



VALIDATION REPORT

OPTIMIZATION OF STEAM CONSUMPTION IN THE
PROCESS BY INSTALLATION OF FREE FLOW
FALLING FILM FINISHER EVAPORATOR AND
RETROFIT TO THE CHEMICAL RECOVERY BOILER
IN CACHAR PAPER MILL OF HINDUSTAN PAPER
CORPORATION LIMITED IN INDIA

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DET NORSKE VERITAS



VALIDATION REPORT

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Client: Hindustan Paper Corporation Limited	Client ref.: Mr. N K Ghosh

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Summary:

Det Norske Veritas Certification AS (DNV) has performed a validation of the “Optimization of steam consumption in the process by installation of free flow falling film finisher evaporator and retrofit to the chemical recovery boiler in Cachar Paper Mill of Hindustan Paper Corporation Limited” project in India on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, the simplified modalities and procedures for small-scale CDM project activities and the subsequent decisions by the CDM Executive Board. This validation report summarizes the findings of the validation.

The validation consisted of the following three phases: i) a desk review of the project design documents, ii) follow-up interviews with project stakeholders and iii) the resolution of outstanding issues and the issuance of the final validation report and opinion.

In summary, it is DNV’s opinion that the project, as described in the project design document of 21 July 2007, meets all relevant UNFCCC requirements for the CDM and correctly applies the approved baseline and monitoring methodology AMS-II.D, version 09. Hence, DNV requests the registration of the “Optimization of steam consumption in the process by installation of free flow falling film finisher evaporator and retrofit to the chemical recovery boiler in Cachar Paper Mill of Hindustan Paper Corporation Limited” project as a CDM project activity.

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***Abbreviations***

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CH ₄	Methane
CL	Clarification request
CPM	Cachar Paper Mill.
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
FFFF	Free Flow Falling Film Evaporator
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
HP	High Pressure
HPC	Hindustan Paper Corporation.
IPCC	Intergovernmental Panel on Climate Change
LP	Low Pressure
MP	Monitoring Plan
NCV	Net Calorific Value.
N ₂ O	Nitrous oxide
NGO	Non-governmental Organisation
NPM	Nagoan Paper Mill.
ODA	Official Development Assistance
PAT	Profit After Tax.
PDD	Project Design Document
UNFCCC	United Nations Framework Convention on Climate Change
WBL	Weak Black Liquor



1 INTRODUCTION

M/s Hindustan Paper Corporation Limited (HPC) has commissioned Det Norske Veritas Certification AS (DNV) to validate the “Optimization of steam consumption in the process by installation of free flow falling film finisher evaporator and retrofit to the chemical recovery boiler in Cachar Paper Mill of Hindustan Paper Corporation Limited (the project). This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for small-scale CDM projects, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The validation team consisted of the following personnel:

Mr Subhendu Biswas	DNV Certification Kolkata	Project manager, CDM validator
Mr Soumik Biswas	DNV Certification Kolkata	Applicant technical reviewer
Mr C Kumaraswamy	DNV Certification Bangalore	Technical reviewer
Mr Ramesh Ramachandran	DNV Certification Chennai	Sector Expert

1.1 Validation Objective

The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, monitoring plan, and the project's compliance with relevant UNFCCC and host Party criteria are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

1.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords, the simplified modalities and procedures for small-scale CDM project activities and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology AMS-II D, version-09. The validation team has, based on the recommendations in the Validation and Verification Manual /15/ employed a risk-based approach, focusing on the identification of significant risks for project implementation and the generation of CERs.

The validation is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.

1.3 Description of Proposed CDM Project

The project activity undertaken in the Cachar plant of HPC involves the implementation of energy efficiency improvement measures in the evaporator plant of the unit. The measures include installation of a FFFF evaporator in the multiple effect evaporator train which results in lower steam consumption per tonne of weak black liquor processed in the evaporator plant. The strong black liquor generated at the outlet of the evaporator unit is fired in a chemical recovery



boiler. In the project, the flue gases from the chemical recovery boiler is passed through 3 additional banks of economiser tubes along with two indirect heaters for black liquor concentration resulting in higher HP steam production in the boiler system. This excess steam produced in the chemical recovery boiler replaces equivalent amount of steam that would have generated in the utility section of the plant. There are 3 numbers of coal fired boilers in the utility section for generation of HP steam for the plant.

The retrofit measure of installation of the free flow falling film finisher evaporator in the evaporator plant was completed in November 2004.

The average anticipated emission reduction due to the project activity is expected to be around 25 664 tonnes of CO₂ equivalent per year.



2 METHODOLOGY

The validation consisted of the following three phases:

- I a desk review of the project design documents
- II follow-up interviews with project stakeholders
- III the resolution of outstanding issues and the issuance of the final validation report and opinion.

In order to ensure transparency, a validation protocol was customised for the project, according to the Validation and Verification Manual /15/. The protocol shows in transparent manner criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organises, details and clarifies the requirements a CDM project is expected to meet;
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

The validation protocol consists of three tables. The different columns in these tables are described in Figure 1.

The completed validation protocol for the “Optimization of steam consumption in the process by installation of free flow falling film finisher evaporator and retrofit to the chemical recovery boiler in Cachar Paper Mill of Hindustan Paper Corporation Limited” is enclosed in Appendix A to this report.

Findings established during the validation can either be seen as a non-fulfilment of validation protocol criteria or where a risk to the fulfilment of project objectives is identified. Corrective action requests (CAR) are issued, where:

- i) mistakes have been made with a direct influence on project results;
- ii) validation protocol requirements have not been met; or
- iii) there is a risk that the project would not be accepted as a CDM project or that emission reductions will not be certified.

The term Clarification may be used where additional information is needed to fully clarify an issue.



Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities			
Requirement	Reference	Conclusion	Cross reference
The requirements the project must meet.	Gives reference to the legislation or agreement where the requirement is found.	This is either acceptable based on evidence provided (OK), a Corrective Action Request (CAR) of risk or non-compliance with stated requirements or a request for Clarification (CL) where further clarifications are needed.	Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is validated. This is to ensure a transparent Validation process.

Validation Protocol Table 2: Requirement Checklist				
Checklist Question	Reference	Means of verification (MoV)	Comment	Draft and/or Final Conclusion
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organised in seven different sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.	Gives reference to documents where the answer to the checklist question or item is found.	Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.	The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.	This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) due to non-compliance with the checklist question (See below). A request for Clarification (CL) is used when the validation team has identified a need for further clarification.

Validation Protocol Table 3: Resolution of Corrective Action Requests and Requests for Clarification			
Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
If the conclusions from the draft Validation are either a Corrective Action Request or a Clarification Request , these should be listed in this section.	Reference to the checklist question number in Table 2 where the Corrective Action Request or Clarification Request is explained.	The responses given by the project participants during the communications with the validation team should be summarised in this section.	This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".

Figure 1 Validation protocol tables



2.1 Review of Documents

The PDD /1/ in its initial version (version-01 dated 2 September 2006) and final version-02 dated 21 July 2007 submitted by HPC along with additional background documents /1/ ~ /14/related to the project design and baseline were assessed during validation.

2.2 Follow-up Interviews

During the period 20 February 2007 to 22 February 2007 DNV performed interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of HPC were interviewed. The main topics of the interviews are summarised in Table 1.

Table 1 Interview topics

Interviewed organisation	Interview topics
M/s HPC	<ul style="list-style-type: none">➤ Assessment of project details and proof of additionality of the project.➤ Assessment of baseline for the project and calculation of baseline emissions.➤ Review of monitoring and verification procedure of the organisation and management structure of the organisation for the project activity.➤ Review of the stakeholder consultation process.➤ Review of compliance to statutory and regulatory requirements.➤ Review of data adequacy and cross reference to that used in emission reduction estimation.

2.3 Resolution of Clarification and Corrective Action Requests

The issues identified in DNV's draft validation report of 27 April 2007 (rev 01) were resolved to DNV's satisfaction during communication between M/s HPC and DNV. To guarantee the transparency of the validation process, the concerns raised and responses given are documented in Table 3 in the validation protocol in Appendix A.

Since modifications to the PDD were necessary to resolve DNV's concerns, HPC decided to revise the PDD and eventually submitted final version-02 dated 21 July 2007. After assessment of the revised PDD, DNV issued this final report and opinion.

