



VALIDATION REPORT

“5 MW DEBAL GRID- CONNECTED HYDROELECTRIC PROJECT IN UTTARANCHAL, INDIA”

REPORT No. 2007-1016

REVISION No. 04

DET NORSKE VERITAS



VALIDATION REPORT

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Client: Chamoli Hydro Power Pvt. Ltd.	Client ref.: B.Sadasiva Reddy Director

Project Name: 5 MW Debal Grid-connected Hydroelectric Project in Uttarakhand, India
Country: India
Methodology: AMS-I.D
Version: 13
GHG reducing Measure/Technology: Grid connected electricity generation from hydro sources
ER estimate: 23 880 tCO₂e per year
Size
☐ Large Scale
☒ Small Scale
Validation Phases:
☒ Desk Review
☒ Follow up interviews
☒ Resolution of outstanding issues
Validation Status
☐ Corrective Actions Requested
☐ Clarifications Requested
☒ Full Approval and submission for registration
☐ Rejected
 In summary, it is DNV's opinion that the "5 MW Debal Grid-connected Hydroelectric Project in Uttarakhand, India" as described in the PDD of 16 January 2010, meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology AMS-I.D version 13. Hence, DNV requests the registration of the "5 MW Debal Grid-connected Hydroelectric Project in Uttarakhand, India" as a CDM project activity.

Report No.: 2007-1016	Date of this 02 Feb 2010	Rev. No. 04
Report title: "5 MW Debal Grid-connected Hydroelectric Project in Uttarakhand, India"		
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Key words:

Validation

Clean Development Mechanism

Hydropower

Kyoto Protocol

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Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEA	Central Electricity Authority
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CL	Clarification request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
DPR	Detailed Project Report
EE	Executive Engineer
EIA	Environment Impact Assessment
GHG	Greenhouse gas(es)
IPCC	Intergovernmental Panel on Climate Change
MNES	Ministry of Non Conventional Energy Sources
MoEF	Ministry of Environment & Forests
MP	Monitoring Plan
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
UERC	Uttaranchal Electricity Regulatory Commission
UJVNL	Uttaranchal Jal Vidyut Nigam Limited
UPCL	Uttaranchal Power Corporation Limited
UNFCCC	United Nations Framework Convention on Climate Change



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1 EXECUTIVE SUMMARY – VALIDATION OPINION

Det Norske Veritas Certification AS (DNV) has performed a validation of the “5 MW Debal Grid-connected Hydroelectric Project in Uttarakhand, India” on the basis of UNFCCC criteria for the Clean Development Mechanism and host Party criteria 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 and the subsequent decisions by the CDM Executive Board.

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

The project participant is M/s Chamoli Hydro Power Pvt. Ltd. from the host Party India. India meets all participation requirements and the DNA of India has approved the project through a letter of approval on 16 April 2007 and confirmed that the project assists in achieving sustainable development /2/. No Annex I project participant has yet been identified.

Having an installed capacity of less than 15 MW, the project is eligible as type I small-scale CDM project activity. It has also been demonstrated that the project is not a de-bundled component of a large scale project. The validation has confirmed that the project is eligible as category I.D small-scale CDM project activity and correctly applies the simplified baseline and monitoring methodology AMS-I.D, version 13 /4/.

The determination of the baseline is well elaborated, transparent and sufficiently supported with facts, and is reasonable for the selected 10 year crediting period. Moreover, an analysis of the barriers facing the project demonstrates that the project is not a likely baseline scenario.

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 the absence of the project activity. The total emission reductions from the project are estimated to be 23 880 t CO_{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 defined. The monitoring plan makes sufficient provision for monitoring relevant project and baseline emission indicators. Responsibilities and authorities for project management, monitoring and reporting and QA/QC procedures have also been addressed.

A local stakeholder consultation process has been carried out by the project participant. 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.

In summary, it is DNV’s opinion that the “5 MW Debal Grid-connected Hydroelectric Project in Uttarakhand, India”, as described in the PDD of 16 January 2010, meets all relevant UNFCCC requirement for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology AMS-I.D, version 13 /4/. DNV thus requests the registration of the project as a CDM project activity.



