



VALIDATION REPORT

9 MW Neria hydroelectric project in Karnataka, India

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DET NORSKE VERITAS



VALIDATION REPORT

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Client: 9 MW Neria Hydroelectric Project, Karnataka, India	Client ref.: Mr.S.Chandrasekhar Managing Director

Summary:
Det Norske Veritas Certification AS (DNV) has performed a validation of the “9 MW Neria hydroelectric project in Karnataka, 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 revised project design document version 05 of 12 August 2008 incorporating the guidelines provided in the EB41 para 55(i), meets all relevant UNFCCC requirements for the CDM and is eligible as category I.D small-scale CDM project activity and correctly applies the approved simplified baseline and monitoring methodology AMS-I.D, version 10. Hence, DNV requests the registration of the “9 MW Neria hydroelectric project in Karnataka, India” as a CDM project activity.

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Abbreviations

BPCL	Bhoruka Power Corporation Limited
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEA	Central Electricity Authority
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CH ₄	Methane
CL	Clarification request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
EB	Executive Board
GHG	Greenhouse gas(es)
GWH (GWh)	Gigawatt Hour
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
KPTCL	Karnataka Power Transmission Corporation Limited
KREDA	Karnataka renewable Energy Development Agency
KSPCB	Karnataka State Pollution Control Board
KWh	Kilo Watt hour
MW	Mega Watt
MNES	Ministry of Non-Conventional Energy Sources
MoEF	Ministry of Environment and Forest
MP	Monitoring Plan
NEDCAP	The Non-Conventional Energy Development Corporation of Andhra Pradesh
N ₂ O	Nitrous oxide
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
PPA	Power Purchase Agreement
UNFCCC	United Nations Framework Convention on Climate Change



1 INTRODUCTION

Bhoruka Power Corporation Limited (BPCL) has commissioned Det Norske Veritas Certification AS (DNV) to validate the “9 MW Neria hydroelectric project in Karnataka, India” (hereafter called “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:

K.Venkata Raman	DNV India	Team Leader / CDM Validator
Astakala Vidyacharan	DNV India	GHG auditor
Michael Lehmann	DNV Oslo	Sector expert
Chandrashekara Kumaraswamy	DNV India	Technical verifier.

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 / 10/ and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology AMS-I.D version 10. The validation team has, based on the recommendations in the Validation and Verification Manual / 9/ 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 is a 9 MW capacity, grid connected, hydroelectric power generating unit. The project is located downstream of Nidle bridge across the River Neria at Dhamasthala in Dakshina Kannada District of Karnataka State in India. The purpose of the project is to generate electric power using the hydro potential of the River Neria, a tributary of the River Nethravathy. The project is conceived as a run-of-the-river hydro electric project and hence construction of a dam and impounding of water in the dam is not required. The project envisages installation of 2 nos horizontal S type Kaplan turbines, each of 4.5 MW rated capacity, which are connected to



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horizontal type generators. The project involves construction of a diversion structure, power canal, fore-bay, penstock, power house and power evacuation system. As the Neria River is not a perennial river, a low Plant Load factor of 31.15% is assumed to be possible. Thus, the project activity is expected to result in generation of about 22.70 GWh. After allowing for auxiliary consumption and transmission losses, it is expected that the project will evacuate 21.74 GWh to the KPTCL grid. The power is generated at 11 KV which is stepped up to 33 KV, synchronised with the grid requirements, and is fed to the grid at Pilakala sub-station. The KPTCL grid is a part of the Southern Regional Grid.

The technology used in the project is indigenous and is well proven. The available hydraulic head is only 17.5 M at a flow rate of 30 cumecs/unit. To exploit the potential of such low-flow, low-head, run-of-river potential, Kaplan type turbines are best suited. Thus, the project employs well proven technology and is very likely to achieve its objective of reducing anthropogenic GHG emissions by displacing fossil fuel based power generation with power generated from run-of-river hydro potential. The project thereby helps in reducing power deficit in Karnataka State and also contributes towards sustainable development.

Based on a baseline emission factor calculated ex-ante, the project is expected to result in emission reductions of 18 633 tons of CO₂e per year during the ten year fixed crediting period starting from the date of registration of the project activity.

2 METHODOLOGY

The validation consisted of the following three phases:

- I a desk review of the project design and the baseline and monitoring methodology
- 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 / 9/. 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 “9 MW Neria hydroelectric project in Karnataka, India” 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:



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- 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
<i>The requirements the project must meet.</i>	<i>Gives reference to the legislation or agreement where the requirement is found.</i>	<i>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.</i>	<i>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.</i>

Validation Protocol Table 2: Requirement Checklist				
Checklist Question	Reference	Means of verification (MoV)	Comment	Draft and/or Final Conclusion
<i>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.</i>	<i>Gives reference to documents where the answer to the checklist question or item is found.</i>	<i>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.</i>	<i>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.</i>	<i>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.</i>

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
<i>If the conclusions from the draft Validation are either a Corrective Action Request or a Clarification Request, these should be listed in this section.</i>	<i>Reference to the checklist question number in Table 2 where the Corrective Action Request or Clarification Request is explained.</i>	<i>The responses given by the project participants during the communications with the validation team should be summarised in this section.</i>	<i>This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".</i>

Figure 1 Validation protocol tables



2.1 Review of Documents

The PDD / 1/ submitted by Bhoruka Power Corporation Limited (version 01, 02 and 03 dated 3 January 2008) and additional background documents related to the project design and baseline, such as grid emission factor calculations, financial analysis, and the monitoring plan were reviewed as a part of the validation.

2.2 Follow-up Interviews

On 10 January 2007, DNV performed interviews with representatives of Bhoruka Power Corporation Limited to confirm selected information and to resolve issues identified in the document review. The main topics of the interviews are summarised in Table 1.

