

Executive Summary of EIA Report

HPCL	Environment Impact Assessment for Proposed Mill Revival Plan of Ashok Paper Mills at Jogighopa, Bongaigaon District, Assam
	Introduction

1.0 INTRODUCTION

Ashok Paper Mills (APM), originally promoted by Maharaja of Darbhanga and Baidyanath Ayurvedic Bhawan group in 1957, was taken over by Government of Assam and Bihar in 1968. Subsequently, late Srimati Indira Gandhi, former Prime Minister of India laid the foundation stone on October 3, 1970 for an integrated 30,000 TPA Pulp & Paper Mill at Jogighopa, Assam. Commercial production was started in 1976. The mill suffered heavily during All Assam Student Union (AASU) agitation. Operation was interrupted from 1980 to 1983 and again due to non availability of power during 1979 & 1980. The production came to a grinding halt from March 1983. An agreement was signed on 15th August 1985 between the former Prime Minister late Shri Rajiv Gandhi and AASU which stipulated revival of APM (Assam Accord). APM's Jogighopa unit was taken over by Government of Assam (GoA) on January 7, 1991 under provision of Assam Act No. XV of 1990 (Acquisition and transfer of undertaking) in the name of Ashok Paper Mill.

In spite of various actions taken by the Government to put the mill back in profitable operation, the operations could not be sustained on account of various reasons.

Hindustan Paper Corporation Limited a government of India undertaking decided to commission a Techno-Economic Feasibility study and a detailed project report along of Ashok Paper Mill, Assam through a consultant of repute as per the directive of Ministry of Industry.

Ausenco Engineers Pvt Limited (Previously Sandwell India Consulting Engineers Pvt. Limited (Ausenco Sandwell), Mumbai and Vimta Labs Limited, Hyderabad have been retained to undertake a study of the Environmental Impact Assessment and to prepare an Environmental Management Plan for various components, which may be affected due to the impacts arising out of the proposed mill revival project.

The EIA report addresses the environmental impacts due to the proposed mill revival project and proposes the mitigation measures for the same.

1.1 Project in Brief

The design of revival operations is structured in such a way that the selection of process technology shall be energy efficient and environmentally compliant. While selecting the process, the guidelines of the Ministry of Environment and Forests (MoEF) as part of Corporate Responsibility for Environmental Protection is considered for any revival option.

Based on the above, the revival operations shall consider the following process option:

- Energy efficient cooking system (either RDH/Super batch/Low solids cooking)
- Displacement wash press;
- Oxygen delignification system;
- Elemental chlorine free bleaching sequence;
- Integrated chlorine dioxide plant;

Falling film evaporation plant;
Single drum large economiser recovery boiler;
Two-stage causticising plant;
Rotary limekiln;
Non condensable gases collection and incineration process;
Captive power plant including multi fuel power boiler and TG; and
Wastewater treatment system.

The features of revival plan to make 2,00,000 tpa of writing and printing paper at existing mill location are briefed below:

- State of the art paper machine comprising of stock preparation and approach flow system for 600 tpd production;
- Environmentally friendly cooking, screening, washing and bleaching system for 520 BDTPD bleached pulp production;
- Chlorine dioxide plant of 12 tpd capacity;
- Oxygen generation plant of capacity 16tpd;
- Black liquor evaporation plant of water evaporation capacity 200 tph;
- Recovery boiler of firing capacity 1100 tpd dry black liquor solids;
- Re-causticising plant of 2500 m³/d capacity;
- Lime kiln of capacity 230 tpd;
- Water treatment plant of capacity 30,000 m³/day;
- Waste water treatment system including for colony of hydraulic capacity 30000 m³/d;

Non condensable gases collection and incineration system;

- Electrical and Automation systems;
- New pipe racks and structures;
- Mill wide facilities including railway tracks inside the mill;
- Rain water harvesting for colony area;
- Green belt development as per MoEF guidelines; and
- New colony for all mill employees (635)

1.2 Project Site

The proposed project area is located. The site is located at the intersection of longitude 90°33'19" E and latitude 26°14'56" N and falls under Survey of India Toposheet No 78 J/11.

The site is about 110 km, East direction (aerial) from Guwahati, the State Capital and it is about 9.4 km (SE) from the nearest town Goalpara. The National Highway NH-31-B is at 2.9 km in east direction from the plant site.

