100
5	A new STP will be installed to treat the entire domestic wastewater	100
6	Additional pumping and pipeline systems for disposal of additional treated wastewater for irrigation in the area.	50
	Sub Total (B)	**3200**
C	**Solid waste management**	
1	Collection and disposal of lime mud to cement plants and brick manufacturers	10
2	Collection and disposal of primary clarifier sludge to secondary board manufacturers	10
	Sub Total (C)	**20**
D	**Environmental monitoring systems**	
1	Continuous emission monitoring systems for boilers and kiln	50
2	Continuous ambient air quality monitoring systems (three units as per CPCB guidelines)	150
	Sub Total (D)	**200**
E	**Fire safety systems (E)**	**200**
	Total in Lakhs (A+B+C+D+E)	**5510**