Table 1 Interview topics

Interviewed organisation	Interview topics
Bhoruka Power Corporation Limited	<ul style="list-style-type: none"> ➤ Clarification on technical details of the project. ➤ Confirmation that the project is not a debundled component of a larger project activity ➤ Confirmation on non involvement of ODA ➤ Clarifications on establishment of baseline, monitoring plan and emission reduction calculations ➤ Clarifications on financial additionality, prevailing practice, and other barriers, ➤ Resources, training needs and procedures for operation and maintenance. ➤ Benefits from CDM registration.
Administrative representatives of the Village panchayat	➤ Stakeholders views on the project
Village Panchayat elected members and office bearers	➤ Stakeholders views on the project
Representatives of local residents	➤ Stakeholders views on the project

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation was to resolve any outstanding issues which needed to be clarified for DNV's positive conclusion on the project design. The initial validation identified one (1) corrective action requests and three (3) requests for clarifications. These requests were presented to the project participants in DNV's draft validation report of 17 January 2007(rev. 01) and the project participants were invited to provide a response to these requests. The project participant's response, which included the submission of revised PDD dated 03 January 2008, addressed the corrective action requests and requests for clarifications to DNV's satisfaction.

To guarantee the transparency of the validation process, the concerns raised and responses given are documented in the validation protocol in Appendix A.



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

In the following sections the findings of the validation are stated. 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 final validation findings relate to the project design as documented and described in the revised and resubmitted project design documentation dated 12 August 2008.

3.1 Participation Requirements

The project activity is being proposed as a unilateral project by Bhoruka Power Corporation Limited, which is the only participant from the host Party India. India meets all the participation requirements, and the DNA of India (Ministry of Environment and Forests) has approved the project through a letter dated 7 February 2007 / 3/ and has also provided confirmation that the project assists in achieving sustainable development.

3.2 Project Design

The project has a rated generation capacity of 9 MW and aims to export about 21.74 GWH of electricity to Karnataka Power Transmission Corporation Limited (KPTCL) electricity grid, which is a component of the southern regional grid of India. The project is connected to the KPTCL grid through 33/11 KV substation at Pilakala.

The technology used is available and well tested in India and no transfer of technology is envisaged. The hydro-potential of the running river is made to turn a Kaplan horizontal type turbine, which is connected to a generator to produce electricity.

The river Neria is a tributary to Nethravathy and is seasonal, with water flow confined to about eight months in a year. Therefore, the project envisages generation of power only on a seasonal basis and the plant load factor is estimated to be about 31.15%.

The project results in reduction of GHG emissions by displacing some of the power generated in the fossil fuel dominant southern regional electricity grid. The added advantage of the project will be employment generation and providing an opportunity for locals as a provider of services for the project requirement, like security, transport requirements, and canteen facilities, resulting in extra income generation for the local populace. The technology applied is deemed good practice and is not expected to be replaced within the crediting period.



The project implementation was initiated on 6 September 2004 with the start of civil and structural works for the project. The expected life time of the project is estimated to be around 30 years and a fixed crediting period of 10 years starting from the date of registration is considered.

For the small hydro project under consideration, the project boundary considered encompasses the diversion structure, water conducting system, penstock, powerhouse, power evacuation system, and the tailrace canal. The Southern regional grid with all the power generating stations connected to it is considered as the system grid.

The validation did not reveal any information that indicates that the project can be seen as a diversion of official development assistance (ODA) funding towards India.

3.3 Project Baseline

Since the project is a renewable resource based power generation activity having capacity of less than 15 MW and exports power to the grid, the project is eligible for consideration as Type I D, small scale CDM project activity and applies the simplified baseline methodology of AMS-I.D, version 10. It was verified that the project is not a debundled component of a larger project activity.

The baseline for the project activity is the function of the generation mix of the southern regional grid. The applicable baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kgCO₂e/kWh). The methodology permits calculation of emission coefficient either as a combined margin (CM), consisting of the combination of Operating Margin (OM) and Build Margin (BM) according to the procedures prescribed in the approved methodology ACM0002 or as the weighted average emissions (in kgCO₂e/kWh) of the current generation mix. The selection of the southern region grid as the grid system boundary for the project activity is in line with the recent EB guidance for large countries such as India. The combined margin emission coefficient for southern grid of India is 0.857 kg CO₂e/kWh, has been sourced from CEA data. The Central Electricity Authority, Ministry of Power, Government of India has published a database of carbon dioxide emission factors from the power sector in India based on detailed authenticated information obtained from all operating power stations in the country (“CO₂ Baseline Database” at

<http://www.cea.nic.in/planning/c%20and%20e/Govtment%20of%20India%20website.htm>)

This database i.e. the CO₂ baseline database provides information about the OM and BM factors of all the regional electricity grids in India. DNV confirms that the database is an official publication of the Government of India for the purpose of CDM baselines and the OM in the CEA database is calculated ex ante using the simple OM approach based on the generation-weighted average emissions per electricity unit of all fossil-fuelled generating sources serving the system over a three year period of 2003-2004, 2004-2005 and 2005-2006 /11/ and determined to 1.00379 kg CO₂e/kWh. BM is calculated ex ante based on 20% most recent capacity additions in the grid based on net generation as described in ACM0002, and determined to be 0.71134 kg CO₂e/kWh. Actual calorific values of coal and lignite have been used.

3.4 Additionality

As per the Attachment A to Appendix B of simplified modalities and procedures for small scale CDM project activities, the project demonstrates additionality through the existence of the investment barriers, prevailing practice and other barriers.



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DNV was also able to verify that the project proponents seriously considered the benefits of CDM for the proposed project. The board of directors of M/s BPCL passed the resolution considering CDM revenue on 15 September 2003 /5/ followed by a letter of appointment of the CDM consultant in December 2003. The agreement with the equipment supplier and the construction and civil works was signed in September 2004. The project design document of the proposed CDM project was finally submitted for validation in September 2006. The chronological order of events /6/ as presented by BPCL and their justification for the delay in forwarding for validation is deemed acceptable. BPCL wanted to get their 24 MW Chayadevi hydro project registered first before this project (also validated by DNV and registered on 30 March 2007). From the above it is sufficiently demonstrated that BPCL had considered CDM benefits since the conceptualization of the project activity.

As of February 2004, India had a total installed power generating capacity of 112,058 MW dominated by thermal power stations (79,838MW, 71.2% of installed capacity, including wind power to a limited extent), with hydropower stations contributing 29,500 MW (26.3%). Again, even as of January 2007, India was facing an energy deficit of 9.3% and a peak demand deficit of 13.9% as per estimates of the Ministry of Power. In order to meet these needs, enormous investments will surely be made, both by the State and the business community. However, such investments are likely to flow into thermal power stations, where the returns on investments are quicker, higher and more certain. Additional hydropower stations under planning constitute a mere 1970 MW during 2002-2007 and 5837 MW during 2007-2012. According to the Ministry of New and Renewable Energy (hitherto, Ministry of Non-conventional Energy Sources), the estimated potential of small hydro power generation (hydro power stations up to 25 MW capacity are reckoned as small) is 15,000 MW, out of which only 1849.78 MW (12.3% of the existing potential) was exploited as on 30 September 2006. It is also to be noted that small hydropower generations contribute only 1.44% of the installed national power generation capacity. Thus, it can be surmised that investing in hydropower projects, much less in small hydro projects, is not the prevailing common practice. Thermal power stations attract investments as the returns are quicker and better. Thus, the financially more attractive option is deemed to result in larger GHG emissions..