1.3 Scope of the Present Study

The study covers the core area of 10 km radius with the proposed project site as the centre. The scope of the study broadly includes:

- Literature review to collect data relevant to the study area
- Environmental monitoring so as to establish the baseline environmental status of the study area
- Identification of various existing pollution loads due to industrial and domestic activities in the ambient levels
- Prediction of incremental levels of pollutants in the study area due to implementation of the proposed Ashoka Paper mill project
- Evaluation of the predicted impacts on the various environmental attributes in the study area by using scientifically developed and widely accepted

Environmental Impact Assessment Methodologies

- Preparation of an Environmental Management Plan (EMP) outlining the measures for improving the environmental quality and environmentally sustainable development
- Identification critical environmental attributes required to be monitored.

The literature review includes identification of relevant articles from various publications, collection of data from various government agencies and other sources.

1.4 Methodology of the Study

Reconnaissance survey was conducted by Vimta Labs Limited, in consultation with the officials of M/S Hindustan Paper Corporation Ltd & Ausenco Sandwell and sampling locations were identified on the basis of:

- Dispersion modelling exercise using the predominant wind directions in the study area as recorded by Indian Meteorological Department (IMD)
- Topography, location of surface water bodies like ponds, canals and rivers
- Location of villages/towns/sensitive areas
- Accessibility, power availability and security of monitoring equipment, pollution pockets in the area
- Areas which represent baseline conditions
- Collection, collation and analysis of baseline data for various environmental attributes.

The field observations are used to:

- Set up air quality models
- Identify extent of negative impacts on community/natural resources
- Identify mitigation measures and monitoring requirements.

The study also provides framework and institutional strengthening for implementing the mitigation measures. Field studies have been conducted for a period of 1st December 2008 to 28th February 2009, representing winter season to determine variations and also to determine existing conditions of various Environmental attributes as outlined.

2.0 **PROJECT DESCRIPTION**

2.1 **Project Profile**

The major mill plant facilities envisaged for the proposed revival plan and their capacities are given in **Table-2.1**.

TABLE-2.1
SALIENT FEATURES OF THE PROPOSED REVIVAL PLAN

Sr. No.	Plant Facilities	Capacity
1	Plant Capacity	2.0 lakh tpa
2	Project Cost	Rs. 2476 Crores
3	Land Available	763 acres
4	Raw material Requirement	From Northern Coal fields West Bengal, Madhya Pradesh
5	Fresh Water Requirement	1250 m ³ /hr
6	Water Source	Brahmaputra river
7	Power Generation	43 MW
8	Power Source	Captive
9	Manpower Requirement	During Operation: 630 Nos During Construction: 6000 Nos
10	Annual operating days	340 days/annum at 90%efficiency

2.1.1 Need of the Project

M/s Ashok Paper Mill Limited has proposed revival plan for the existing mill in order to meet the demand and to avail the facility of the region, which are promote the establishment of the paper industry.

2.2 **Project Location Details**

The proposed project is located near Korea village Bongaigaon district in Assam state.

The environmental setting of the proposed project site is given in **Table-2.2**.

TABLE-2.2
ENVIRONMENTAL SETTING OF THE PROJECT SITE

Sr. No.	Particulars	Details
1	Project Location	Korea village, Bongaigoan district, Assam state
2	Geographical Coordinates	Latitude : 26°14'56" N Longitude : 90°33'19" E
3	Climatic conditions as per IMD Goalpara	Predominant Annual Wind Direction : NE followed by SE and SW Annual mean Max Temp: 37.2 °C Annual mean Min Temp : 6.5 °C
	Climatic conditions - During Study period (Winter season - Dec 2008 to Feb2009)	Predominant Wind Direction : NE followed by SE and East Max Temp: .31.2 °C

Sr. No.	Particulars	Details
		Min Temp : 7.2 °C
4	Nearest Highway	NH-31-B, East direction, 2.9 km
5	Nearest railway station	Jogighopa, 3.3 km, SE direction
6	Nearest Airport	Jogighopa, 3.3 km, SE direction
7	Nearest water bodies	Brahmaputra, 1.6 km, South direction
8	Nearest town/City	Goalpara, 9.4 km, South East direction
9	Hills/valleys	No major hills within 10 km radius
10	Archaeologically important places	None within 10 km radius
11	National Parks/ Wildlife Sanctuaries	None within 10 km radius
12	Reserved / Protected Forests	None within 10 km radius
13	Seismicity	Seismic Zone-IV as per IS 1893 (Part I): 2002
14	Defence Installations	None within 10 Km radius
15	Major industries within 25 Km radius	There is no industries present with in 10 km radius
16	Socio-economic factors	No R&R issues involved
17	Topography of the plant site	Plain
18	Nature of soil	Clay
19	Major crops in the study area	Paddy, Cotton
20	Seismicity	Seismic Zone-V as per IS 1893 (Part I): 2002