2.4 Internal Quality Control

The draft validation report including the initial validation findings underwent a technical review before being submitted to the project participants. The final validation report underwent another technical review before requesting registration of the project activity. The technical review was performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.



3 VALIDATION FINDINGS

The findings of the validation are stated in the following sections. The validation criteria (requirements), the means of verification and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A.

The validation findings relate to the project design as documented and described in the revised and resubmitted PDD version 02, dated 21 July 2007.

3.1 Participation Requirements

The sole project participant is Hindustan Paper Corporation Limited. The DNA of India has approved the project activity vide letter number 4/19/2006-CCC dated 4 October 2007. India has ratified the Kyoto protocol, established a DNA and thus meets the requirements to participate in the CDM. No Annex I Party has yet been identified for the project.

The project is expected to contribute to the sustainable development of the region as it results in lower emissions for equivalent amount of steam saved. It also results in the development of technical skills of the operation and maintenance personnel. The DNA of India has confirmed that the project assists in achieving sustainable development.

3.2 Project Design

In the paper production facility of Cachar Paper mill, steam at high pressure is generated from a 4 boiler system. 3 of the boilers are coal fired and located in the utility section of the plant and one is through a chemical recovery boiler in the evaporator plant. As a part of efficiency improvement in the steam utilization of the plant, a free flow falling film evaporator is installed in the multiple effect evaporator train of the evaporator plant. The evaporator consists of 3 nos. of bodies of 945 m² area each along with a distributor plate assembly for dispersion of the feed. As a part of the project, the preheaters' which were previously an integral part of the evaporator body are relocated to the outside and uses the vapour generated from the main evaporator system for heat integration. As a result of efficiency improvement, the outlet strong black liquor concentration has increased to around 70% and the specific LP steam consumption per tonne of weak black liquor processed has improved from 0.18 in the baseline scenario to around 0.15 post project implementation.

Increased concentration of strong black liquor eliminates the requirement of a direct contact type exchanger wherein the hot flue gas from the chemical recovery boiler was used to get the desired concentration. The energy available in the hot flue stream in the post project scenario is utilised in the generation of additional HP steam by providing additional economiser banks in the existing chemical recovery boiler. This additional steam generated in the chemical recovery boiler displaces steam generated in the coal fired utility boilers thus resulting in lower GHG emissions in the project scenario.

The engineering design reflects current good practice and all necessary permits have been verified during validation. Training records of the operational and maintenance personnel have been presented and found to be adequate. The organisation provides for sufficient training of its operational and maintenance personnel and the management system in place have been certified to comply with ISO 9001 standard.



The project proponent has chosen a fixed crediting period of 10 years with the starting date of the crediting period as 01 January 2008 or the date of registration, whichever is later.

DNV was able to confirm that no ODA is involved in this project, as the project will be funded from internal funds.

3.3 Baseline Determination

The project applies the approved simplified baseline methodology AMS II D Version-09 for small-scale CDM project activities, titled “Energy efficiency and fuel switching measures for industrial facilities”.

The baseline methodology adopted is applicable as it has been demonstrated that

- The energy efficiency measure is carried out at the Cachar paper plant of HPC.
- The retrofit measures are primarily aimed at increasing steam utilization and energy efficiency of the evaporator plant and substitution of coal based steam generation.
- The measures include retrofitting of the multiple effect evaporator system and chemical recovery boiler system and
- The annual average thermal energy saving due to the project is around 74.24 GWh_{th} which is below the ceiling of 180 GWh_{th} for small scale project activities.

The continuation of existing setup of the plant is the baseline scenario for the plant. The amount of LP steam consumed per tonne of WBL processed in the plant is derived from the monitored amount of LP steam consumed and WBL processed for the period November 2003 to October 2004.

The increased amount of HP steam generated in the chemical recovery boiler would have been generated in the coal fired utility boilers in the absence of the project activity. The amount of coal based thermal energy generated per tonne of HP steam generated is based on the monitored amount of coal consumed and total amount of steam generated from chemical recovery boiler and coal fired boilers for the period November 2003 to October 2004.

It is confirmed from publicly available article by Daniel J Cenatempo on project financing that the baseline equipment would not have crossed its technical lifetime and would have comfortably continued in service till the end of crediting period for the project.

For conservative estimation of baseline emissions the amount of HP steam generated from the chemical recovery boiler is estimated as a function of the specific steam consumption per tonne of WBL processed and evaluated for the amount of WBL processed during the project period.

The evaporator plant utilises LP steam which is extraction steam from the steam turbine where HP steam is utilised for power generation. For conservative estimation the amount of LP steam saved due the project activity is considered to be equal to the amount of HP steam that is avoided at the coal fired utility boiler.

3.4 Additionality

The project additionality has been demonstrated by analysing the investment barrier, technological barrier and other related barriers.

*Investment barrier:*

The proposal of installation of a falling film evaporator was placed before the 137th board meeting, held on 5th February 1995, and it was decided to go ahead with the same for two units of HPC - Nagaon Paper Mill (NPM) and Cachar Paper Mill (CPM). The project was however, put on hold due to the depressed market conditions of the paper industry and low realisation of the project. The poor financial condition of Hindustan Paper Corporation Limited also resulted in the delay in taking forward the project activity. The audited figures of production, sales and PAT (profit after tax) of the organisation was presented during the validation process and found to be in order. It was evidenced that the Cachar plant was running below capacity till 2005~2006 and that the Cachar plant registered a net cash profit only in 2000~2001.

The scheme was revived for the Nagaon plant (NPM), also a unit of HPC, and was approved in the 156th Board meeting held on 20 January 2001 at an investment of INR 110 million. Post implementation of the project in NPM the same project was put up for approval for CPM (Cachar paper Mill) at its 173rd meeting held on 18 July 2003, at an outlay of INR 150 million. Prior to the board meeting, a note on the benefits of the project was forwarded to the Board from Deputy General Manager (Utilities) on 15 June 2003. Reduction of greenhouse gas and benefits from CDM were highlighted as benefits from the project activity. Extracts from minutes of meeting of the 173rd meeting of the board of HPC held on 18 July 2003, dated 24 July 2003, indicates that in light of the benefits that would be derived from the project the board approved the project for Cachar paper mill, given that the unit had been operating below capacity with very low realisation and higher cost for project activity implementation at CPM than what it had been for NPM, the thrust of the management was to invest in measures for maximization of production and optimization of consumption of raw materials. The annual report of the organisation for the period 2002~2005 confirmed that R&D activities of the organisation was towards optimization of raw material consumption.

Technological barrier:

The project involves installation of a falling film finisher evaporator in the evaporator plant. Use of falling film evaporator with multiple effects ensures high heat transfer efficiency and is ideal for products with low scaling property*. The main difficulty in falling film evaporators is uniform feed distribution and formation of scale⁺. Falling film evaporators are not used beyond the 3rd effect due to thick and sticky scale formation. In the project plant, the paper manufacturing process is based on 100% bamboo based feedstock. It is confirmed from an independent survey of paper and pulp industry in India that all other paper and pulp manufacturers use a mix of bamboo and hardwood / softwood feedstock. Non wood fibrous raw material like bamboo are characterised by high silica content as against the conventional feed stock and this results in high scale formation in evaporator tubes and deposits on furnace wall of chemical recovery boilers[%]. In the project activity, the falling film evaporator installed as a part of the project is the last effect of the multiple effect evaporation system; thus the problem of scaling is expected to be much more profound. This results in frequent choking of the tubes and water boiling operation has to be carried out much more frequently as compared to the baseline. The inter-stage transfer pumps were removed as a part of the project but due to increase in

* <http://www.sspindia.com/industrial-evaporators/index.html>

⁺ <http://www.greenbusinesscentre.com/documents/Evaporator.pdf>

[%] <http://www.p2pays.org/ref/10/09590.htm>



frequency of chocking of the tubes one of the pumps was being reinstalled on a trial basis to counter the chocking tendency in the evaporator plants.

Efficiency of an evaporator depends on the utilization of the heat transfer area which in turn depends on the distribution of the feed on the laminar tubes. In the project plant, due to the high silica content, this uniform distribution of weak black liquor is hindered, resulting in unequal wetting of the evaporator tubes and thus leading to lower efficiency at times. The high silica content of feedstock has been confirmed from the laboratory analysis report of strong black liquor of the plant /1/~14/.