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2 INTRODUCTION

Chamoli Hydro Power Pvt. Ltd. has commissioned Det Norske Veritas Certification AS (DNV) to perform a validation of the “5 MW Debal Grid-connected Hydroelectric Project in Uttaranchal, India” (hereafter called “the project”). This report summarises the findings of the validation of the project, performed 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, and the subsequent decisions by the CDM Executive Board.

2.1 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).

2.2 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-I.D, version 13 /4/. The validation was based on the recommendations in the CDM Validation and Verification Manual version 1.1 /3/.

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.



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3 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.

The following sections outline each step in more detail.

3.1 Desk Review of the Project Design Documentation

The following table lists the documentation that was reviewed during the validation:

- /1/ CDM PDD: Project Design Document for “5 MW Debal Grid-connected Hydroelectric Project in Uttarakhand, India” Project, initial version 00 webhosted on 17 December 2006, version 01 dated 01 May 2008 re webhosted on 08 May 2008, version 2 dated 23 June 2009 & final version 04 dated 16 January 2010.
- /2/ Letter of Approval by DNA of India dated 16 April 2007.
- /3/ CDM Executive Board: *Validation and Verification Manual*, version 1.1.
- /4/ CDM Executive Board AMS-I.D, version 13 *Grid connected renewable electricity generation*.
- /5/ CDM Carbon Dioxide Baseline Data base, version 3.0, dated 15 December 2007. (www.cea.nic.in)
- /6/ Detail Project Report for the project activity was prepared in June 2005 by Verma Associates Consulting Engineers (Hydro Power Projects).
- /7/ CDM India Designated National Authority: <http://cdmindia.nic.in/cdmindia/projectList.jsp?search=search>
- /8/ Agreement for civil construction for the project activity signed between Chamoli Hydro Power Pvt. Ltd. & M/s P.R. Engg. Services, Chandigarh, India dated 16 October 2006.
- /9/ Revised Power Purchase Agreement, signed between M/s Chamoli Hydro Private Limited and Uttarakhand Power Transmission Corporation Limited dated 10 November 2006.
- /10/ Purchase order placed for electro-mechanical equipments dated 31 May 2006.
- /11/ Project commissioning certificate dated 23 July 2007.
- /12/ Minutes of meeting of the board of directors of M/s Chamoli Hydro Power Pvt. Ltd. dated 19 October 2005 & 20 November 2005.
- /13/ E-mail correspondence for quotations for validation of the project activity with TUV Sud, SGS dated 25 September 2006 & DNV dated 03 December 2006.
- /14/ Contract for appointment of DNV as DOE for the project activity in December 2006.
- /15/ Power Purchase Agreement signed between Uttarakhand Power Corporation Limited & project proponent dated 05 February 2003.
- /16/ Independent Chartered Accountant certificate for actual project cost, assumptions & calculations used for project IRR calculations.
- /17/ No Objection Certificate for the project activity from irrigation department dated 22