Based on the tariff structure and the capital investment terms of the lending institutions, the proponents have carried out an IRR analysis /3/. The IRR for the project has been estimated to be 11.71% without CDM revenue which is below the post tax bench mark (weighted average cost of capital) of 14.75%.

The selection of the Weighted Average Cost of Capital (WACC) as a benchmark for the proposed project activity and the calculation of WACC are justified and acceptable, further to DNV's review of the financial worksheets for the project.

The total finances obtained for the project include two components viz.: loan and equity. Subsequently, the project IRR is based on the total investment (including the debt and the equity portions). In order to evaluate the financial viability of the project, the project developer has assessed the expected minimum returns on all components of the investment made. Hence, the benchmark selected is the expected minimum returns considering the risks associated with each of the components of the total investment. Thus, from an investor's perspective, the WACC is one of the most appropriate benchmarks for comparing project IRR since it is the weighted average of the total cost of the different components of the investment. The computation takes into account the rate of interest on term loan and as regards equity, the project proponent has



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taken into account the post-tax return of 16% envisaged in the DPR as well as permitted by Central Regulatory Commission.

While the rate of interest on the term loan was evidenced from the bank documents, DNV has verified that the consideration of the 16% return on equity for the working of the WACC on the following reasons, which are deemed to be justifiable.

a) The benchmark of 16% is as recommended by the Karnataka electricity regulatory commission (KERC) and is in line with the latest tool of additionality which states: “the benchmark is to represent standard returns in the market, considering the specific risk of the project type, but not linked to the subjective profitability expectation or risk profile of a particular project developer.” This is also acceptable due to the fact that, this is in line with the EB guidelines that the return on equity should be “Government/official approved benchmark” and is publicly available and determined by a relevant national authority. The KERC is a governmental agency.

b) The selected 16% return on equity is lower than the benchmark of the governmental agencies of IREDA (India Renewable Energy Development Agency) at 19 - 21% and KREDL (Karnataka Renewable Energy Development Limited) at 18%.

c) The various Electricity Regulatory Commissions (ERCs) also recommend 16% return on equity with assumptions, which do not match with the assumptions of the project activity. The 16% return on equity adopted is less than the Government bond rates, increased by a suitable risk premium, calculated by the capital asset pricing model (CAPM) at 25.37% return on equity considering a beta value of 1 available publicly and which is comparable to the beta value of 1.080 for hydropower projects of Tata Power Company Ltd. and 1.195 for Jaiprakash Hydro Power Ltd. DNV was also able to verify that the beta value for a 16% ROE would be 0.52, which is lower than the available figures.

A sensitivity analysis has also been carried out by the proponents for a 5% variation in the electricity generation, tariff, variation in fuel cost and operation and maintenance which also demonstrate that the IRR is less than the benchmark. DNV was also able to verify that the increase in the above parameters for the IRR to touch the benchmark is unlikely due to the following reasons.

- a) The O&M cost considered in the IRR analysis is 2.5% of the total project cost as against the normal industry standards of 5-10%, and hence is not likely to be reduced.
- b) Though the tariff used in the IRR calculations is as per the Power Purchase Agreement (PPA) signed between the project proponent and Karnataka Power Transmission Company Limited (KPTCL) on 4 November 2004, the tariff is revised at the instance of KPTCL and has seen a reduction to Rs.2.80 instead of the 2% yearly escalation as per the PPA. Hence the tariff increase of 20% for the IRR to touch the benchmark is not realistic.
- c) The PLF of the project activity at 31% is based on the dependability factor of 90% sourced on data from the Detailed Project Report (DPR). Since the PLF is based on hydrological data, an increase in generation of 18.5% is not likely. This was also verified from the generation data at the project activity.



DNV was able to confirm the investment analysis and the IRR determined there-in through the detailed spreadsheet calculations provided by the project proponent. The cash flow analysis has been presented for a period of 20 years. The analysis presented also considers all the applicable benefits for the hydro power projects.

DNV was able to confirm that the all documents pertaining to the presented analysis have been verified, such as

- Project costs
- Energy purchase agreements
- Tariff as per PPA

The selection of the Weighted Average Cost of Capital (WACC) as a benchmark for the proposed project activity and the calculation of WACC are justified and acceptable, further to DNV's review of the financial worksheets for the project.

Due to the delicate and sensitive nature of the project terrain which is essentially composed of loose rocks, difficulties are expected during the construction stages, especially during construction of diversion structure. A detailed note on the hydrological aspects of the project site which has been prepared by TCE Consulting Engineers Limited (Project Consultants) /8/ has been submitted pointing to the many geological challenges that the project has to overcome.

Frequent changes in the power procurement policies of the state authorities, unfavourable tariff structure and lack of infrastructure are cited as other barriers.

Based on the above, the existence of various barriers to the project proposal is well substantiated and thus the proposed project activity is deemed additional.

3.5 Monitoring Plan

The project activity essentially consists of generating power from hydro potential, a renewable resource, and feeding it to the southern regional grid. The installed capacity of the project is 9 MW, and the project is not a debundled component of a larger project activity. Thus, the project qualifies for consideration as a SSC activity and therefore, baseline and monitoring methodology AMS-I.D is applicable for the project. Accordingly, the methodology requirement of "Metering the Electricity Generated" is applied.

Power exported to the grid is measured by a main meter and is verified by the readings of a check meter. The meters installed are of standard quality specified by the purchasing authority and the calibration of the meters is governed by the relevant clauses of the Power Purchase Agreement. The monthly readings of power evacuated to the grid are jointly recorded and may be counter verified by monthly bills raised.

The emission factor is based on the annual data published by CEA and is applied on an *ex-ante* basis.

All data, including the CEA data of grid emissions, will be archived in paper and electronic format until two years after the crediting period.