Other barriers:

Locational disadvantage of the plant with respect to transportation of equipment during its erection and commissioning stage is also a barrier to the project activity.

Communication from M/s Enmas Ahlstrom Limited, dated 10 April 2000, confirms that HPC is the only paper and pulp manufacturing organisation to take up a falling film evaporation installation project in the country. There is no other 100% bamboo based paper and pulp manufacturer in India to have taken up such an energy efficiency project.

A study report by Stephan Walker on “hardwood fibre and requirements of the Indian Pulp and paper industry”¹ indicates that there are no other 100% bamboo based plants in the country.

It is sufficiently demonstrated that the investment barrier, technological barrier and others barriers affect the project activity and prevents any widespread replication of the project activity.

The delay in presenting the project for CDM registration is attributed to the non-availability of an appropriate methodology for the project and the lead time required for appointment of a consulting agency to take the project forward. The project was initially web-hosted using AM0018, for a 30 day period starting from 26 September 2006. During desk review and subsequent validation it was identified that the project does not fulfil the applicability criteria of the methodology AM0018. The project was subsequently recast as a small scale project activity using approved methodology AMS-II.D and presented for validation

The above mentioned arguments thus sufficiently demonstrate that the project is not a likely baseline scenario and that the emission reductions resulting from the project are additional.

3.5 Monitoring Plan

The project applies the approved simplified monitoring methodology AMS-II.D Version 09 for small-scale CDM project activities, titled “Energy efficiency and fuel switching measures for industrial facilities”.

The monitoring plan adequately addresses all necessary information for monitoring and reporting of emission reductions due to the project activity.

The monitoring plan provides for monitoring of amount of LP steam consumed in the evaporator plant and WBL processed in the evaporator plant. The amount of coal consumed in the coal fired utility boilers and amount of HP steam generated from the chemical recovery boiler and coal fired boilers are measured during the project period.

¹ 2006 Gottstein fellowship project , “hardwood fibre requirements of the Indian Paper and pulp industry” by Stephan Walker.



For determination of project emission the amount of MP steam utilised in the ejector system of the evaporator plant and for soot blowing in the chemical recovery boiler is monitored during the project period.

As required by the methodology the technical specification of the equipment retrofitted as a part of the project activity is included in the monitoring plan of the project. The monitoring plan provides for monitoring of all future retrofit measures that are carried out during the project period and evaluation of effect of the same on emission reduction estimates for the project.

The project proponent has prepared monitoring and measurement procedures and defined the roles and responsibilities of the operating personnel of the unit. The monitoring plan details the parameters, sources, methods of collection and archiving of data. These were found to be adequate. The organisation has established a management structure for the CDM project with clear roles and responsibilities, calibration of measuring instruments and authority for necessary corrective actions.

3.6 Calculation of GHG Emissions

The emission reduction for the project are calculated in terms of decrease in LP steam consumption in evaporator plant and increased amount of HP steam generation in the chemical recovery boiler system.

Emission reduction due to reduced LP steam consumption in evaporator plant is estimated based on the difference of specific consumption of LP steam per tonne of WBL processed in the evaporator plant during the baseline and project period and the annual average amount of WBL processed in the project Plant. For conservative estimation, this amount of LP steam saved is assumed to be equal to the amount of HP steam that would have been generated in the coal fired boiler system. The amount of equivalent coal saved is computed from the monitored amount of coal consumed and HP steam generated in the coal fired utility boiler. IPCC default emission coefficient of coal is used to estimate the emission reduction due to the project activity.

Emission reductions associated with increased HP steam generation in the chemical recovery boiler is estimated based on the difference in coal based thermal energy generation per tonne of total HP steam generated in the plant between the baseline and project period. The baseline specific energy generation is computed for the amount of HP steam produced in the coal fired boilers and HP steam that would have been generated in the chemical recovery boiler based on amount of WBL processed in the project period. The amount of coal based energy saved is translated to tonnes of CO₂ equivalent based on IPCC default value of coal and NCV of coal.

Project emissions are computed for the extra amount of MP steam consumed in the ejector system of the evaporator plant and soot blowing steam in the chemical recovery boiler. The absolute differential between the baseline and project period consumption figures are used to compute the project emissions. MP steam used in the project plant is let down from the HP header and a material and energy balance is done across the letdown station to evaluate the amount of MP generated per tonne of HP let down.

The calculations are transparent and have been verified. The IPCC default emission factors are used for emission reduction calculation which is justifiable as the change in emission factor does not significantly affect the emission reduction projections for the project activity



3.7 Environmental Impacts

The assessment of environmental impact has been carried out as required by the Environment protection act (1986). Relevant environmental management plans are drawn up and organisation is equipped to adhere to the requirements of the management plans. The effects of the project on air, water and surrounding environment has been assessed and found to be insignificant. There are no trans-boundary effects for the project activity. All necessary statutory and regulatory clearances are available for the generation unit.

3.8 Comments by Local Stakeholders

The major stakeholders identified for the HPC project are its employees, statutory and regulatory bodies, suppliers, transporters, local population and shareholders of the organisation. Concerns of the statutory and regulatory bodies were invited during the stage of obtaining necessary clearances for the project. Comments were invited from the employees of the organisation, who are the major stakeholders of the project, through a notice issued by the senior manager, civil and environment, of the unit.

No adverse comments were received during the stakeholders' consultation process.



4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The PDD of 2 September 2006 was made publicly available on DNV's climate change website (www.dnv.com/certification/climatechange) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 26 September 2006 to 25 October 2006. The project design document was again made publicly available on DNV's climate change website (www.dnv.com/certification/climatechange) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 21 April 2007 to 20 May 2007 due to the change in the methodology applied.

One comment was received on 18 May 2007 The comment received (in unedited form) is given in the below text box.

Comment by: Jeevanandan

Inserted on: 18 05 2007

Subject:

Comment: Dear Sir,

Starting date of the project:

As per the statement in the PDD it is identified that the project has happened in 2001 only due to CDM revenues but it is quiet surprising why the PP has not approached the CDM system until now and the justification provided is not self explanatory. The suitable documentation has to be provided as an annex in the PDD.

Emission calculation:

The PP use the steam from Recovery boiler, which is burnt by Renewable biomass((strong black liquor)so it is not clear from the PDD how does the distinction would be done between the SBL generated steam and fossil fuel fired boiler generated steam.

The PDD uses a term steam economy but no where in the PDD algorithm is available for estimating the same.

To estimate accurately the emission reduction the entire evaporators system "steam economy" should be studied in baseline and project facility.

Additionality:

The technology barrier are quiet commonly encountered in all evaporators, how does this sector alone has a specific barrier needs to be established.

Double Counting:

Keeping in view of the SSC methodology AMS III M the impact of high recovery percentage of SBL due to the energy effieicny activity vis-a-vis higher soda recovery needs to be evaluated.

***How DNV has considered the comment received in its validation:***

As already discussed in section 3.4 of this report, it has been demonstrated that

- The project activity was initially revived at the Nagoan plant of HPC in 2001 (which is not a part of the project activity).
- The delay in implementing the same at the Cachar plant (project activity) was due to
 - The unit operating below capacity with low realisation
 - Higher cost for project activity implementation at CPM than what it had been for NPM,
 - The thrust of the management therefore was to invest in measures for maximization of production and optimization of consumption of raw materials.

The delay in presenting the project for CDM registration is attributed to the non-availability of an appropriate methodology for the project and the lead time required for appointment of a consulting agency to take the project forward. The project was initially web-hosted using AM0018, for a 30 day period starting from 26 September 2006. During desk review and subsequent validation it was identified that the project does not fulfil the applicability criteria of the methodology AM0018. The project was subsequently recast as a small scale project activity using approved methodology AMS-II.D and presented for validation.

The monitoring plan of the final PDD version 02 dated 21 July 2007 provides for separately monitoring the amount of steam generated from the chemical recovery boiler and coal fired boilers. The emission reduction estimates associated with reduction in LP steam consumption and HP steam generation in coal fired boiler system is separately evaluated in the project activity.

Steam economy in terms of LP steam consumed per tonne of WBL processed during the baseline and project period has been separately evaluated for emission reduction estimation.

The project faces significant technological barrier which is assessed in section 3.4 of the final validation report.

The project does not apply methodology AMS IIIM in the project activity.