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- December 2005.
- /18/ No Objection Certificate for the project activity from Forest department dated 15 March 2005.
 - /19/ No Objection Certificate for the project activity from village Panchayat dated 04 December 2005.
 - /20/ Project IRR calculation Spreadsheet.
 - /21/ Reserve Bank of India prime lending rate <http://rbidocs.rbi.org.in/rdocs/Wss/PDFs/67614.pdf> . Applied benchmark for the project activity.
 - /22/ No Objection Certificate for the project activity from State Electrical Inspectorate dated 05 June 2007.
 - /23/ No Objection Certificate for the project activity from revenue department dated 20 December 2005.
 - /24/ Implementation Agreement signed between project proponent & Government of Uttaranchal dated 28 April 2004.
 - /25/ Ministry of Non Conventional Energy Sources: small hydro booklet. <http://mnes.nic.in/booklets/Book7-e.pdf>
 - /26/ Order on the Approach Paper for determination of tariff for new hydro generating stations with capacities greater than 1 MW and up to 25 MW. <http://www.uerc.in/ordersPetitions/orders/Misc/2005/Order%20on%20Approach%20to%20Initial%20Tariff%20for%20New%20Hydro%20Generating%20Stations%20with%20capacity%20above%201%20MW%20and%20upto%2025%20MW.pdf>
 - /27/ 2006 IPCC Guidelines for National Greenhouse Gas Inventories
 - /28/ Density of diesel consumed in the Diesel generator as per Society of Indian Automobile Manufacturers (SIAM) <http://www.siamindia.com/scripts/Diesel.aspx>
 - /29/ Uttaranchal Electricity regulatory Commission Order on determination of tariff of Rajwakti small hydro electric project date 17 November 2005.
Uttaranchal Electricity regulatory Commission Order on determination of tariff of Hanumanganga small hydro electric project date 23 December 2005.
 - /30/ EIA Notification S.O.60 (E) dated 27/01/1994, clause no.3 (b), & Schedule-I Para 2; that the projects with a capacity of less than 25 MW need not have any Environmental Clearance. [http://envfor.nic.in/legis/eia/so-60\(e\).pdf](http://envfor.nic.in/legis/eia/so-60(e).pdf)
 - /31/ Publically available literature surveys to demonstrate geological risks: current science, vol. 87, no. 2, 25 July 2004. <http://www.iisc.ernet.in/currsci/jul252004/134a.pdf>
<http://info.worldbank.org/etools/docs/library/114813/bestcourse/docs/Course%20Projects/Best%20End%20of%20Course%20Projects/SVETLANA/Rautela-final%20project.pdf> and
http://www.humanitarianinfo.org/sumatra/reliefrecovery/cross/docs/EmergencyDisasterMitigation/UNCRD_ConsultantReportOnFieldSurveyOfNaturalDisasters_August2002.pdf



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3.2 Follow-up Interviews with Project Stakeholders

On 9 April 2007 DNV performed interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of the project proponent (Chamoli Hydro Power Pvt. Ltd., Hyderabad) and the consultant (Zenith Energy Services (P) Ltd.) were interviewed. The main topics of the interviews are summarized below:

Date	Name	Organization	Topic
2007/04/09	Mr. Mohan Reddy	Zenith Energy Services (P) Limited	<ul style="list-style-type: none"> ➤ Financials of the project activity ➤ Environmental compliance ➤ Estimated emission reductions ➤ Project additionality
	Mr. B. Sadashiva Reddy	Chamoli Hydro Power Pvt. Ltd.	<ul style="list-style-type: none"> ➤ Stakeholders consultation process ➤ Technology applied and operational lifetime. ➤ Baseline data. ➤ Monitoring and reporting procedures. ➤ Calibration, internal audit and corrective action procedures. ➤ Provisions for training, operation and maintenance

3.3 Resolution of Outstanding Issues

The objective of this phase of the validation was to resolve any outstanding issues which needed be clarified prior to DNV's positive conclusion on the project design. In order to ensure transparency a validation protocol was customised for the project. The protocol shows in a transparent manner the 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 the figure below. The completed validation protocol for the "5MW Debal Grid connected Hydroelectric Project in Uttaranchal, India" by Chamoli Hydro Power Pvt. Ltd. is enclosed in Appendix A to this report.

Findings established during the validation can either be seen as a non-fulfilment of CDM 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) CDM and/or methodology specific requirements have not been met; or



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- iii) there is a risk that the project would not be accepted as a CDM project or that emission reductions will not be certified.

A request for clarification (CL) 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
<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>

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 2 are linked to checklist questions the project should meet. The checklist is organised in different sections, following the logic of the large-scale PDD template, version 03 - in effect as of: 28 July 2006. Each section is then further sub-divided.</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 and Clarification Requests			
Draft report clarifications and corrective action requests	Ref. to checklist question in table 2	Summary of project owner response	Validation conclusion
<i>If the conclusions from the draft Validation are either a CAR or a CL, these should be listed in this section.</i>	<i>Reference to the checklist question number in Table 2 where the CAR or CL 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

3.4 Internal Quality Control

The validation report underwent a technical review. The technical review was performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.