The project design employs state-of-art microprocessor based high accuracy monitoring and control equipment that will measure, record, monitor and control various key parameters like generation by the project and net energy exported to the grid. A team of personnel experienced in electrical and mechanical engineering and project operations, lead by a Project-in-Charge is



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responsible for monitoring, recording and reporting the monitored data. The team is also responsible for periodic calibration of the metering instruments in accordance with the provisions of the PPA, quality of data, implementing any corrective action that may be warranted, and preparation of report for review by the Board of Directors or by a Committee appointed by it for this purpose. Findings of internal audit to be carried out by a designated team shall also be reviewed by the Board of Directors or the Committee and suitable corrective actions implemented by the project team. The effectiveness of the corrective action also will be monitored and reports submitted for review.

Emergency handling measures consists of provision of a suitable fire fighting system and stand-by features for all critical items. The procedures for operation and maintenance of control equipment and for emergency preparedness shall be in accordance with the provisions of the PPA.

3.6 Calculation of GHG Emissions

The project activity calculates the emission reductions as the product of the electricity exported to the southern regional grid and the corresponding grid emission factor.

The project activity is based on a renewable resource, run-of river hydro power plant with no reservoir, and no emissions due to the project activity are expected to occur. Since the energy generating equipment is not transferred from another activity and no existing equipment is transferred to another activity, no leakage needs to be considered.

Thus, the reduction in emissions is equal to the electricity generated multiplied by the Combined Margin emission factor of the grid for the corresponding period as the project partly replaces fossil fuel-based electricity generation.

Since the project emissions are zero, the emission reductions are equal to the baseline emissions. These are determined based on the monitored net amount of electricity supplied to the grid and the baseline emission factor fixed as 0.857 kg CO₂e/kWh, ex-ante and as described in section 3.3 of this report. The project is expected to result in emission reductions of 186 330 tonnes of CO₂ during the 10 years of fixed crediting period starting from the date of the registration of the project activity.

3.7 Environmental Impacts

The project proposes to utilise the run-of-river hydro potential and does not envisage construction of storage dam. Thus, issues of submergence and displacement are not involved. As per regulations, an EIA is not required for projects costing less than USD 22 M; the total cost of this project is below USD 8 M and hence is exempt from conducting a detailed Environmental Impact Assessment study. Hydro power projects below 25 MW are not included in the Schedule of project activities needing environmental clearances (S.O. 1533 dated 14th September 2006, Ministry of Environment & Forests (MoEF), Govt. of India). The project, however, has received Consent for Establishment from the Karnataka State Pollution Control Board, thus fulfilling the legal environmental clearance required for this class of project. It has also received clearances from the Department of Forests, Ecology and Environment, Government of Karnataka, in respect of land required for the project, and the Department of Fisheries, Government of Karnataka. Thus, the project has received the necessary clearances from the statutory authorities. /4/



3.8 Comments by Local Stakeholders

The local village panchayat, an elected local self government body, comprising of elected members of the local community, has issued a No Objection Certificate for implementing the project. No adverse comment has been received. The Department of Energy, Government of Karnataka, has accorded the necessary sanction for implementation of the project. Karnataka Renewable Energy Development Agency has also sanctioned the project and the KPTCL has issued the Power Purchase Agreement favouring the project implementation.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The PDD of 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 day - period from 13 September 2006 to 12 October 2006. No comment was received.

5 VALIDATION OPINION

Det Norske Veritas Certification AS (DNV) has performed a validation of the "9 MW Neria hydroelectric project in Karnataka, India" located near Dharmasthala, Dakshina Kannada District, Karnataka State, 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 Project participant is Bhoruka Power Corporation Limited. The Host Party India meets all participation requirements and the DNA of India has approved the project and authorized the project participant. No Annex 1 Party is yet identified for the project.

The validation has confirmed that the project is eligible as category I.D. small scale CDM project activity and correctly applies simplified baseline and monitoring methodology AMS I.D., Version 10, Scope 1, dated 23rd December 2006. The determination of the baseline is well elaborated, transparent and sufficiently supported with facts. The selected baseline scenario is reasonable for the selected 10 years crediting period. Moreover, an analysis of the barriers facing the project demonstrates that the project is not a likely baseline scenario. The project is likely to reduce on an average GHG emission of 18 633 t CO₂e/year.

The project will contribute to sustainable development by generating renewable energy, providing benefits such as direct and indirect employment generation, ensuring environment well being and aid in bridging the gap between demand and supply of power. The DNA of India has confirmed that the project assists in achieving sustainable development and has accorded the approval for the project on 7 February 2007.



 VALIDATION REPORT

The validation did not reveal any information indicating that the project can be seen as a diversion of ODA funding towards India.

The project results in the reduction of GHG emissions that are real, measurable and give long term benefits and are additional to what would have occurred in absence of the project.

The monitoring plan makes sufficient provision for monitoring of relevant project and baseline emission indicators. Responsibilities and authorities for project management, monitoring and reporting and QA/QC procedures have also been addressed.

The project participant has obtained all the necessary clearances from the local stakeholders. DNV published the PDD on the DNV climate change web site and comments by Parties, stakeholders and UNFCCC accredited NGOs were invited through the CDM web site. No comment was received.

In summary, it is DNV's opinion that the project, as described in the revised project design document of 12 August 2008 meets all relevant UNFCCC requirements for the CDM, is eligible as category I.D. small-scale CDM project activity and correctly applies the approved simplified baseline and monitoring methodology AMS-I.D, version 10. Hence, DNV requests the registration of the "9 MW Neria hydroelectric project in, Karnataka, India" project as a CDM project activity.