5 VALIDATION OPINION

Det Norske Veritas Certification AS (DNV) has performed a validation of the “Optimization of steam consumption in the process by installation of free flow falling film finisher evaporator and retrofit to the chemical recovery boiler in Cachar Paper Mill of Hindustan Paper Corporation Limited” project in India. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The review of the project design documentation and the subsequent follow-up interviews have provided DNV with sufficient evidence to determine the fulfilment of stated criteria.

The host Party is India and no Annex I Party is identified for the project as yet. India fulfils the participation criteria and the DNA of India has approved the project vide letter No. 4/19/2006-CCC dated 4 October 2007. The DNA of India has confirmed that the project assists in achieving sustainable development.

Having a net thermal saving capability of less than 180 GW_{th} per annum, the project is eligible as type II small-scale CDM project activity. The project correctly applies the simplified baseline and monitoring methodology AMS-II.D Version 09.

By installing of efficient falling film finisher evaporator and increased HP generation from a chemical recovery boiler, the project results in reductions of CO₂ emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

The total emission reductions from the project are estimated to be on the average 25 664 tCO_{2e} per year over the selected 10 year crediting period. The emission reduction forecast has been checked and is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

Adequate training and monitoring procedures have been implemented.

In summary, it is DNV’s opinion that the project, as described in the project design document version-02 dated 21 July 2007, meets all relevant UNFCCC requirements for the CDM, is eligible as category II small-scale CDM project activity and correctly applies the approved simplified baseline and monitoring methodology AMS-II.D Version 09. Hence, DNV requests the registration of the “Optimization of steam consumption in the process by installation of free flow falling film finisher evaporator and retrofit to the chemical recovery boiler in Cachar Paper Mill of Hindustan Paper Corporation Limited” project as a CDM project.



REFERENCES

Documents provided by the project proponent that relate directly to the project:

- /1/ Project design document “Optimization of steam consumption in the process by installation of free flow falling film finisher evaporator and retrofit to the chemical recovery boiler in Cachar Paper Mill of Hindustan Paper Corporation Limited” Version-01 dated 2 September 2006.
- /2/ Project design document “Optimization of steam consumption in the process by installation of free flow falling film finisher evaporator and retrofit to the chemical recovery boiler in Cachar Paper Mill of Hindustan Paper Corporation Limited” Version-02 dated 21 July 2007.
- /3/ Host country approval letter from Ministry of Environment and forest, Government of India, dated 4 October 2007.
- /4/ Agenda note to 173rd HPC board meeting.
- /5/ Proposal for installation of a FFFF in evaporator plant for GHG emission reduction, dated 15 June 2003, forwarded by Deputy General Manager (Utilities).
- /6/ Extracts of the minutes of meeting of the 173rd meeting of the Board of HPC held on 18th July 2003.
- /7/ Extracts of the minutes of meeting of the 174th meeting of the Board of HPC held on 18th November 2003.
- /8/ Compiled figures of steam generated from chemical recovery boiler, for the period November 2003 to December 2005, from plant log book.
- /9/ Emission reduction estimation spreadsheet , “HPC Cachar Mill - ER Estimation (21072007)_Version 02_final.xls”.
- /10/ Communication from HPC to Pollution control board, Assam, on the installation of FFFF in the evaporator plant.
- /11/ Audited figures of production, sales and net profit of the Cachar plant for the period 1996~97 to 2005~2006.
- /12/ Material return voucher for disposal of the old evaporator from the Cachar plant.
- /13/ Analysis report of strong black liquor taken from Cachar plant as provided by “Central pulp and paper research Institute” dated 27th December 2002.
- /14/ Notice inviting comments from local stakeholders on the project dated 01st June 2003.

Background documents related to the design and/or methodologies employed in the design or other reference documents:

- /15/ International Emission Trading Association (IETA) & the World Bank’s Prototype Carbon Fund (PCF): *Validation and Verification Manual*. <http://www.vvmanual.info>
- /16/ Appendix B of the simplified modalities and procedures for small-scale CDM project



activities: *Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories*. Version 06: 20 September 2005.

Persons interviewed during the validation, or persons who contributed with other information that are not included in the documents listed above:

- /17/ Mr. N K Ghosh : HPC
- /18/ Mr. P Goswami, DGM (Utility- CPM).
- /19/ Mr. N K Upadhyay, DGM (Chemical Plant Operation- CPM).
- /20/ Mr. S K Rajkhowa, Senior Manager (Planning and development- CPM).
- /21/ Mr. K R M Rao, Manager (Recovery plant- CPM)

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APPENDIX A

VALIDATION PROTOCOL FOR SMALL-SCALE CDM PROJECT ACTIVITIES

Table 1 Mandatory Requirements for Small Scale Clean Development Mechanism (CDM) Project Activities

Requirement	Reference	Conclusion	Cross Reference/ Comment
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3	Kyoto Protocol Art. 12.2	OK	Table 2, Section E.4.1
2. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof	Kyoto Protocol Art. 12.2, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	GL-4	Table 2, Section A.3
3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC	Kyoto Protocol Art. 12.2.	OK	Table 2, Section E.4.1
4. The project shall have the written approval of voluntary participation from the designated national authority of each party involved	Kyoto Protocol Art. 12.5a, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	GL-4	
5. The emission reductions should be real, measurable and give long-term benefits related to the mitigation of climate change	Kyoto Protocol Art. 12.5b	OK	Table 2, Section E.1 to E.4
6. Reduction in GHG emissions must be additional to any that would occur in absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity	Kyoto Protocol Art. 12.5.c, Simplified Modalities and Procedures for Small Scale CDM Project Activities §26	GL 2, GL 3 and GL 4	Table 2, Section B.2.1
7. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall	Decision 17/CP.7, CDM Modalities and	NA	

Requirement	Reference	Conclusion	Cross Reference/ Comment
provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties.	Procedures Appendix B, § 2		
8. Parties participating in the CDM shall designate a national authority for the CDM	CDM Modalities and Procedures § 29	OK	Designated National Authority of India is The Ministry of Environment and Forests.
9. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol	CDM Modalities and Procedures § 30, 31b	OK	The host country (India) has ratified the Kyoto Protocol on 26 August 2002.
10. The participating Annex I Party's assigned amount shall have been calculated and recorded	CDM Modalities and Procedures §31b	OK	Annex – I Party is yet to be identified.
11. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7	CDM Modalities and Procedures §31b	OK	Annex – I Party is yet to be identified.
12. The proposed project activity shall meet the eligibility criteria for small scale CDM project activities set out in § 6 (c) of the Marrakesh Accords and shall not be a debundled component of a larger project activity	Simplified Modalities and Procedures for Small Scale CDM Project Activities §12a,c	OK	Table 2, Section A.1
13. The project design document shall conform with the Small Scale CDM Project Design Document format	Simplified Modalities and Procedures for Small Scale CDM Project Activities, Appendix A	OK	The project design document conforms to the version-03 format of CDM-SSC-PDD of UNFCCC.
14. The proposed project activity shall confirm to one of the project categories defined for small scale CDM	Simplified Modalities and Procedures for Small	OK	Table 2, Section A.1.3, B and D

Requirement	Reference	Conclusion	Cross Reference/ Comment
project activities and uses the simplified baseline and monitoring methodology for that project category	Scale CDM Project Activities §22e		
15. Comments by local stakeholders are invited, and a summary of these provided	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22b	Ok	Table 2, Section G
16. If required by the host country, an analysis of the environmental impacts of the project activity is carried out and documented	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22c	OK	Table 2, Section F
17. Parties, stakeholders and UNFCCC accredited NGOs have been invited to comment on the validation requirements and comments have been made publicly available	Simplified Modalities and Procedures for Small Scale CDM Project Activities §23b,c,d	OK	The project was put up for international stakeholder consultation for a period of 30 days. One comment was received during the process which is suitably addressed in the project.