Note: All distances mentioned above in () are aerial distances

2.3 Implementation schedule

The implementation schedule is basically decided by the extent and nature of activities involved along with the financials and source of funding the project. Additionally, the time required for getting the environmental clearances for such projects is a vital factor to be considered.

The revival of the mill can be completed in 36 months. This schedule however does not take in to consideration the environmental approval process and financial closure from participating financial institutions.

2.4 Revival Plan Details

The revival plan considers production of writing and printing grades of paper to achieve a production capacity of 200,000 TPA.

2.5 Material and Resources Requirement

2.5.1 Raw Materials

The raw materials required for the project is bamboo. The average annual requirement of the raw materials major element analysis details of raw materials are given in

RAW MATERIALS REQUIREMENT

Raw Material	Unit	Requirement
Bamboo	MT Green/annum	745000

LAND USE BREAK-UP OF PLANT AREA

Particulars of area	Area in acres	Area in Ha
Mill Complex area	59.8	26.34
Vacant land	317.8	140.0
Low lying area	184.8	81.40
Colony area	180.8	79.64
Total area	743.2	327.40

The mill area where the existing plant is located is almost on a level ground and the area under the mill compound is about 583.4 acres. About 33% of the total plant area will be earmarked for greenbelt development.

2.6 Project Cost on Environmental Management

The total project cost for the proposed mill revival project is 2476 crores, out of which 215 crores shall be spent on environmental management.

2.7 Sources of Pollution

The various types of pollution from the paper mill are categorized under the following types:

- Air pollution
- Water pollution
- Solid waste generation and
- Noise pollution.

2.8 Green Belt

The existing mill area has greenery around the mill area. However, with a view to mitigate the adverse effect of pollutants, and to provide an environmental cover from pollution, increased greenbelts (33% of total plant area) will be maintained. This attenuates the noise levels to a considerable extent.

3.0 BASELINE ENVIRONMENTAL STATUS

A regional background to the baseline data is being presented at the very onset, which will help in better appreciation of micro-level field data, generated on several environmental and ecological attributes of the study area. The base line status of the project environment is described section wise for better understanding of the broad-spectrum conditions. Field monitoring studies to evaluate the base line status of the project site were carried out during the months of 1st December 2008 to 28th February 2009, representing winter season.

4.0 ANTICIPATED IMPACT ASSESSMENT AND MITIGATION MEASURES

4.1 Details of the Investigated Environmental Impacts

This chapter provides a brief overview of the potential impacts on various environmental components due to the construction and operation of coal based power plant and allied activities, which could cause significant environmental concerns, have been investigated and discussed.

The proposed paper mill involve creation of new landuse, construction and installation of co-generation power plant, construction of building for paper mill, coal handling system, storage facilities for raw material and finished products. If adequate control measures are not taken to prevent/mitigate the adverse environmental impacts, these operations may cause environmental degradation and lead to irreversible damage to the eco-system. Various environment impacts, which have been identified due to the proposed paper mill, are discussed in the following sections.

The environmental impacts are categorized as primary or secondary. Primary impacts are those, which are attributed directly to the project and secondary impacts are those, which are indirectly induced and typically include the associated investment and changed pattern of social and economic activities by the proposed action.

The impacts have been assessed for the existing environment conditions have already been covered under baseline environmental monitoring and continue to remain same till the operation of the project.

4.2 Impacts during Construction Phase

4.2.1 Impact on Land Use

This includes the following activities related to land acquisition if any, leveling of site, construction of related structures and installation of related equipment. The total land area required for the proposed plant is 763 acres. No additional land is required to be procured for proposed project. The adequate land required for the proposed paper mill is available with in the old plant premises which is not in operation presently. The present land-use of the project site is categorized under industrial category and land is leveled. Apart from the change in land use pattern like open land converts in constructed area within the project site there will not be any adverse impact on the surrounding land use during the construction period.