REFERENCES

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

- / 1/* Bhoruka Power Corporation Limited: CDM PDD for "9 MW Neria hydro electric project in Karnataka, India" version 03 dated 3 January 2008 and all previous versions and corrected version of date 12 August 2008 incorporating the EB 41 guidelines.
- / 2/* Ministry of Environment and Forest (DNA of India): Letter of approval dated 7 February 2007.
- / 3/* Bhoruka Power Corporation Limited – Neria financials in spreadsheet format
- / 4/* Clearances issued by i) the Local Village Panchayat, KSPCB, ii) Department of Forest, Ecology and Environment, iii) Department of Fisheries, iv) Department of Energy, and v) KREDA
- / 5/* Proof of early consideration of CDM project activity
- / 6/* BPCL note substantiating the delay in submitting the project for validation
- / 7/* Power Purchase Agreements for the project activity
- / 8/* Hydrology report prepared TCE Consulting Engineers Limited (Project Consultants)

VALIDATION REPORT



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

/ 9/ International Emission Trading Association (IETA) & the World Bank's Prototype Carbon Fund (PCF): *Validation and Verification Manual*. <http://www.vvmanual.info>

/ 10/ 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*. AMS I.D., Version 10, Scope 1, dated 23rd December 2006

/ 11/ [http://www.cea.nic.in/planning/c%20and%20e/Govtment%20of%20India%20website](http://www.cea.nic.in/planning/c%20and%20e/Govtment%20of%20India%20website.htm)
[.htm](http://www.cea.nic.in/planning/c%20and%20e/Govtment%20of%20India%20website.htm)

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

Mr Mohan Reddy, Zenithenergy
/ 12/ Mr V V Reddy, BPCL

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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	OK	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	CAR 1 OK	Host country approval letter shall be evidenced. Copy of letter of approval has been verified. CAR 1 is closed
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	OK	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 provide an affirmation that such funding does not	Decision 17/CP.7, CDM Modalities and Procedures Appendix B,	OK	The project has been proposed as a unilateral project.

Requirement	Reference	Conclusion	Cross Reference/ Comment
result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties.	§ 2		
8. Parties participating in the CDM shall designate a national authority for the CDM	CDM Modalities and Procedures § 29	OK	National Clean Development Mechanism Authority, Ministry of Environment and Forests, is the DNA in India for CDM.
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	India ratified the protocol on 26 th August 2002.
10. The participating Annex I Party's assigned amount shall have been calculated and recorded	CDM Modalities and Procedures §31b	OK	The project has been proposed as a unilateral project
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	The project has been proposed as a unilateral project
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	
14. The proposed project activity shall confirm to one of the project categories defined for small scale CDM project activities and uses the simplified baseline and monitoring methodology for that project category	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22e	OK	Table 2, Section A.1.3, B and D
15. Comments by local stakeholders are invited, and a summary of these provided	Simplified Modalities and Procedures for Small Scale CDM Project	OK	Table 2, Section G

Requirement	Reference	Conclusion	Cross Reference/ Comment
	Activities §22b		
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	Parties, stakeholders and NGOs were invited to provide comments through the CDM website during a 30 days period from 13 September 2006 to 12 October 2006. No comment was received.

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	The project qualifies as a small scale CDM project activity, since the nominal installed capacity of the project is 9 MW, which is less than the 15MW qualifying capacity of the simplified modalities and procedures for small-scale CDM project activities. It involves the installation of 2 * 4.5 MW horizontal S type Full Kaplan connected to a synchronous generator to generate energy.		OK
A.1.2. The small scale project activity is not a debundled component of a larger project activity?	/1/	DR	There are no other projects registered in the previous two years, by the same proponent, using the same technology and within 1 km of the project boundary of a registered small scale project. Hence, this project is not a debundled component of a larger project activity.		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 activity involves generation of electricity using hydro power, and supply to the grid. Thereby, the project activity confirms to Type I D-Renewable Electricity Generation for the Grid.		OK

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	Yes. The project is located downstream of Nidle Bridge on the Kokkada Dharmasthala road across Neria River. The project site is located at a distance of 5 km from Dharmasthala Village, 50 km from Mangalore, the district headquarters and 295 km from Bangalore, the state head quarters. The geographical coordinates are Latitude 12° 52' North, longitude 75° 0 East.		OK
A.2.2. Are the project's system (components and facilities used to mitigate GHG's) boundaries clearly defined?	/1/	DR, I	The project boundary considered in this project activity encompasses the diversion structure, water conducting system, penstock, powerhouse, power evacuation system and the tailrace canal.		OK
A.2.3. Does the project design engineering reflect current good practices?	/1/	DR, I	Yes, the project design reflects current good practice through the construction of a diversion structure; on which 2 horizontal S type Full Kaplan turbines will be sited that in turn is connected to horizontal synchronous generator turbines to generate electricity		OK
A.2.4. Will the project result in technology transfer to the host country?	/1/	DR	The project will not result in technology transfer to the host country.		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	Though not specifically mentioned in the PDD, the project will require minimal training and maintenance efforts, as this involves setting up of small hydro project using native technologies		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 project will help improve the condition of the rural area by providing direct and indirect employment opportunities. The project will also help in infrastructure development in the area through the construction of access roads and basic civic amenities like schools, dispensaries and hospitals. It will also reduce the burden on the fossil fuels, with the generation and supply of electricity to the area using renewable hydro energy.		OK
A.3.2. Will the project create any adverse environmental or social effects?	/1/	DR, I	The proposed project is likely to create employment opportunities and contribute to local development, apart from environmental and technological well being. However, this should be further confirmed by the DNA of India.	CAR-1	OK
A.3.3. Is the project in line with sustainable development policies of the host country?	/1/	DR	The project is inline with the sustainable development policies of India stipulated using the four indicators: social well being, technological well being, environmental well being and economical well being. The project is likely to create direct and indirect job opportunities, provide basic civic amenities, improve the power availability and at the same time reduces the burden on the fossil fuel based power generation. However, this further needs to be validated by the DNA of India with the approval.	CAR-1	OK
A.3.4. Is the project in line with relevant	/1/	DR	As per the MoEF, an EIA is not required for		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
legislation and plans in the host country?			projects costing less than INR 1000 Million, as is the case with the proposed project activity. The Consent for establishment, as per requirements of the Air Act and Water Act and other legal permits have been verified		
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	Yes, the project applies one of the simplified baseline methodologies proposed for the small-scale project activity category I.D, i.e. the baseline is the annual kWh generated by the project times an emission coefficient calculated as the weighted average emissions (in KgCO ₂ /kWh) calculated in a transparent and conservative manner.		OK
B.1.2. Is the baseline methodology applicable to the project being considered?	/1/	DR	Yes, the selected baseline methodology AMS-ID is applicable to the proposed project activity since it involves a 9MW hydro electric power generation unit which supplies electricity to the southern grid. Also, the choice of baseline methodology is conservative since the project proponent has considered the Southern regional grid instead of the Karnataka state grid, which is in accordance to the UNFCCC directives established in this regard.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
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.	/1/				
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 has demonstrated its additionality through investment barriers, hydrological risks, geological risks, transmission risks, lack of infrastructure and barriers due to prevailing practices.</p> <p>Investment Barriers: The IRR calculations for the project activity without the CDM revenues are worked out to be 10.57%, while that with the CDM revenues, is 12.82%, which is an improvement by 2.25%. Hence it is claimed that the project activity would not be possible if not for the CDM revenues. <i>The IRR calculation sheet may be provided.</i></p> <p>Hydrology Risks: The project states that the availability of water in small rivulet, Neria River on which the project is being constructed poses a concern area. The river is mainly dependent on the monsoons for the water. The monsoons are irregular with wide fluctuations in rainfall. <i>The data source for Table B.3 may be provided.</i></p> <p>Geology Risks: The diversion structure needs to be built downstream of the three major nalas joining the river, to ensure that the flows carried by the river are utilised for power generation. However, the terrain is said to be of loosely held rocks, because of which the project site can pose</p>	GL-4	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			<p>difficulties during construction of diversion structure and other constructions. This risk is perceived risk for investment. Against a projected investment of Rs.326.7 millions, at the time of financial closure the project proponent had to spent Rs.370 million resulting in an escalation of Rs.43.3 millions due to escalation in the project on account of construction difficulties. <i>A geology study data may be provided to prove the same.</i></p> <p><u>Institutional Barrier:</u> The Government policies in the state of Karnataka are said to be unstable. For instance, before 2 years, the power purchase price from SHP power projects was at Rs.3.20 per kWh with 5% annual escalation. It is this price that was envisaged by the promoters at the time of project planning. The same has been revised twice since then; even a legally valid power purchase agreement is in place. And now the price stands at Rs.2.90 per kWh with 2% escalation. This impacts project viability adversely and also indicates inconsistency in government policies and no guarantee that the project receives the same tariff in future for the power fed to grid. This creates a significant barrier for the private sector investments in the power sector in Karnataka state.</p> <p><i>The above said statement needs justification.</i></p> <p>Another critical issue is that the project proponents have to back down the generation whenever required by the utility company, KPTCL. A clear clause is built into the Power Purchase Agreement to this effect. Accordingly, a significant risk is existing for the project activity that demands shut</p>		