Table 2 Requirements Checklist

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
A. Project Description The project design is assessed.					
A.1. Small scale project activity It is assess whether the project qualifies as small scale CDM project activity.					
A.1.1. Does the project qualify as a small scale CDM project activity as defined in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM?	/1/	DR, I	Being an energy efficiency program the project qualifies as type II of small scale CDM project activity. The total energy savings due to the project is around 82 GWH _{th} which is below the ceiling of 180 GWH _{th} for small scale CDM project activity.		OK
A.1.2. The small scale project activity is not a debundled component of a larger project activity?	/1/	DR, I	The project is not a debundled component as there are no other projects registered by the same project proponent within 1 km of the proposed small scale activity using the same technology.		OK
A.1.3. Does proposed project activity confirm to one of the project categories defined for small scale CDM project activities?	/1/	DR	The project involves measures implemented in the evaporator section of the plant and efficiency improvement in the chemical recovery boiler of the unit. Thus the project justifiably qualifies as an energy efficiency improvement project under category II D of small scale project activity.		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
A.2. Project Design Validation of project design focuses on the choice of technology and the design documentation of the project.					
A.2.1. Are the project's spatial (geographical) boundaries clearly defined?	/1/	DR, I	The project boundary includes the evaporator plant where the finisher evaporator is installed, the chemical recovery boiler where enhanced HP generation takes place and the utility section comprising of 3 coal fired boilers which generate HP steam for the plant.		OK
A.2.2. Are the project's system (components and facilities used to mitigate GHG's) boundaries clearly defined?	/1/	DR, I	The components within the project boundary are clearly identified in the project.		OK
A.2.3. Does the project design engineering reflect current good practices?	/1/	DR	The installation of a finisher evaporator for better steam efficiency and relocation of the preheaters to outside the exchanger body reflects good engineering practice. The detail designing has been done by experts in the field of paper and pulp manufacturing machinery and reflect current good practice.		OK
A.2.4. Will the project result in technology transfer to the host country?	/1/	DR	No		OK
A.2.5. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period? Does the project make provisions for meeting training and maintenance needs?	/1/	DR	The existing personnel of the plant had been trained as a part of the technical up-gradation of the plant. The training needs of the operating and maintenance personnel are covered in the existing QMS of the organisation.		Ok