After the commencement of paper mill and additional facilities existing barren land will be cleared and the topography of the area will permanently change. Due to change in the topography of the project area and clearance of the present herbal vegetative cover and also shrub vegetation may have minor temperature variations at local level. The temperature pattern indicates a regional behavior and is not likely to be affected by operations in surrounding areas except project

operational area. The proposed afforestation programme and greenbelt plan will reduce temperatures in surrounding areas also mitigates impacts due to operations.

- **Rainfall**

The monthly total rainfall in the region varies between 22.9 – 574.3 mm during monsoon and post monsoon seasons as per IMD data of Goalpara. Any changes in the pattern of rainfall will be on regional scale because of cumulative reasons. The operation of paper mill is not expected to have any adverse effect on the rainfall pattern of the area.

- **Wind Speed**

The wind speeds of any area depend on the existence of elevations and depressions in the region. The proposed plant operation will have minor change in topography and creation of concrete structures in project area and its immediate vicinity. Due to change in the topography of the project area minor variations are envisaged at local level.

- **Humidity**

The relative humidity in the area is not likely to change because of the construction operations, as it will not cause any changes in the prevailing temperatures and rainfall of the region.

- **Impact on Drainage**

The project area is not falling in any major river catchment area and also not passing any seasonal nallahs or streams. Hence, construction activity of paper mill will not have any impact on local drainage pattern or drainage system.

4.2.3 Impact on Soil

The construction activities will result in loss of vegetation cover and topsoil to some extent in the plant area. Apart from localized construction impacts at the plant site, no adverse impacts on soil in the surrounding area are anticipated.

4.2.4 Impact on Air Quality

The main sources of emission during the construction period are the movement of equipment at site and dust emitted during the leveling, grading, earthwork, foundation works and exhaust emissions from vehicles and equipment deployed during the construction phase is also likely to result in marginal increase in the levels of SO₂, NO_x and SPM. The impact will be for short duration and confined within the project boundary and is expected to be negligible outside the plant boundaries. The impact will, however, be reversible, marginal and temporary in nature. Proper maintenance of vehicles and construction equipment will help in controlling the gaseous emissions. Water sprinkling on roads and construction site will prevent fugitive dust.

4.2.5 Impact on Water Quality

Impact on water quality during construction phase may be due to non-point discharges of solids from soil loss and sewage generated from the construction work force stationed at the site. However, as the construction will be carried out on the flat terrain, the soil losses will be negligible. Further, the construction will be more

related to mechanical fabrication, assembly and erection; hence the water requirements would be meager. Temporary sanitation facilities (septic tanks and soak pits) will be set-up for disposal of sanitary sewage generated by the work force through contractors. The overall impact on water environment during construction phase due to proposed project is likely to be short term and insignificant.

4.2.6 Impact on Noise Levels

Heavy construction traffic for loading and unloading, fabrication and handling of equipment and materials are likely to cause an increase in the ambient noise levels. The likely noise levels will be in the range of 60-70 dB (A). The areas affected are those close to the site. However, the noise will be temporary and will be restricted mostly to daytime.

The noise control measures during construction phase include provision of caps on the equipment and regular maintenance of the equipment. The construction site will be barricaded during the construction period.

4.2.7 Impact on Terrestrial Ecology

The initial construction works at the project site involves land clearance. During construction activities vegetation may be disturbed. The tree felling if any will be limited to the construction area itself. Greenbelt will be developed during construction phase to improve the aesthetic value in the area and to screen out the fugitive dust generated during construction.

The removal of vegetation from the soil and loosening of the topsoil generally causes soil erosion. However, such impacts will be confined to the project site and will be minimized through paving and water sprinkling. The option of transplantation of trees will also be studied to save the existing matured trees and replanted in the area earmarked for greenbelt development.

4.2.8 Impact on Socio-economic Structure

The proposed paper mill project in this region will create temporary jobs for 2000-3000 persons to local people in unskilled, skilled sector which in turn leads to several dependent jobs. This activity may enhance the financial structure of the people.

4.3 Impacts during Operational Phase

The following activities related to the operational phase will have varying impacts on the environment and are considered for impact assessment:

- Land use;
- Soil quality;
- Topography and climate;
- Air quality;
- Water resources and quality;
- Solid waste;
- Noise levels;
- Terrestrial and aquatic ecology;
- Demography and socio-economics; and
- Infrastructural facilities.

4.3.1 Impact on Land Use

The present land use of the area falls under industrial category which is not in operation and will be converted into constructed area after the execution of the proposed paper mill project.