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			<p>down of the project in situations such as an emergency, surplus power situation, off-peak duration etc. For seasonally operating small hydroelectric projects, risk associated with this PPA clause makes a significant barrier. <i>A copy of the PPA may be provided to substantiate the same.</i></p> <p>Prevailing Practice: The total installed capacity of power projects in India is 124,302 MW as on 30.04.2006 Against this small hydro projects in operation in India is 1748 MW as on the same date, giving an idea of the contribution of small hydro projects in the total power generation at 1.40%, which is negligible.</p> <p>Similarly, in the Southern region, the total installed capacity of power plants is 36,462.3 MW against small hydro installations of 642 MW indicating that small hydro projects account only to a negligible 1.76% of total generation in the Southern region. Out of the total installations of small hydro in Southern region, the contribution of Karnataka is to an extent of 301 MW as per MNES and this accounts for 3.87% of total capacity of power plants in Southern region.</p> <p>This clearly shows that the investment in the small hydro power is very less against the thermal power plants, which give the project proponent an assured and a faster rate of return on their investment.</p> <p>Another interesting fact is that the installed capacity of hydro projects, basically large projects in India is 32,326 MWs against an installed capacity of small hydro projects to an extent of 1748 MW accounting</p>		

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			for about 5% of the total hydro capacity. Hence it is demonstrated that the prevailing practices favour the fossil fuel based power plants against the renewable hydro power projects.		
B.2.2. Is the application of the baseline methodology and the discussion and determination of the chosen baseline transparent and conservative?	/1/	DR	As the project activity is in the state of Karnataka the baseline scenario has been appropriately considered to be the southern region electricity grid. The details of calculation of grid emission factor shall be made available.	GL-2	OK.
B.2.3. Are relevant national and/or sectoral policies and circumstances taken into account?	/1/	DR	The national policies in the host country favour the development of renewable energy sources.		OK
B.2.4. Is the baseline selection compatible with the available data?	/1/	DR	The data source for the baseline calculation needs to be clearly stated. (The specific page rather than just the site/web address needs to be provided.)	GL-2	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	The current Indian power scenario and all its regional grids are highly carbon intensive and with increased inclination on huge thermal power stations, it is likely that it will either continue to be or become more carbon intensive during crediting period of ten years. The current power generation mix for the year 2005-2006 is thermal-73.9%, Hydro – 22.8% and Nuclear – 3.25. In the absence of the project activity, which is a zero carbon emission activity, the equivalent quantum of power would have come from one or more fossil fuel based power stations.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
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	Yes, the project's starting date is 06/09/2004, with the start of civil and structural works for the project. The start date of the crediting period is from the date of registration of the project activity. The project's operational lifetime is expected to be 30 yrs.		OK
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	Yes, the project has chosen a fixed crediting period of 10 yrs, starting from the date of registration of the project activity		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	Yes, the monitoring methodology adopted for the project activity is "Metering the electricity generated", which is in accordance with Category I.D of Appendix B of Simplified M&P		OK
D.1.2. Is the monitoring methodology applicable	/1/	DR	Yes, apposite justification has been provided in		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
to the project being considered?			Section D.2		
D.1.3. Is the application of the monitoring methodology transparent?	/1/	DR	Yes, the application of the monitoring methodology is simple and transparent		OK
D.1.4. Will the monitoring methodology give opportunity for real measurements of achieved emission reductions?	/1/	DR	Yes, the methodology chosen will give opportunity for real measurements of the achieved emission reductions.		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 project activity being a run of river hydroelectric project, there will not be any project emissions through the crediting period.		OK
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/	DR	There are no leakages involved in the project activity. The simplified baseline and monitoring methodology for category I.D small-scale projects, states that leakage shall only be considered if the project involves transfer of energy generating equipment from another activity or if the existing equipment is transferred to another activity.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
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/	DR	Yes, the electricity supplied to the grid is calculated using micro processor based high accuracy monitoring and control equipment. Necessary stand by or check meters are also installed to operate in stand by mode when the main meters are not working. The meters are calibrated and sealed. Sales records may also be used to counter check or as an alternate proof of the power exported to the Grid. The data will be archived in paper and in electric form for up to two years after the end of the crediting period.		OK
D.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/1/	DR	Yes, the baseline indicators have been chosen in line with the small-scale methodologies approved by the CDM EB.		OK
D.4.3. Will it be possible to monitor / measure the specified baseline indicators?	/1/	DR	Yes. The data will be recorded at the project site and at the KPTCL sub station. Invoices for the quantity of electricity exported to the Grid will also be stored and will allow cross checking of the net metered generated electricity.		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, I	The project management responsibility rests on the Board of Directors (BoD) of BPCL.		OK
D.5.2. Is the authority and responsibility for registration monitoring measurement and reporting clearly described?	/1/	DR, I	Designated manager assisted by a team appointed by Board of Directors are responsible for monitoring, measurements and reporting.		OK
D.5.3. Are procedures identified for training of monitoring personnel?	/1/	DR, I	No procedures for training of monitoring personnel are described, but the project requires only limited monitoring, which is part of normal operations.		OK
D.5.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR	No emergencies are foreseen		OK
D.5.5. Are procedures identified for calibration of monitoring equipment?	/1/	DR	The procedures for calibration of the monitoring equipment have been detailed		OK