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
A.3. Contribution to Sustainable Development The project's contribution to sustainable development is assessed					
A.3.1. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR	The up-gradation of the chemical recovery boiler and evaporation plant will result in lower fossil fuel consumption and thus related GHG emissions associated with fossil fuel burning.		OK
A.3.2. Will the project create any adverse environmental or social effects?	/1/	DR	The project is not envisaged to have any adverse effect on the environmental or social front.		OK
A.3.3. Is the project in line with sustainable development policies of the host country?	/1/	DR	Clarification is requested on the status of host county approval for the project activity.	CL-1	OK
A.3.4. Is the project in line with relevant legislation and plans in the host country?	/1/	DR	Same as A.3.3	CL-1	OK
B. Project Baseline The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.					
B.1. Baseline Methodology It is assessed whether the project applies an appropriate baseline methodology.					
B.1.1. Is the selected baseline methodology in line with the baseline methodologies provided for the relevant project category?	/1/	DR	The project applies the simplified baseline and monitoring methodology AMS II D version-09 dated 18 May 2007.		OK
B.1.2. Is the baseline methodology applicable to the project being considered?	/1/	DR	The baseline methodology is applicable to the project as it is demonstrated that.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			<ul style="list-style-type: none"> - The project involves implementation of energy saving measures at the existing plant of HPC. - The project involves retrofitting of the existing evaporator plant with a FFFF and chemical recovery boiler of higher efficiency. - The annualised aggregate energy saving due to the project is around 82 GWH_{th} which is lower than the ceiling of 180 GWH_{th} for small scale project. 		
B.2. Baseline Determination It is assessed whether the project activity itself is not a likely baseline scenario and whether the selected baseline represents a likely baseline scenario.					
B.2.1. Is it demonstrated that the project activity itself is not a likely baseline scenario due to the existence of one or more of the following barriers: investment barriers, technology barriers, barriers due to prevailing practice or other barriers?	/1/	DR	<p>The project argues that though initially the project was approved internally it was put on hold looking at the poor financial condition of the organisation. Clarification is requested on the internal approval of the project and documentary evidence is required on the argument that dual benefits from CDM and savings from project was seriously considered during final approval of the project at CPM.</p> <p>Plant performance records of CPM is required to assess the argument that the unit was operating below breakeven capacity due to infrastructure and locational disadvantage w.r.t finished good movement from plant.</p> <p>Clarification is requested on the level of silica content in the black liquor processed in the</p>	CL-2	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			evaporator plant. Records of downtime of the finisher evaporator unit pre and post project implementation is required to assess the argument that the project has lead to increase in scaling and downtime of the unit.		
B.2.2. Is the application of the baseline methodology and the discussion and determination of the chosen baseline transparent and conservative?	/1/	DR	The baseline of the project activity is the continuation of existing practice. Clarification is requested on the remaining lifetime of the equipment which are retrofitted as a part of the project.	CL-3	OK
B.2.3. Are relevant national and/or sectoral policies and circumstances taken into account?	/1/	DR	It is argued that the project is unique in the field of paper manufacturing at the time the decision to implement the project was taken. Clarification is requested on the basis of this argument and analysis is required to assess that there is no precedence of the project activity in bamboo based pulp and paper industry in India.	CL-4	OK
B.2.4. Is the baseline selection compatible with the available data?	/1/	DR	Yes		OK
B.2.5. Does the selected baseline represent the most likely scenario describing what would have occurred in absence of the project activity?	/1/	DR	Same as B.2.2	CL-3	OK
C. Duration of the Project / Crediting Period It is assessed whether the temporary boundaries of the project are clearly defined.					
C.1.1. Are the project's starting date and operational lifetime clearly defined?	/1/	DR	The starting date of the project activity is 18 July 2003. The operating lifetime of the project is 20 years.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
C.1.2. Is the assumed crediting time clearly defined (renewable crediting period of seven years with two possible renewals or fixed crediting period of 10 years with no renewal)?	/1/	DR	Fixed crediting period of 10 year duration starting from 1 January 2007 has been selected for the project activity. As the project does not claim for retroactive credits and the crediting period can only start after registration of the project, the start date of crediting period needs to be modified accordingly.	CAR-1	OK
D. Monitoring Plan The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed.					
D.1. Monitoring Methodology It is assessed whether the project applies an appropriate monitoring methodology.					
D.1.1. Is the selected monitoring methodology in line with the monitoring methodologies provided for the relevant project category?	/1/	DR	The project applies the monitoring methodology AMS II D which is applicable to the project		OK
D.1.2. Is the monitoring methodology applicable to the project being considered?	/1/	DR	The monitoring methodology is applicable to the project as it is demonstrated that. <ul style="list-style-type: none"> - The project involves implementation of energy saving measures at the existing plant of HPC. - The project involves retrofitting of the existing evaporator plant with a FFFF and chemical recovery boiler of higher efficiency. - The annualised aggregate energy saving due to the project is around 82 GWH_{th} which is lower 		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			than the ceiling of 180 GWH _{th} for small scale project.		
D.1.3. Is the application of the monitoring methodology transparent?	/1/	DR	yes		Ok
D.1.4. Will the monitoring methodology give opportunity for real measurements of achieved emission reductions?	/1/	DR	The parameters are measurable in nature.		OK
D.2. Monitoring of Project Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
D.2.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/1/	DR	The specification of the equipment installed as a part of the project needs to be included in the monitoring plan as required in the methodology.	CAR-2	OK
D.2.2. Are the choices of project GHG indicators reasonable?	/1/	DR	Yes all the parameters required for determination of project emissions are identified in the project		OK
D.2.3. Will it be possible to monitor / measure the specified project GHG indicators?	/1/	DR	yes		OK
D.2.4. Will the indicators give opportunity for real measurements of project emissions?	/1/	DR	Clarification is requested on the retrofit measures executed till date in the evaporator plant and boiler section after project implementation which may affect the steam efficiency or efficiency of the project plant/ coal fired boiler system.	CL-5	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
D.3. Monitoring of Leakage If applicable, it is assessed whether the monitoring plan provides for reliable and complete leakage data over time.					
D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/		No leakage is applicable to the project as there is not transfer to equipment from and to the project plant. Clarification is requested on the asset disposal record of the old equipments which are retrofitted as a part of the project.	CL-6	OK
D.4. Monitoring of Baseline Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
D.4.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	/1/		All the parameters required for baseline emissions are identified for the project activity		OK
D.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/1/	DR	yes		OK
D.4.3. Will it be possible to monitor / measure the specified baseline indicators?	/1/	DR	The period for which the baseline data is collected for different parameters, as provided under section B.6.2, do not match with that provided in the excel sheet for emission reduction calculation.	CAR-3	OK
D.4.4. Will the indicators give opportunity for real measurements of baseline emissions?	/1/	DR	yes		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
D.5. Project Management Planning It is checked that project implementation is properly prepared for and that critical arrangements are addressed.					
D.5.1. Is the authority and responsibility of project management clearly described?	/1/	DR	The organisation has framed a monitoring and verification plan for the project wherein the roles and responsibilities of the concerned personnel is clearly defined.		OK
D.5.2. Is the authority and responsibility for registration monitoring measurement and reporting clearly described?	/1/	DR	The records will be collected by the operating personnel and review by their in-charge of operations.		OK
D.5.3. Are procedures identified for training of monitoring personnel?	/1/	DR	The training need of the operating and maintenance personnel is covered under the existing QMS of the organisation.		OK
D.5.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR	There are no scenarios that may lead to unintended emissions from the project boundary.		OK
D.5.5. Are procedures identified for calibration of monitoring equipment?	/1/	DR	All the measurement instruments will be calibrated on an annual frequency as detailed under the M&V procedure of the organisation.		OK
D.5.6. Are procedures identified for maintenance of monitoring equipment and installations?	/1/	DR	The maintenance need and resources are covered under the existing M&V procedure of the organisation		OK
D.5.7. Are procedures identified for monitoring, measurements and reporting?	/1/	DR	yes		OK
D.5.8. Are procedures identified for day-to-day records handling (including what records	/1/	DR	Yes		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
to keep, storage area of records and how to process performance documentation)					
D.5.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	/1/	DR	The organisation has firmed up an annual frequency for data review and necessary change in monitoring parameters		OK
D.5.10. Are procedures identified for internal audits of GHG project compliance with operational requirements as applicable?	/1/	DR	yes		OK
D.5.11. Are procedures identified for project performance reviews?	/1/	DR	yes		OK
D.5.12. Are procedures identified for corrective actions?	/1/	DR	Covered under the QMS of the organisation		OK
E. Calculation of GHG emission It is assessed whether all material GHG emission sources are addressed and how sensitivities and data uncertainties have been addressed to arrive at conservative estimates of projected emission reductions.					
E.1. Project GHG Emissions The validation of ex-ante estimated project GHG emissions focuses on transparency and completeness of calculations.					
E.1.1. Are all aspects related to direct and indirect project emissions captured in the project design?	/1/	DR	Provision of 4 nos. of external steam heaters is included as a part of the project as detailed in section A.4.2 of the PDD. Clarification is requested on the source of steam used therein and whether this steam is additional to that used in the baseline.	CL-7	OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
E.1.5. Have conservative assumptions been used?	/1/	DR	For conservativeness the amount of LP consumed in the evaporator is taken to be equivalent amount of HP at turbine inlet from which LP is extracted.		OK
E.1.6. Are uncertainties in the project emissions estimates properly addressed?	/1/	DR	Parameters related to emission reduction calculation, $\left(\frac{A_{HP_CFB}}{A_{coal_CFB}} \right)$, $\left(\frac{A_{coal_CFB}}{A_{HP_cogen}} \right)_b$, are calculated as a function of amount of coal consumed at the coal fired boilers. These parameters are dependent on the quality of coal fired at the utility section wrt. Calorific value, ash content, moisture content etc for equivalent amount of energy output. clarification is requested as to how these uncertainties are taken care of in determination of these factors.	CL-10	
E.2. Leakage It is assessed whether there leakage effects, i.e. change of emissions which occurs outside the project boundary and which are measurable and attributable to the project, have been properly assessed and estimated ex-ante.					
E.2.1. Are leakage calculation required for the selected project category and if yes, are the relevant leakage effects assessed?	/1/	DR	There are no leakages associated with the project activity.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
E.3. Baseline GHG Emissions The validation of ex-ante estimated baseline GHG emissions focuses on transparency and completeness of calculations.	/1/				
E.3.1. Are the baseline emission boundaries clearly defined and do they sufficiently cover sources for baseline emissions?	/1/	DR	The baseline emission sources are clearly identified in the project and is consistent with the determination of the project emissions.		OK
E.3.2. Are all aspects related to direct and indirect baseline emissions captured in the project design?	/1/	DR	yes		OK
E.3.3. Have all relevant greenhouse gases and sources been evaluated?	/1/	DR	All relevant GHG sources are evaluated in the project.		OK
E.3.4. Do the methodologies for calculating baseline emissions comply with existing good practice?	/1/	DR	In determination of $\left(\frac{A_{LP}}{A_{WBL}}\right)_b$ the data for LP is taken for the period Nov'03 to Sep'04 where as the WBL data is for the period Nov'03 to Oct'04. The factor needs to be recalculated based data on LP steam consumption and WBL processed for the same period. The monitoring plan details that the parameter will be measured in m3 and density correction will be incorporated to compute the equivalent tonnage. This is not evidenced in the detailed excel sheet provided for determination of emission reduction.	CAR-5	OK
E.3.5. Are the calculations documented in a complete and transparent manner?	/1/	DR	The unit of parameter $\left(\frac{A_{MP-SJE}}{A_{WBL}}\right)_b$ as used in emission reduction calculations do not match with that detailed under B.6.2 of the PDD.	CAR-6	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
E.3.6. Have conservative assumptions been used?	/1/	DR	For conservativeness the amount of LP consumed in the evaporator is taken to be equivalent amount of HP at turbine inlet from which LP is extracted.		OK
E.3.7. Are uncertainties in the baseline emissions estimates properly addressed?	/1/	DR	There are no uncertainties w.r.t to the baseline emission determination.		OK
E.4. Emission Reductions Validation of ex-ante estimated emission reductions.					
E.4.1. Will the project result in fewer GHG emissions than the baseline case?	/1/	DR	in determination of emission reduction associated with the increase in LP steam economy, HP generation per tonne of coal fired and MP steam use, the reduction must be limited to increase in steam efficiency only. Factors like $EF_{grid,b}$, $\left(\frac{A_{HP_CFB}}{A_{coal_CFB}} \right)$ must be same during determination of baseline emission and project emission to prevent emission reduction claims associated with change in these factor during the baseline and project period..	CAR-7	OK
F. Environmental Impacts It is assessed whether environmental impacts of the project are sufficiently addressed.					
F.1.1. Does host country legislation require an analysis of the environmental impacts of the project activity?	/1/	DR	Being an energy efficiency measure EIA is not required in the project activity.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
F.1.2. Does the project comply with environmental legislation in the host country?	/1/	DR	The project has applied for host country approval, status of the same needs to be confirmed.	GL-01	OK
F.1.3. Will the project create any adverse environmental effects?	/1/	DR	There are no adverse effects on the environment due to the project activity.		OK
F.1.4. Have environmental impacts been identified and addressed in the PDD?	/1/	DR	Yes.		OK
G. Comments by Local Stakeholder					
Validation of the local stakeholder consultation process.					
G.1.1. Have relevant stakeholders been consulted?	/1/	DR	The local community, employees of the organisation, regulatory and statutory authorities and equipment suppliers have been identified as relevant stakeholders to the project.		OK
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/	DR	The above mentioned personnel had been contacted by the plant authorities through an one to one interaction.		OK
G.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/1/	DR	No such regulation exists under the Indian DNA.		OK
G.1.4. Is a summary of the comments received provided?	/1/	DR	yes		OK
G.1.5. Has due account been taken of any comments received?	/1/	DR	No adverse comment has been received during the stakeholder consultation process.		OK

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
<p>CAR 1</p> <p>As the project does not claim for retroactive credits and the crediting period can only start after registration of the project, the start date of crediting period needs to be modified accordingly</p>	C.1.2	Addressed in the revised PDD.	<p>OK.</p> <p>Changes incorporated in the revised PDD and found to be in order.</p> <p>CAR closed.</p>
<p>CAR 2</p> <p>The specification of the equipment installed as a part of the project needs to be included in the monitoring plan as required in the methodology</p>	D.2.1	Addressed in the revised PDD	<p>OK.</p> <p>Changes incorporated in the revised PDD and found to be in order.</p> <p>CAR closed.</p>
<p>CAR 3</p> <p>The period for which the baseline data is collected for different parameters, as provided under section B.6.2, do not match with that provided in the excel sheet for emission reduction calculation.</p>	D.4.3	Addressed in the revised PDD	<p>OK.</p> <p>Parameters as used in emission reduction estimation are found to be in line with that used in the revised PDD.</p> <p>CAR closed.</p>
<p>CAR-4</p> <p>Combined margin emission factor of the north eastern regional grid as given in annex-04 of the PDD do not match with that used in the excel sheet for emission factor determination.</p>	E.1.4	For conservative estimation, emission reductions associated with reduced electricity consumption In the evaporator plant is not claimed in the project activity.	<p>OK</p> <p>CAR closed.</p>
<p>CAR 5</p> <p>In determination of $\left(\frac{A_{LP}}{A_{WBL}} \right)_b$ the data for LP is taken for the period Nov'03 to Sep'04 where</p>	E.3.4	Addressed in the revised PDD	<p>OK.</p> <p>The calculation of average LP consumed per tonne of WBL processed in the plant has been computed for the</p>