4.3.2 Impact on Soil

Most of the impacts of paper mill project on soils are restricted to the construction phase, which will get stabilized during operational phase. The impact on the topsoil will be confined to the proposed main plant area only.

The probable sources of degradation of soil quality will be only due to generation of ash from co-generation plant. The fly-ash will be utilized to the maximum extent as per Fly Ash Notification of 1999 and bottom ash will be disposed in low areas in surrounding areas.

The fugitive emissions in the ash and coal handling area will be controlled to a great extent through proposed control measures like dust collection and suppression systems. The emissions of particulate matter will be restricted to less than 100 mg/Nm³. Installation of tall stacks and installation of dust control systems in coal handling areas, the impact on the soil may be insignificant.

4.3.3 Topography and Climate

The area of the plant site is plain and it will be maintained during operation stage also. There will not be any topographical changes during operation of the project.

Heat loss through stack will be 6 to 7% of the total heat input to the furnace. The quantum of heat so lost to the atmosphere is not significant. The moderate wind speed and rainfall in the region will mitigate the adverse impacts. The vegetation in region will help to manage thermal balance.

4.3.4 Impact on Air Quality

The major air emissions from this co-generation power plant/chemical recovery boiler will be Suspended Particulate Matter (SPM), Sulphur dioxide (SO₂) and Oxides of Nitrogen (NO_x).

The impact on ambient air quality is assessed hereunder considering the site specific meteorological parameters, which were recorded by using continuous recorder.

Short term 24 hourly GLC's incremental values were estimated using the site-specific meteorological data.

4.3.4.1 *Air Pollution Modeling*

Prediction of impacts on air environment has been carried out employing mathematical model based on a steady state gaussian plume dispersion model designed for multiple point sources for short term. In the present case, Industrial Source Complex [ISC3] dispersion model based on steady state gaussian plume dispersion, designed for multiple point sources for short term and developed by United States Environmental Protection Agency [USEPA] has been used for simulations from point sources.

4.3.4.2 Model Options Considered for Computations

The model options considered for computations are:

The plume rise is estimated by Briggs formulae, but the final rise is always limited to that of the mixing layer;
Stack tip down-wash is not considered;
Buoyancy induced dispersion is used to describe the increase in plume dispersion during the ascension phase;
Calms processing routine is used by default;
Wind profile exponents are used by default, 'Irwin';
Flat terrain is used for computations;
It is assumed that the pollutants do not undergo any physico-chemical transformation and that there is no pollutant removal by dry deposition;
Washout by rain is not considered;
Cartesian co-ordinate system has been used for computations; and
The model computations have been done for 10 km with 500 m interval.

4.3.4.3 Model Input Data

For the modeling purpose pollutants like, Sulphur dioxide, Oxides of Nitrogen and Particulate Matter are considered. The details of stack emissions envisaged from the project are given in **Table-4.1** of report. Maximum emission levels are considered for modeling purpose..

5.0 **SUMMARY AND CONCLUSIONS**

5.1 **Justification for Implementation of the Project**

The proposed revival plan of Ashok Paper Mill project will have marginal impacts on the local environment. However, with the implementation of the proposed pollution control and environment management measures, the impacts anticipated due to construction and operation of the proposed project will be mitigated.

The project will provide direct and indirect employment to a large number of personnel.

Thus, in view of considerable benefits from the project without much environmental impact, the proposed revival plan is fully justified and is most advantageous to the region as well as to the nation.

5.2 **Summary of Anticipated Environmental Impacts and Mitigation Measures**

The summary of anticipated adverse environmental impacts due to the proposed revival plan and mitigation measures is given below.

5.2.1 Anticipated Environmental Impacts and Mitigation Measures

- Air pollution modeling, carried out for the proposed revival plan project of APM and new co-generation power plant shows that resultant concentrations of SO₂ (16.8 µg/m³), NO_x (17.9 µg/m³) and SPM (34.1 µg/m³) after implementation of the proposed revival plan project will remain within the National Ambient Air Quality Standards for rural/residential areas;
- Limiting of pollutant discharge and minimizing its effect on air quality, within prescribed standards, will be achieved, consequent to selection eco-friendly

CFBC technology and plant design for boilers and installation of stacks of adequate height (105-m) that provides better dispersion of pollutants;

- Consequently the proposal is unlikely to have major impacts on local or regional air quality or to adversely affect human health or status of pollution-sensitive vegetation, either locally or on nearby terrain.