D.5.6. Are procedures identified for maintenance of monitoring equipment and installations?	/1/	DR	As in D.5.5		OK
D.5.7. Are procedures identified for monitoring, measurements and reporting?	/1/	DR	Designated manager assisted by a team appointed by Board of Directors are responsible for monitoring, measurements and reporting		OK
D.5.8. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/1/	DR	The records will be stored safely and retention period for the records is 2 years after the last crediting period.		OK
D.5.9. Are procedures identified for dealing with	/1/	DR	No uncertainties are foreseen		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
possible monitoring data adjustments and uncertainties?					
D.5.10. Are procedures identified for internal audits of GHG project compliance with operational requirements as applicable?	/1/	DR	Internal audit for GHG compliance is carried out as per the monitoring schedule. Audit report will be reviewed by the Board of Directors and later will be sent to external DOE for verification.		OK
D.5.11. Are procedures identified for project performance reviews?	/1/	DR	Regular internal audits are carried out to see the project performance		OK
D.5.12. Are procedures identified for corrective actions?	/1/	DR	Yes, Board of Directors will be responsible for the corrective action in case of any deviation to the adhering standard based on the audit result findings.		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	Emissions related to the setting up of the SHP are not significant in comparison to the emissions generated during the construction activities of fossil fuelled power plants. No indirect emissions are likely as this is an energy generation project based on renewable resources		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			and no reservoir is involved.		
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	According to the simplified baseline and monitoring methodology for category I.D small-scale projects, leakage shall be considered, only if the project represents transfer of energy technology equipment from or to another activity. Since this is not the case in this project, no leakage must be considered.		OK
E.3. Baseline GHG Emissions The validation of ex-ante estimated baseline GHG emissions focuses on transparency and completeness of calculations.					
E.3.1. Are the baseline emission boundaries clearly defined and do they sufficiently cover sources for baseline emissions?	/1/	DR	The baseline emission boundaries are defined in accordance with the methodology specified under Appendix B of simplified modalities and procedures for small-scale CDM project activities, TYPE I.D.		OK
E.3.2. Are all aspects related to direct and indirect baseline emissions captured in the project design?	/1/	DR	All emission sources have been captured in the PDD.		OK
E.3.3. Have all relevant greenhouse gases and sources been evaluated?	/1/	DR	Yes.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
E.3.4. Do the methodologies for calculating baseline emissions comply with existing good practice?	/1/	DR	Yes, as recommended by appendix B of the Simplified M&P		OK
E.3.5. Are the calculations documented in a complete and transparent manner?	/1/	DR	Detailed calculations for the baseline estimations shall be forwarded	GL-2	OK
E.3.6. Have conservative assumptions been used?	/1/	DR	Yes		OK
E.3.7. Are uncertainties in the baseline emissions estimates properly addressed?	/1/	DR	No uncertainties are likely to occur in the baseline evaluation		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	The project replaces the fossil fuel based electricity generation with a renewable, zero emission project activity. Hence the project activity results in reduction of GHG emissions than the baseline. The project activity is expected to achieve around 186 330 t CO ₂ e of emission reductions over the 10 year crediting period.		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	Environmental impact assessment is not required as per MoEF of India for projects whose total investment is less than 22.22US\$, such as the project activity		OK
F.1.2. Does the project comply with	/1/	DR	Consent for establishment by the State Pollution		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
environmental legislation in the host country?			Control Board has been obtained.		
F.1.3. Will the project create any adverse environmental effects?	/1/	DR	As the project size is small with no reservoir, no adverse environmental impacts are expected to occur.		OK
F.1.4. Have environmental impacts been identified and addressed in the PDD?	/1/	DR	Yes, the project has only beneficial environmental impacts.		OK
G. Comments by Local Stakeholder Validation of the local stakeholder consultation process.					
G.1.1. Have relevant stakeholders been consulted?	/1/	DR	The following stakeholders have been identified. <ul style="list-style-type: none"> • KREDL • Karnataka Power Transmission Corporation Ltd. • Karnataka State Pollution Control Board • Irrigation Department • Revenue Department • Forest Department • Local Village Panchayat 		OK
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/	DR	The following is not clear: <ul style="list-style-type: none"> • When was the public hearing held? • What were the communications processes adopted for intimation/consultation of the stakeholders meeting? • Are there recorded minutes of the meeting? 	GL-3	OK
G.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation	/1/	DR	There are no requirements as per the laws/regulations of the host country regarding stakeholder consultation process for small scale		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
process been carried out in accordance with such regulations/laws?			projects.		
G.1.4. Is a summary of the comments received provided?	/1/	DR	The summary of comments received may be submitted.	CL-3	OK
G.1.5. Has due account been taken of any comments received?	/1/	DR	As in G.1.4	CL-3	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
CAR 1: Approval from the DNA of India shall be forwarded	A.3.3	Approval from DNA is furnished for verification.	Approval from the DNA of India has been verified and found satisfactory. CAR 1 is closed.
CL 1: The following shall be provided to demonstrate additionality: <ul style="list-style-type: none"> Detailed IRR analysis The data source for Table B.3 Geology study data Copy of the PPA 	B.2.1	<p>Furnished as attachment the following:</p> <p>Detailed IRR analysis: Spreadsheet showing IRR analysis is furnished.</p> <p>Data source for Table B.3: In view of the fact that the baseline emission factor is taken from CEA Data base, Table B 3 has been eliminated from the PDD. The whole section B.3 of PDD is modified.</p> <p>Geology study data:</p>	<p>Detailed fund flow calculations have been submitted in a spreadsheet and have been verified and found satisfactory.</p> <p>Grid emission factor data as published by the CEA has been used. PDD has been modified accordingly.</p> <p>Copy of report and note from TCE Consulting Engineers Limited has been submitted and verified.</p> <p>Copy of PPA has been submitted and verified.</p> <p>CL 1 is closed.</p>