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
as the WBL data is for the period Nov'03 to Oct'04. The factor needs to be recalculated based data on LP steam consumption and WBL processed for the same period. The monitoring plan details that the parameter will be measured in m3 and density correction will be incorporated to compute the equivalent tonnage. This is not evidenced in the detailed excel sheet provided for determination of emission reduction.			period November 2003 to October 2004. CAR Closed.
CAR 6 The unit of parameter $\left(\frac{A_{MP_SJE}}{A_{WBL}} \right)_b$ as used in emission reduction calculations do not match with that detailed under B.6.2 of the PDD.	E.3.5	Addressed in the revised PDD	OK. Changes incorporated in the revised PDD and found to be in order. CAR closed.
CAR 7 in determination of emission reduction associated with the increase in LP steam economy, HP generation per tonne of coal fired and MP steam use, the reduction must be limited to increase in steam efficiency only. Factors like $EF_{grid,b} \cdot \left(\frac{A_{HP_CFB}}{A_{coal_CFB}} \right)$ must be same during determination of baseline emission and project emission to prevent emission reduction claims associated with change in these factor during the baseline and project period..	E.4.1	Addressed in the revised PDD and excel workbook containing ER calculation	OK. Changes incorporated in the revised ER calculation details and the PDD. Same found to be in order. CAR closed.

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
<p>CL 1</p> <p>Clarification is requested on the status of host county approval for the project activity.</p>	A.3.3, 3.4	<p>The project proponent has applied for host country approval (HCA) to the Ministry of Environment and Forests, Government of India. However issuance of HCA for the project activity is subject to the closure of validation by the DOE.</p>	<p>HCA for the project received on 04 October 2007.</p> <p>CL closed.</p>
<p>CL 2</p> <p>The project argues that though initially the project was approved internally it was put on hold looking at the poor financial condition of the organisation. Clarification is requested on the internal approval of the project and documentary evidence is required on the argument that dual benefits from CDM and savings from project was seriously considered during final approval of the project at CPM.</p> <p>Plant performance records of CPM is required to assess the argument that the unit was operating below breakeven capacity due to infrastructure and locational disadvantage w.r.t finished good movement from plant.</p> <p>Clarification is requested on the level of silica content in the black liquor processed in the evaporator plant. Records of downtime of the finisher evaporator unit pre and post project implementation is required to assess the argument that the project has lead to</p>	B.2.1	<ul style="list-style-type: none"> - Documentary evidences have been submitted to the DOE as to the facts that (i) the project was put on hold looking at the poor financial condition of the organization and (ii) that dual benefits from CDM and fossil fuel savings from the project was seriously considered during final approval of the project at CPM. - Plant performance records, proving that CPM was operating below break-even capacity for the period between 1996 and 2004, has been submitted to the DOE. - Sample analysis report on the level of silica content in the black liquor processed in the evaporator plant of CPM, has been submitted to the DOE. Non-wood fibrous raw materials normally have a higher ash and silica content than wood. Most of the silica gets dissolved during cooking and remains as an 	<p>Documentary evidence in the form of "agenda note" to the 173rd Board meeting provided. The agenda note clearly indicates that the project was put on hold due to the poor financial condition of the organisation.</p> <p>The financial condition of the company presented in the form of audited figures for the period 1996 ~2006. the presented figures indicate that the organisation had been operating below capacity till 2004 and with a very low operating profit margin.</p> <p>Analysis report on sample of strong black liquor collected from Cachar mill presented. The analysis report indicates a high silica content (1.4% w/w%) as against the conventional strong black liquor generated in wood based paper industry.</p> <p>CL closed.</p>

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
increase in scaling and downtime of the unit.		undesirable constituent of the black liquor. The silica causes many problems as washing is difficult owing to the poor drainability of the pulp and high viscosity of black liquor. The outcome is scale-formation in evaporator tubes; deposits on the furnace walls of recovery boilers, slow setting rate of caustizing white liquor and lime sludge unsuitable for re-burning. The presence of silica is a major technical obstacle to the efficient chemical recovery of non-wood black liquor. The technological problems related high silica content are typical to bamboo based black liquor and are not encountered as such in case of wood based black liquor*. The project proponent anticipated the above-mentioned technological risks involved in the successful operation of the project activity which may lead to increase in the downtime of the unit. Documentary evidence has been submitted to the DOE as to the difficulties involved in handling bamboo based black liquor, containing comparatively higher amount of silica.	

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
<p>CL 3</p> <p>The baseline of the project activity is the continuation of existing practice. Clarification is requested on the remaining lifetime of the equipment which are retrofitted as a part of the project</p>	B.2.2, 2.5	<p>Documentary evidence has been provided to the DOE as to the normal operating lifetime of a cascade evaporator which has been replaced with a free flow falling film (FFFF) evaporator under the project activity.</p>	<p>Accepted.</p> <p>Analysis of equipment lifetime as presented in a paper on paper and pulp industry provided. It is substantiated that the average lifetime of a chemical recovery boiler and evaporator system is beyond 40 years and in the project the baseline equipment would have continued in service beyond the end of crediting period.</p> <p>CL closed.</p>
<p>CL 4</p> <p>It is argued that the project is unique in the field of paper manufacturing at the time the decision to implement the project was taken. Clarification is requested on the basis of this argument and analysis is required to assess that there is no precedence of the project activity in bamboo based pulp and paper industry in India</p>	B.2.3	<p>At the time when the decision to implement the project activity was taken, similar project activity was implemented in the company's other plant Nagaon Paper Mill (NPM) which also had come up with CDM in perspective. Documentary evidence has been provided to the DOE to prove that apart from the Nagaon and Cachar Paper Mills of Hindustan Paper Corporation Limited, there are no other integrated pulp and paper mill in India entirely based on bamboo as the raw material. This evidence also substantiates the fact that there was no precedence of the project activity in bamboo based pulp and paper industry in India.</p>	<p>Accepted.</p> <p>Communication from M/s Enmas Ahlstrom Limited confirms that HPC is the only paper and pulp manufacturing organisation to take up a falling film evaporation installation project in the country. There is no other 100% bamboo based paper and pulp manufacturer in India to have taken up such an energy efficiency project.</p> <p>A study report by Stephan Walker on "hardwood fibre and requirements of the Indian Pulp and paper industry" indicates that there are no other 100% bamboo based plants in the country.</p> <p>CL closed.</p>
CL 5	D.2.4	<p>No retrofit measures have been executed till date in the evaporator</p>	Accepted.

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
Clarification is requested on the retrofit measures executed till date in the evaporator plant and boiler section after project implementation which may affect the steam efficiency or efficiency of the project plant/ coal fired boiler system.		plant and chemical recovery boiler section after the project implementation. Documentary evidence has been provided to the DOE as to the details of the energy conservation measures implemented in CPM in the period between 2003 and 2006 demonstrating that no retrofit measure was carried out in any boiler or evaporator plant after the implementation of the project activity.	Records of capital expenditure of the plant during the period 2003~2006 presented. The records indicate that there has been no energy efficiency measure in the evaporator plant post project implementation and neither in the chemical recovery boiler. CL Closed.
CL 6 Clarification is requested on the asset disposal record of the old equipments which are retrofitted as a part of the project.	D.3.1	Asset disposal record for the cascade evaporator (acting as the finisher evaporator in the pre-project scenario), replaced with a FFFF evaporator under the project activity, has been submitted to the DOE.	Accepted. Material return voucher for evaporator dated April 2004 confirms that the same was disposed off as scrap and not as equipment. CL closed.
CL 7 Provision of 4 nos. of external steam heaters is included as a part of the project as detailed in section A.4.2 of the PDD. Clarification is requested on the source of steam used therein and whether this steam is additional to that used in the baseline	E.1.1	Steam used in the four external steam heaters provided under the project activity, is generated from the evaporation of water from the weak black liquor being concentrated in the mixed feed arrangement of the multiple effect evaporator train of CPM.	Accepted. CL closed.
CL 8 The excess MP consumption for soot blowing in chemical recovery boiler is determined as function of the amount of HP steam generated in the boiler. Clarification is requested as to why MP consumed for soot	E.1.3	As soot-blowing steam depends on the degree of the fouling of the tubes, pressure drop across the tube banks, quality of flue gas, number of soot blowing assemblies and steam flow during each sequence of soot blowing,	Accepted. CL closed.