5.2.1.1 Water Environment

- The proposed revival plan of APM will source its entire fresh water requirement from River Brahmaputra. The total water requirement for the project is 30000 m³/day ;
- The project will not extract groundwater and hence there will be no impact on groundwater resources.

The wastewater generated in the plant area will be treated in the wastewater treatment system and will be recycled and reused in the plant greenbelt/Ashhandling plant or coal handling plant and rest will be discharged after compliance of stipulated norms. Rain water will be collected through storm water drains and shall be suitably diverted to rainwater harvesting pits. Hence, impact on the water quality is not envisaged.

5.2.1.2 Solid Waste Management and Land Use

A long-term ash management agenda has been drawn to ensure compliance with the Ash Management Rules and meet CREP (Corporate Responsibility for Environment Protection) requirements. All efforts will be put to promote ash utilization in construction business.

5.2.1.3 Noise Environment

The main noise generating sources are blowers from turbines and chippers. The impact of noise emission will be minimized by acoustic enclosures and the noise levels will be limited to 85dB [A].

5.2.1.4 Greenbelt Development

Greenbelt with a width of 50-m will be developed around the plant site. In the proposed greenbelt, trees will be planted with a density of 2500 trees/ha.

5.2.1.5 Socio- Economics

The major economic impacts, which will occur to the region, during the construction phase and operation of the proposed project, will be an increased availability of direct and indirect employment. Local people will be benefitted after commissioning of the proposed project in terms of petty to major contractual jobs and associated business establishments.

5.3 Environment Management Plan during Operation Phase

During operation phase, the impacts on the various environmental attributes should be mitigated using appropriate pollution control equipment. The Environment Management Plan prepared for the proposed revival plan aims at minimizing the pollution at source.

5.3.1 Air Pollution Management

Fugitive and stack emissions from the co-generation plant will contribute to increase in concentrations of SPM, SO₂ and NO_x pollutants. The mitigative measures proposed in the plant are:

- Installation of ESP's of 99.8% efficiency to limit the SPM concentrations below 50 mg/Nm³;
- Provision adequate stack heights for wider dispersion of gaseous emissions;
- Dust extraction system will be provided at transfer points of conveyor system;
- Enclosed Conveyor belt to prevent dust generation;
- Provision of water sprinkling system at material handling and storage yard;
- Asphaltting of the roads within the plant area; and
- Development of greenbelt around the plant to arrest the fugitive emissions.
- NCG incineration system to minimise odour

5.3.2 Water Pollution Management

The wastewater will be generated from fibre line ,paper machine,cooling towers, and boilers. Additionally, domestic wastewater from canteen and employees wash area will also be generated. The proposed measures to minimise the impacts are:

- Provision of sewage treatment plant to treat domestic sewage from plant and township;
- Utilization of treated domestic wastewater for greenbelt development;
- Provision of separate storm water system to collect and store run-off water during rainy season and utilization of the same in the process to reduce the water requirement; and
- Construction of suitable rainwater harvesting structures.
- Comprehensive waste water treatment plant meeting disposal standards set by CPCB/MoEF.

5.3.3 Noise Pollution Management

In the process, various equipments like pumps, cooling tower, compressors etc generate the noise. The recommendations to mitigate higher noise levels are:

- Equipment shall conform to noise levels prescribed by regulatory authorities;
- Provision of acoustic enclosures to noise generating equipments like pumps;
- Provision of thick greenbelt to attenuate the noise levels; and
- Provision of earplugs to the workers working in high noise level area.

5.3.4 Solid Waste Management

The main solid waste emanates from the proposed power and chemical recovery boiler will be ash (Fly ash and Bottom ash). The total ash generated from the proposed revival project will be 220tpd. It is proposed to use for brick manufacturing and Cement manufacture. Chipper dust generated during chipping operations and screen rejects can be burnt in boilers.

Sludge generated from wastewater treatment plant is the other solid wastes which will be recycled/ given to cardboard manufacturers/egg tray manufacturers. Sludge from the effluent treatment plant contains organic matter with significant heat-value and can be burnt in the multi-fuel boiler. Lime grits from recausticising plant is another solid waste needing disposal. Lime sludge generated is reburnt in the lime kilns and hence not considered a solid waste. The waste oil (spent oil) shall be sold to authorized recycling centers. The limesludge

needed for bleeding the silica level shall be filled as landfill.

