

Compliance on Implementation of Corporate Responsibility for Environmental Protection (CREP) at ABIL - A Path Forward

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Industrial development is an important segment in our country's endeavor for economic growth, employment generation and better living standards. Industrial activities without proper control and measures for safeguarding the environment will pose a serious threat for pollution and associated problems.

Environmental degradation has become a serious issue of concern for technocrats and government agencies and ultimately for the common public. Hence it is not only mandatory to comply with regulatory norms of Central Pollution Control Board, but to excel the compliance through adoption of cleaner and Eco-friendly technologies. Ministry of Environment and Forest (MoEF), Government of India, in March 2003 issued guidelines in the form of CREP (Corporate Responsibility for Environment Protection) for the industries to be achieved progressively in five years. To combat environmental degradation Central Pollution Control Board (CPCB) has identified 17 major polluting industries and Indian paper industry has been categorized as one of the 17th highly polluting industry.

Abhishek Industries Ltd. (ABIL), a company of TRIDENT GROUP of industries, is a large Integrated Pulp & Paper Industry; with a production capacity of 110 tpd is under expansion envisaging a production of 375 tpd. Eco-friendly technology, ECF bleaching preceded by Oxygen delignification is introduced in the expansion program. In this paper activities taken up in ABIL towards environmental protection in line with guidelines to CREP is presented.

ABOUT THE MILL:

M/s Abhishek Industries Ltd., (ABIL) is an integrated pulp and paper mill situated at Dhaula, District Sangrur, Punjab. It is a part of Trident group of companies. The mill produces Eco-friendly paper varieties using wheat straw, an agro based residue. The mill is a success story following the path of sustainable development and continuous improvement.

The paper division of ABIL was established at Dhaula, Punjab in the year 1993. The mill was initially established as a 75 tpd Writing and Printing grade paper mill, based primarily on Wheat Straw. The mill

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installed a new fourdrinier paper machine, a captive pulp mill with continuous digesters, brown stock washing, screening and cleaning, four stage bleach plant (C-E (P)-H-H) and supporting utilities. ABIL has upgraded its paper mill to expand the capacity and make the operations more environmentally friendly. Presently the mill produces 110 tpd of Printing and Writing paper grades, which are widely accepted in the national and also international markets. Presently ABIL has embarked on massive expansion to go for 375 tpd with latest Eco-friendly technologies. The mill also is going for a new Fibre line supplied by the world leader METSO SUNDSVAL

AB., Sweden, with an ECF bleaching sequence of O-D1-E (OP)-D2 to get bleached Wheat Straw pulp Brightness of 89+ %ISO.

INTRODUCTION:

In the present global Industrial scenario, preservation of the environment has been one of the chief strategies followed by the industrial houses world over. In a world, highly focused on technological developments, organizations are considering new approaches for the protection of environment. The industrial atmosphere in Asia is changing very fast and this has resulted with improved economic conditions on one hand but adverse impact on the

environment on the other hand. The Pulp and Paper industry is also influenced with such developmental changes.

Total global papermaking fibre consumption is projected to increase from about 300 millions tones for 1998 to about 425 million tones by Jaakko Poyry Consultants (2). The new fibre requirement will come from Recovered fibre, Non-wood fibre and fast growing wood plants. Atchison (3) estimates that the global supply of Agricultural residues, which could be used for papermaking, is in the order of 2.45 billion bone dry metric tones. Of this, about half is Straw which, in fact, the most widely used Non-wood plant fibrous raw material in the Pulp and Paper Industry. With ever increasing awareness towards pollution abatement and with the implementation of stricter environmental regulations, the pulp and paper industry is forced to look for alternatives to meet the stringent effluent regulations and ever growing competition.

At ABIL, we are installing ECF bleaching sequence preceded by Oxygen delignification for Wheat Straw chemical pulp i.e O-D1-E(OP)-D2 bleaching sequence. Replacing conventional C-E(P)-H-H bleaching with ECF bleaching favours high brightness of pulp, less colour reversion and less AOX discharge level into the effluent stream. The paper discusses the measures taken at ABIL in combating pollution towards environmental protection, which is in situ with CREP. Other aspects concerning to Environment and Community Development are also highlighted

DISCUSSION ON CHARTER ON CORPORATE RESPONSIBILITY FOR ENVIRONMENT PROTECTION

Parameter Discharge of AOX :

CPCB under CREP had fixed the norms for AOX pollutant in effluent discharge as 1.5 Kg/MT of paper upto March 2005 and it would be 1.0 Kg/MT of paper before March 2007.