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
<p>blowing is a dependent on the amount of HP generated in the boilers as it depends on the degree of the fouling of the tubes, pressure drop across the tube banks, quality of flue gas, number of soot blowing assemblies and steam flow during each sequence of soot blowing. Clarification is requested as to why the factor of $\left(\frac{A_{MP}}{A_{HP}}\right)$ is used for MP associated with ejector system but not used for soot blowing steam.</p>		<p>the variations in the above-mentioned factors between the baseline scenario and the project activity scenario and their impact on the soot-blowing steam quantum, cannot be quantified. However, in order to arrive at a conservative estimate of the emission reductions, absolute values for the quantity of medium pressure (MP) steam used for the purpose of soot-blowing in the chemical recovery boiler, have been considered for both the baseline and the project scenarios.</p> <p>MP steam used for the purpose of soot-blowing in the chemical recovery boiler is made available by letting down the pressure of HP steam. Therefore any change in the consumption pattern of MP steam in the soot-blowers of the chemical recovery boiler, will result in reduction in a certain quantity of HP steam generation from the coal fired boilers of the cogeneration plant. The amount of HP steam corresponding to the MP steam used for soot-blowing in the chemical recovery boiler, will be calculated by dividing the amount of soot blowing steam by a factor of $\left(\frac{H_{SB}}{H_{HP}}\right)$ where H_{SB} is specific enthalpy of steam used for the purpose of soot</p>	

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
		blowing in the chemical recovery boiler (in kJ/kg) and H_{HP} is the average specific enthalpy of HP steam generated in the coal fired boilers of CPM (in kJ/kg)	
<p>CL 9</p> <p>For emission reduction related to change in electrical load in the project boundary. List of drives with rated capacity pre and post project needs to be provided.</p> <p>Clarification is requested on the mechanism of operating hours of these drives during the baseline period and how the same will be monitored in the project scenario.</p>	E.1.4	<p>List of electricity drives with their rated capacities in the pre and post project cases have been provided to the DOE.</p> <p>Operating hours of all the electrical loads in the evaporator plant area, have been considered to be equal to the operating hours of the evaporator plant for the baseline period. Operating hours of the evaporator plant will be monitored in the project scenario. Similarly operating hours of all the electrical loads in the evaporator plant area, have been considered to be equal to the operating hours of the evaporator plant for the baseline period and the same will be monitored in the project scenario as well.</p>	<p>As per EB directive (EB 32) project applying AMS II D need to measure the energy consumed by the drives affected by the project activity. As the emission reductions estimates in the project are based on rated capacity of the motors they are not claimable under AMS IID.</p> <p>Emissions reduction associated with reduced electrical power consumption in the project boundary is thus removed from the overall emission reduction estimates.</p> <p>CL closed.</p>
<p>CL 10</p> <p>Parameters related to emission reduction calculation, $\left(\frac{A_{HP_CFB}}{A_{coal_CFB}} \right)$, $\left(\frac{A_{coal_CFB}}{A_{HP_cogen}} \right)_b$, are calculated as a function of amount of coal</p>	E.1.6	Addressed in the revised PDD	<p>Accepted.</p> <p>Changes incorporated in the revised PDD and work sheet and found to be in order.</p>

DET NORSKE VERITAS

Optimization of steam consumption in the process by installation of free FLOW FALLING FILM FINISHER EVAPORATOR AND RETROFIT TO THE CHEMICAL RECOVERY BOILER IN CACHAR PAPER MILL OF HINDUSTAN PAPER CORPORATION LIMITED

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
consumed at the coal fired boilers. These parameters are dependent on the quality of coal fired at the utility section wrt. Calorific value, ash content, moisture content etc for equivalent amount of energy output. clarification is requested as to how these uncertainties are taken care of in determination of these factors.			

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APPENDIX B

CERTIFICATES OF COMPETENCE



CERTIFICATE OF COMPETENCE

Michael Lehmann

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJi-i1)

GHG Auditor:	Yes		
CDM Validator:	Yes	JI Validator:	Yes
CDM Verifier:	Yes	JI Verifier:	Yes
Industry Sector Expert for Sectoral Scope(s):	Sectoral scope 1,2,3 & 9		
Technical Reviewer for (group of) methodologies:			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes	AM0021	Yes
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029	Yes	AM0023	Yes
ACM003, ACM0005, AM0033, AM0040	Yes	AM0024	Yes
ACM0004	Yes	AM0027	Yes
ACM0006, AM0007, AM0015, AM0036, AM0042	Yes	AM0028, AM0034	Yes
ACM0007	Yes	AM0030	Yes
ACM0008	Yes	AM0031	Yes
ACM0009, AM0008, AMS-III.B	Yes	AM0032	Yes
AM0006, AM0016, AMS-III.D	Yes	AM0035	Yes
AM0009, AM0037	Yes	AM0038	Yes
AM0013, AM0022, AM0025, AM00379, AMS-III.H, AMS-III.I	Yes	AM0041	Yes
AM0014	Yes	AM0034	Yes
AM0017	Yes	AMS-II.A-F	Yes
AM0018	Yes	AMS-III.A	Yes
AM0020	Yes	AMS-III.E, AMS-III.F	Yes

Høvik, 6 November 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director



CERTIFICATE OF COMPETENCE

Chandrashekara Kumaraswamy

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1)

GHG Auditor:	Yes		
CDM Validator:	Yes	JI Validator:	-
CDM Verifier:	Yes	JI Verifier:	-
Industry Sector Expert for Sectoral Scope(s):	Sectoral scope-04 & 05		
Technical Reviewer for (group of) methodologies:			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes	AM0021	Yes
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029	Yes	AM0023	Yes
ACM003, ACM0005, AM0033, AM0040	Yes	AM0024	Yes
ACM0004	Yes	AM0027	Yes
ACM0006, AM0007, AM0015, AM0036, AM0042	Yes	AM0028, AM0034	Yes
ACM0007	Yes	AM0030	Yes
ACM0008	Yes	AM0031	Yes
ACM0009, AM0008, AMS-III.B	Yes	AM0032	Yes
AM0006, AM0016, AMS-III.D	Yes	AM0035	Yes
AM0009, AM0037	Yes	AM0038	Yes
AM0013, AM0022, AM0025, AM00379, AMS-III.H, AMS-III.I	Yes	AM0041	Yes
AM0014	Yes	AM0034	Yes
AM0017	Yes	AMS-II.A-F	Yes
AM0018	Yes	AMS-III.A	Yes
AM0020	Yes	AMS-III.E, AMS-III.F	Yes

Høvik, 6 November 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director



CERTIFICATE OF COMPETENCE

Subhendu Biswas

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1

GHG Auditor:	Yes		
CDM Validator:	Yes	JI Validator:	-
CDM Verifier:	-	JI Verifier:	-
Industry Sector Expert for Sectoral Scope(s):			

Høvik, 6 November 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director

Soumik Biswas

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1

GHG Auditor:	Yes		
CDM Validator:	Yes	JI Validator:	-
CDM Verifier:	-	JI Verifier:	-
Industry Sector Expert for Sectoral Scope(s):			

Høvik, 6 November 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director



CERTIFICATE OF COMPETENCE

Ramesh Ramachandran

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1

<i>GHG Auditor:</i>	Yes		
<i>CDM Validator:</i>	Yes	<i>JI Validator:</i>	--
<i>CDM Verifier:</i>	Yes	<i>JI Verifier:</i>	--
<i>Industry Sector Expert for Sectoral Scope(s):</i>	Sectoral scope 4, 5, 13		
<i>Technical Reviewer for (group of) methodologies:</i>			
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029, AM0045	Yes		

Høvik, 22 December 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director