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3.5 Validation Team

Role/Qualification	Last Name	First Name	Country	Type of involvement					
				Desk review	Interviews	Reporting	Supervision of work	Technical review	Expert input
CDM validator / technical team leader	Astakala	Vidyacharan	India	√	√		√		
CDM validator, Methodology Expert	Kutty	Mathsy	India	√		√			√
GHG auditor	Srivastava	Gaurav	India			√			
Technical reviewer	Kakaraparthi	Venkata Raman	India					√	

The qualification of each individual validation team member is detailed in Appendix B to this report.



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4 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 final validation findings relate to the project design document version 04 dated 16 January 2010.

4.1 Participation Requirements

The sole project participant is Chamoli Hydro Power Pvt. Ltd. from the host Party India. India ratified the Kyoto Protocol on 26 August 2002 and Ministry of Environment and Forests is the Designated National Authority of India. The DNA of India has approved the project on 16 April 2007 and also confirmed that the project contributes to sustainable development /2/. The issuance of Letter of Approval by DNA of India for the proposed project activity has been further verified by DNV from the Ministry of Environment and Forest, CDM India, Designated National Authority's website /26/.

No Annex I Party project participant has yet been identified.

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.

4.2 Project Design

The project activity envisages the installation of diversion type two small hydro power units with an aggregated capacity of 5 MW. The project is located on the right bank of Kailganga River just before its confluence with Pinder River. The project activity will use two synchronous generators with a rated capacity of 2500 kVA each coupled to two horizontal Francis turbines with capacity 2500 kW each. The technology is available indigenously. The estimated power generation is 31.18 GWh per year at a plant load factor of 71.18%. The project capacity has been confirmed from the technical specification provided in the purchase order placed for the electro mechanical equipment /10/. The project is expected to export 29.46 GWh to Uttaranchal Power Corporation Limited (UPCL) that is part of northern regional grid of India. The project design reflects good practice.

The starting date of the project activity is stated to be 31 May 2006, which is the date of placing the purchase order for the electro-mechanical equipments /10/. The start date is also in line with the CDM EB clarification provided in its 41st meeting that "the start date shall be considered to be the date on which the project participant has committed to expenditures related to the implementation or related to the construction of the project activity". DNV observed that, though project proponent had entered into an agreement for civil works on 25 March 2005 for a smaller capacity of 3 MW but no binding financial commitment was made. The first financial commitment was observed to have been made on 31 May 2006 when the project proponent executed an agreement for supply of Electro Mechanical equipment for the project activity. Subsequently, the original civil construction agreement was amended on 16 October 2006 as the capacity of the project has been enhanced to 5 MW and then the payment in this regard was made. Hence, 31 May 2006, the date of placing the purchase order for the electro-mechanical equipments /10/ has been considered as start date of the project activity. The project activity was commissioned on 23 July 2007 /11/ and commercial operation of



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exporting power started on 01 September 2007. The expected operational lifetime of the project activity is 30 years and a fixed crediting period has been chosen, with the start date of the first crediting period to be 01 November 2009 or from the date of registration, whichever is later. The project is expected to result in 23 880 tons of CO₂ e emission reductions per annum over the crediting period.

4.3 Baseline Determination

The installed capacity is less than 15 MW, and the project is eligible as type I small-scale CDM project activity and can apply a simplified baseline methodology AMS-I.D. The project applies the baseline methodology stipulated for category I.D of the “simplified modalities and procedure for small scale CDM project activity” The simplified baseline methodology AMS-I.D, version 13 is applicable for grid connected renewable electricity generation projects. The application of AMS-I.D, version 13 is justified as:

- The project generates electricity using hydrological resource and displaces the equivalent grid electricity.
- The project activity is a run of the river power plant with a total installed capacity of 5 MW. The installed capacity has been verified from the electro mechanical specifications provided by the technology supplier dated 31 May 2006/10/.