AOX originates in Pulp & Paper Industry mainly from pulp mill, which is the key source of supplying pulp to paper machine. The function of pulp mill is to convert raw material to unbleached pulp and applying multi-bleaching sequences to make it bleached pulp for various degree of brightness, depending upon the mill targets, to meet the end use requirements.

In the initial conventional bleaching sequence, Chlorine either in the form of gas (Elemental Chlorine) or as hypo (bleach liquor) in the form of available chlorine was the principal bleaching chemical. The source of AOX generates from the chlorine compounds.

Adsorbable Organic Halides (AOX):

The chlorinated organic compounds have acquired bad reputation for the environmental concerns that over the long period they accumulate inside the tissues of living organisms and interface with biochemical process. The bleached Kraft mills using Chlorine and Chlorine compounds have come under critical observations. Adsorbable Organic halides (AOX) have become one main environmental indicator for the industry.

AOX at ABIL:

Originally, we are using conventional multistage bleaching sequence C-Ep-H-H in which chlorine was the bleaching agent. Since our raw material is Wheat straw (agricultural residue) total Chlorine consumption was less due to low Kappa number of unbleached pulp compared to conventional raw material like Hardwood and bamboo. AOX values of treated effluent as tested by reputed lab were around 0.7-0.9 Kg/MT of paper. As on now, the AOX values of Treated Effluent are meeting the CPCB norms to be achieved by March 2007.

ABIL Commitment:

ABIL has committed to minimize the AOX by introducing Fiber line with

three stages ECF bleaching supplied by M/S METSO SUNDSVAL AB, Sweden, in the upcoming expansion project.

Bleaching sequence: O-D1-E (OP)-D2 with a targeted brightness of 89 %ISO+.

O - Oxygen delignification

D1 - Chlorine Dioxide

E (OP) - Oxygen Reinforced alkaline extraction

D2 - Chlorine Dioxide

Oxygen delignification followed by ECF bleaching sequence is the best suited technological option that drastically controls the release of AOX in the effluent discharge and thus we will meet/excel the AOX norms. The expansion program is envisaged to complete by March-2007

Parameter- Installation of Lime Kiln:

Solid waste is often called third pollution after air and water pollution. Lime mud is generated in the Causticizing process of soda recovery plant in the integrated pulp & paper mill, unless recalcined and used back; it is a source of pollution. Since ABIL uses wheat straw as the raw material for pulping, the black liquor is characterized with higher silica content (2.5-2.7%) and it is detrimental in the calcinations of lime mud reburning.

As per the charter on CREP, the time limit for the installation of lime kiln was March 2007. As on now, we are disposing lime mud in the low-lying area inside the mill premises by mixing with fly ash of boiler waste solid and covered with topsoil. Plantation will be done on dumping side after filling. ABIL is committed to install limekiln with a capacity of 140TPD lime mud burning and the same will be installed within the stipulated period and work is in the progress for the procurement of limekiln. (Order has been placed for procuring Lime Kiln from M/S FFE, Chennai)

Parameter - Waste Water Discharge:

CPCB had stipulated the norms for water discharge as under-

- 1) Less than 140 m3/MT of paper within March 2005
- 2) Less than 120 m3/MT of paper before March 2007 for units installed before 1992 and
- 3) Less than 100 m3/MT of paper for units for units installed after 1992

ABIL comes under category no - 3

ABIL:

The water discharge at ABIL was 75 m3/MT of paper and we are meeting the norms. This is possible due to in-house reuse of water where ever possible and also due to closed loop of back water system in the paper machine. TERI has acknowledged ABIL as the best water conservation mill. Treated effluent is being utilized at the different locations of the mill for floor cleaning; spraying on the solid waste disposal area and wherever possible in the system. Our effluent discharge quantity is well within the norms stipulated by CPCB (before March 2007). We are committed for the same norms of water discharge after the expansion of upcoming project.

Parameter - Odour Control by Burning the Reduced Sulphur Emissions in the Boiler/Lime Kiln:

CPCB prescribe for the installation of odour control system before March 2007.

ABIL propose the installation of NCG collection and incineration system for burning the gases in limekiln. The gases will form the fuel for reburning lime mud in the limekiln.