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
		<p>The study is with respect to Hydrology and the data is as sourced by TCE Consulting Engineers Limited, the detailed engineering consultants for the project activity. This data is made part of detailed project report and the same is furnished in the form of hard copy for verification.</p> <p>We are also furnishing separately detailed note on hydrology prepared by TCE Consulting Engineers Limited for working out dependability analysis of energy.</p> <p>Copy of PPA is furnished as hard copy</p>	
<p>CL 2:</p> <p>The details of calculation of grid emission factor shall be made available.</p> <p>The data source for the baseline calculation needs to be clearly stated</p>	B.2.2, 2.4; E.3.5	<p>The methodology adopted for the calculation of the baseline is "Combined Margin (Including Imports)". The baseline emission factor has been adopted from the "CO₂ Baseline Database", for the Southern region, 2005-06, published by Central Electricity Authority (CEA), Govt. of India.</p> <p>http://www.cea.nic.in/planning/c%20and%20e/Govtment%20of%20India%20website.htm</p>	<p>The figures worked out by CEA, a statutory body established and mandated for this purpose, are applied and the emission reductions have been calculated accordingly. This is acceptable and satisfactory.</p> <p>CL 2 is closed.</p>
<p>CL 3:</p> <p>The following shall be clarified:</p>	G.1.2, 1.4, 1.5	The company has obtained permission from village panchayat for setting up of	Clearances have been obtained form KSPCB, department of Forest, Ecology

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
<ul style="list-style-type: none"> • When was the public hearing held? • What were the communications processes adopted for intimation/consultation of the stakeholders meeting? • Are there recorded minutes of the meeting? 		<p>the project. Being a small hydro project no public hearing is required under the local regulations. The company had discussions with members of Panchayat and based on their recommendation the permission is obtained. Copy of the permission is already furnished. Apart from the above the company obtained permission from all other stakeholders such as Dept. of Energy, Govt. of Karnataka, Karnataka Renewable Energy Development Limited (KREDL), Karnataka Power Transmission Corporation Limited (KPTCL), Karnataka State Pollution Control Board (KSPCB), Department of Forest, Ecology, Environment, Govt. of Karnataka, Department of Fisheries, Govt. of Karnataka etc.</p>	<p>and Environment, department of Fisheries, and No Objection Certificate from the local Village Panchayat, an elected body of the local village community have been submitted.</p> <p>CL 3 is closed.</p>

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APPENDIX B

CERTIFICATES OF COMPETENCE



CERTIFICATE OF COMPETENCE

Astakala Vidyacharan

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>	--	<i>JI Validator:</i>	--
<i>CDM Verifier:</i>	--	<i>JI Verifier:</i>	--
<i>Industry Sector Expert for Sectoral Scope(s):</i>	--		

Høvik, 6 November 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director



CERTIFICATE OF COMPETENCE

Michael Lehmann

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 1, 2, 3		
Technical Reviewer for (group of) methodologies:			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes	AM0027	Yes
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029, AM0045	Yes	AM0030	Yes
ACM003, ACM0005, AM0033, AM0040	Yes	AM0031	Yes
ACM0004, ACM0012	Yes	AM0032	Yes
ACM0006, AM0007, AM0015, AM0036, AM0042	Yes	AM0035	Yes
ACM0007	Yes	AM0038	Yes
ACM0008	Yes	AM0041	Yes
ACM0009, AM0008, AMS-III.B	Yes	AM0034	Yes
AM0006, AM0016, AMS-III.D, ACM0010	Yes	AM0043	
AM0009, AM0037	Yes	AM0046	
AM0013, AM0022, AM0025, AM0039, AMS-III.H, AMS-III.I	Yes	AM0047	
AM0014	Yes	AMS-II.A-F, AM0044	Yes
AM0017	Yes	AMS-III.A	Yes
AM0018	Yes	AMS-III.E, AMS-III.F	Yes
AM0020	Yes		
AM0021, AM0028, AM0034, AM0051	Yes		
AM0023	Yes		
AM0024	Yes		

Høvik, 5 February 2007

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director



CERTIFICATE OF COMPETENCE

Raman Venkata Kakaraparthi

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 5		
Technical Reviewer for (group of) methodologies:			
ACM002, AMS-IA-D, AM0019, AM0026, AM0029, AM0045	Yes		

Høvik, 30 October 2007

Michael Lehmann

Michael Lehmann

Technical Director, International Climate Change Services



CERTIFICATE OF COMPETENCE

Kumaraswamy Chandrashekara

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 4 & 5		
Technical Reviewer for (group of) methodologies:			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes	AM0027	Yes
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029, AM0045	Yes	AM0030	Yes
ACM003, ACM0005, AM0033, AM0040	Yes	AM0031	Yes
ACM0004, ACM0012	Yes	AM0032	Yes
ACM0006, AM0007, AM0015, AM0036, AM0042	Yes	AM0035	Yes
ACM0007	Yes	AM0038	Yes
ACM0008	Yes	AM0041	Yes
ACM0009, AM0008, AMS-III.B	Yes	AM0034	Yes
AM0006, AM0016, AMS-III.D, ACM0010	Yes	AM0043	
AM0009, AM0037	Yes	AM0046	
AM0013, AM0022, AM0025, AM0039, AMS-III.H, AMS-III.I	Yes	AM0047	
AM0014	Yes	AMS-II.A-F, AM0044	Yes
AM0017	Yes	AMS-III.A	Yes
AM0018	Yes	AMS-III.E, AMS-III.F	Yes
AM0020	Yes		
AM0021, AM0028, AM0034, AM0051	Yes		
AM0023	Yes		
AM0024	Yes		

Høvik, 5 February 2007

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director