Hence, no adverse impacts due to solid waste generation are envisaged.

6.0 ENVIRONMENT MONITORING

An Environment Impact Assessment study comprises two main phases:

- Assessment of the present situation with regards to environmental problems; and
- Prediction of the impact of after implementation of proposed revival plan of Ashok Paper Mill project facilities.

Usually, as in the case of the study, an impact assessment study is carried over short period of time and the data cannot bring out all variations induced by the natural or human activities. Therefore, regular monitoring programme of the environmental parameters is essential to take into account the changes in the environment. The objective of environmental monitoring is:

- To verify the results of the impact assessment study in particular with regard to new developments;
- To follow the trend of parameters which have been identified as critical;
- To assess the efficacy of the controlling measures;
- To ensure that new parameters, other than those identified in the Impact Assessment study, do not become critical through the commissioning of new installations;
- To check assumptions made with regard to the development and to detect deviations in order to initiate necessary measures; and
- To establish a database for future impact assessment studies for new projects.

The attributes, which merit regular monitoring, are specified below:

- Air quality;
- Water and wastewater quality;
- Noise levels;
- Soil quality; and
- Ecological preservation and afforestation.

The post project monitoring to be carried out at the industry level is discussed below.

6.1 Monitoring and Reporting Procedure

Regular monitoring of important and crucial environmental parameters is of immense importance to assess the status of environment during plant operation. With the knowledge of baseline conditions, the monitoring programme will serve as an indicator for any deterioration in environmental conditions due to operation of the plant, to enable taking up suitable mitigatory steps in time to safeguard the environment. Monitoring is as important as that of control of pollution since the efficiency of control measures can only be determined by monitoring. The following routine monitoring programme would therefore be implemented. A comprehensive monitoring programme is suggested as below.

MONITORING SCHEDULES FOR ENVIRONMENTAL PARAMETE

Sr No.	Particulars	Monitoring Frequency	Method of Sampling	Important Monitoring Parameters
1	Air Pollution and Meteorology			
	Air Quality			
	<i>Stack Monitoring</i>			
	Stacks at power boiler, chemical recovery boiler and lime kiln	Continuous	On-line	SPM, SO ₂ , NO _x and H ₂ S
	<i>Ambient Air Quality Monitoring</i>			
	4 locations around the plant & Colony	Twice in a month	24 hrs continuously	PM _{2.5} , PM ₁₀ , SO ₂ , and NO _x .
	6 locations in surrounding villages	Once in a Quarter	24 hrs continuously	PM _{2.5} , PM ₁₀ , SO ₂ , NO _x and Mercaptans
	<i>Meteorology</i>			
	Meteorological data to be monitored at the plant.	Continuous	On-line	Wind speed & direction, temperature relative humidity and rainfall.
2	Water and Wastewater Quality			
	Industrial / Domestic Waste water			
	Outlet of WWTP	Daily	24 hr composite	pH, TDS, BOD, COD, TSS, Chlorides and Temperature
		Once in fortnight	Composite	AOX
		Once in a season	Composite	As per GSR 422 E
3	Water quality in the study area			
	i) Groundwater at least in 6 locations	Once in a month	Grab	pH, Hardness, Conductivity, TDS, Chlorides, alkalinity, SAR
		Once in a season	Grab	Comprehensive Analysis
	ii) Surface water River Brahmaputra	Once in a month	Grab	pH, Hardness, Conductivity, DO, TDS, alkalinity
		Once in a season	Grab	Comprehensive Analysis
4	Industrial Noise Levels			
	Near administrative office	Once in 3 months	8 hr continuous with noise meter	Noise levels in Db(A)
	Paper machine	Once in 3 months	8 hr continuous with noise meter	Noise levels in dB(A)
	Turbine house	Once in 3 months	8 hr continuous with noise meter	Noise levels in dB(A)
	Power boiler/ compressor	Once in 3 months	8 hr continuous with noise meter	Noise levels in dB(A)
	Ambient Noise Levels			
	Near the Plant Boundary	Once in each season	8 hr continuous with noise meter	Noise levels in dB(A)
5	Soil Quality			
	Plant site	Once in every six months	Grab	Physico-chemical parameters and metals.

The environmental monitoring cell shall co-ordinate all monitoring programmes at site and data thus generated shall be regularly furnished to the state regulatory agencies.