Parameter - Utilization of Treated Effluent for Irrigation:

Land application of pulp and paper mill wastewater for growing a variety of crops has been reported from the several parts of the world. The studies carried by NEERI on the effluent water have demonstrated that a productive crop irrigation program can be integrated with wastewater disposal facility yielding revenue and reducing water treatment costs.

Charter on CREP:

Utilization of treated Effluent for irrigation is being implemented, where ever is possible. At ABIL, we have consent from PPCB for discharging of Effluent both on land and into the Dhanaula drain (Vide Letter no- EE (P)/2006/SGR/LM/9/41/6/DATED 7.4.2006). Currently, we are discharging our Effluent on to land for our huge plantation of Eucalyptus using "KARNAL" technology inside the mill premises. However at ABIL we had taken pilot plant studies for irrigation purpose for cultivating the following crops Wheat, Maize, Mustard, Sugarcane and Paddy at different crop seasons. Results are encouraging, the crop yield is competitive and photographs are enclosed. Near by village farmers are interested to utilize our Effluent discharge for their irrigation purpose and they requested PPCB for the same. PPCB has granted us to discharge the effluent into Dhanaula Drain so that near by farmers are benefited. In the upcoming expansion project it is envisaged to discharge 21500 m³/day and approximately 57 m³/MT of paper

Parameter - Colour Removal from Effluent:

Alkali Lignin imparts color for the Effluent. Though Lignin has no reported toxic and health related problem. The colour imparted by them on the receiving water is aesthetically unpleasant. It reduces light penetration into water, decreasing the efficiency of Photosynthesis in aquatic plants

thereby having adverse impact on their growth.

CPCB Directive:

Indian Paper Manufacturers Association to take up the project with Central Pulp & Paper Research Institute

ABIL:

ABIL uses the Effluent discharge for irrigation process. Soil also retains the colour. ABIL has well designed recirculation sump-pits in all the sections to collect the Black Liquor spillases. This system ensures strict avoidance Black Liquor entering the Effluents and hence reduces the colour of the effluents. Techno commercial feasibility of colour removal from the Effluent is a subject for discussion and it can be pursued with Central Pulp & Paper Research Institute for viable solution.

OTHER ASPECTS

Effluent Treatment Plant:

At ABIL, Effluent Treatment Plant (ETP) is adequate to treat 12500 m3/day of effluent. The total effluent is 7500 m3/day. ETP consists of Primary Clarifier, Sludge Thickener and Anaerobic, Aerobic treatments followed by Secondary Clarifier. The process is combination of both Anaerobic and Activated Sludge Process. Effluent discharge characteristics and ETP flow sheet is appended. The discharge pollutants are meeting the norms of pollution board.

INTALLATION OF CHEMICAL RECOVERY BY AGRO RESIDUE BASED INDUSTRY

ABIL was established in 1993 with an installed capacity of 75 TPD of Printing and Writing paper grade without Soda recovery process (SRP). The production capacity was gradually increased to 110 TPD. Soda Recovery plant was established in

Treated waste water characteristics

Parameter	UOM	Results range achieved at ABIL	PPCB norms
pH	-	7.0-8.0	6.5 - 8.5
TSS	ppm	30 - 50	100
BOD (3 day at 27°C)	ppm	12 - 16	30
COD	ppm	180 - 220	350

1998 with 165 TPD of Black Liquor solids. M/S ENMAS AHLSTROM supplied Soda Recovery boiler and one ESP (ABB make), with two fields to recover the chemicals escaping with flue gases.

Evaporates:

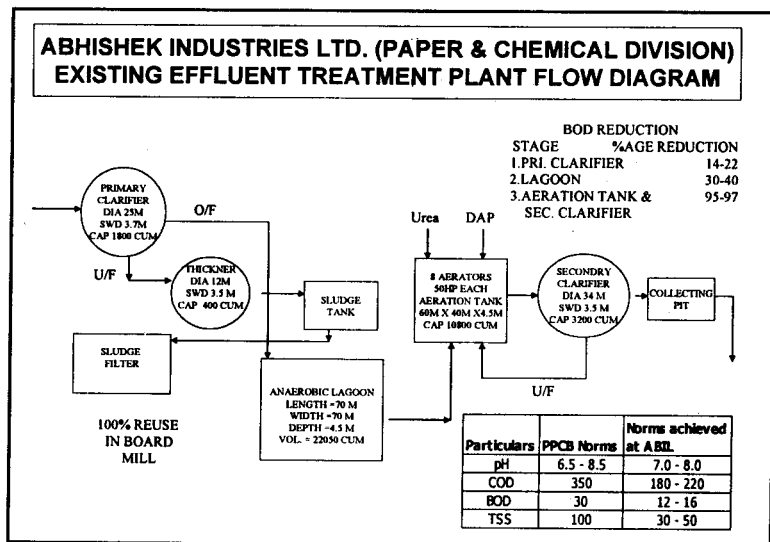
Evaporators consist of eight body six effect, FFFF plate five effects and finishers (3 bodies) with forward flow Black Liquor sequence. It is also equipped with Cascade Evaporator. Black liquor solids at different stages are as under:

- Weak black Liquor- 10-12%
- SCBL solids - 50-52%
- Cascade Evaporator O/L 65-67%

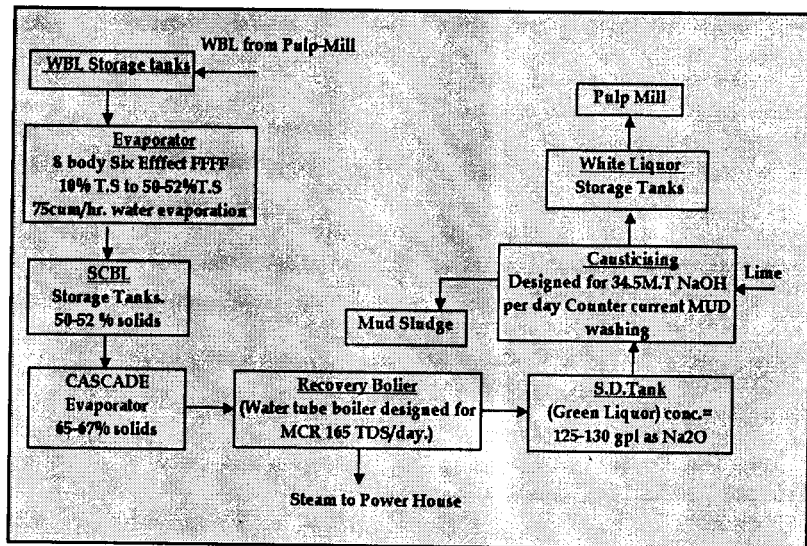
ESP (Ash characteristics):

ABIL is the first Indian paper industry to install full fledged Soda recovery system for agro residue based industry, which uses Wheat Straw as the raw material.

- ABIL is the first mill in India to have installed full-fledged Chemical Recovery system for Black Liquor treatment, generated from Straw pulping.
- Increased utilization of Wheat Straw for paper making thus improving rural economy.



PROCESS FLOW DIAGRAM OF SODA RECOVERY:



Sr.No	Parameters	Results
01	Moisture, % w/w	1.0-1.5
02	Loss on ignition, % w/w	10.0-12.0
03	Water Insoluble, % w/w	0.13-0.15
04	Carbonates as Na ₂ CO ₃ , % w/w	8.0-11.0
05	Chlorides as NaCl, % w/w	30.0-40.0
06	Sulphates as Na ₂ SO ₄ , % w/w	32.0-40.0

- Elimination of Hypo sludge due to ODL and ECF bleaching
- Community Development Measures-
- Rapid assistance during emergencies to surrounding areas

- Like ASTHA ambulance at Handiaya crossing.
- Well-furnished Convent School facility at Barnala
- Contribution for religious and social activities

- Facilities for sports and cultural activities to the local population, with other development activities
- Provision of pump sets to farmers.
- Contribution for facilities development in government hospitals.
- Sugarcane seedlings are provided to over 1000 acre of land
- Free Medical camps were organized in 12 number of near by villages, covering around 10,000 people with help of CMC, Ludhiana

Economic benefits to the society-

- Additional income to farmers on account of raw materials utilization (Rs. 24 crores/annum), which otherwise would have been burnt and would have caused air pollution.
- Appreciation of land/property.
- Benefits to local transporters.

CONCLUSIONS

- With the introduction of new fiber line system from M/s METSO SUNDSVAL AB, Sweden, in which pulp bleaching employed is Eco-friendly ECF, AOX generation will be drastically controlled.
- Effluent discharge is being utilized

for irrigation purpose and down stream village farmers demands for their irrigation purpose.

- Lime Kiln procurement and its installation is in process and the real operative problem can be assessed during its operation.
- Colour removal from the effluent is a serious techno commercial issue and the commercial feasible viable can be explored. CPPRI can guide the paper industry on this subject.

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