As the project activity supplies electricity to the Uttaranchal state electricity grid which forms a part of the northern regional electricity grid, the baseline for this project activity is a function of the generation mix of the northern regional grid. The selection of the northern regional grid as the grid system boundary for the project activity is in line with the EB guidance for large countries such as India. The project design document for the project activity was re-webhosted on UNFCCC website on 08 May 2008¹. The latest combined margin emission factor of northern regional grid was 810.46 t CO₂/GWh, available at the time of re-webhosting has been used for emission reduction calculation and is fixed *ex-ante* for the entire crediting period /5/.

	GHGs involved	Description
Baseline emissions	CO ₂	The major emission source. The GHG emission reduction is achieved by replacing the electricity generated by fossil fuel based power plants in the northern regional grid of India.
Project emissions	CO ₂	Project activity is equipped with diesel generator to meet the emergency requirements of power house; hence emissions due to usage of diesel will be accounted as project emissions.
Leakage	No Leakage	NA

4.4 Additionality

The additionality of the project activity has been demonstrated as per the Attachment A to Appendix B of the modalities and procedures for small-scale CDM project activities. The

¹<http://cdm.unfccc.int/Projects/Validation/DB/2GVLR0G2EP51WDQLACE21SBOYO35C3/view.html>



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project activity primarily demonstrates additionality through investment analysis and other barrier.

4.4.1 CDM consideration and continued action to secure CDM status:

The starting date of the project activity is stated to be 31 May 2006, which is the date of placing the purchase order for the electro-mechanical equipments /10/ and is confirmed to be the earliest among all financial commitments. The project activity was commissioned on 23 July 2007 /11/.

CDM consideration and continued action to secure CDM status: DNV has validated following sequence of events which establishes that the project proponent was a) aware of the CDM (prior to the start date of the project activity) and b) CDM revenue were a decisive factor in the decision to proceed with the project activity:

- (i) The Detailed Project Report for the project activity was prepared in June 2005 prior to start date of the project activity by Verma Associates Consulting Engineers (Hydro Power Projects).
- (ii) The board in its meeting held on 19 October 2005 /12/ noted that the investment cost of the project activity is higher in comparison to similar scale hydro power projects in northern India, due to difficult terrain of project activity. The board also noted that the project activity is located in earth quake prone zone & the region has history of frequent landslides and all the risks identified would impair the financial viability of the project. The note also states that while the board is aware of the above risks associated with the project, discussions are on with consultants to secure CDM status for the project.
- (iii) The final resolution to implement the project as a CDM project was taken in the subsequent Board meeting held on 20 November 2005, where it is noted that “it is significant to implement the project as a CDM project without which viability cannot be achieved”/12/.
- (iv) Project proponent approached the DNA of India for host country approval on 23 April 2006, even prior to the start date of the project activity (31 May 2006) & the approval was obtained on 16 April 2007. /2/.

Continued actions to secure CDM for the project activity is evidenced from the fact that, after the starting date of 31 May 2006, the project participant had started the process of identification and appointment of DOE and was verified from the mail correspondence with various DOEs (TUV Sud & SGS dated 25 September 2006 & DNV dated 03 December 2006) /13/. The DOE selection was finalized in December 2006 /14/ and was web hosted on 16 December 2006 for global stakeholder consultation process. The project activity was commissioned on 23 July 2007 /11/.

The above sequence of events establishes that real actions were taken to secure CDM status for the project in parallel with its implementation. DNV has verified all the referred documents.



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4.4.2 Investment analysis: Choice of approach:

Since the project activity generates revenue without CDM and the alternative to the project does not involve investments, a benchmark analysis was selected to compare the project activity with the generation of electricity by other grid-connected power plant.

4.4.3 Investment analysis: Benchmark selection:

Appropriateness of benchmark: The proponent has carried out an investment analysis based on the total project cost, tariff structure and cash outflow in order to demonstrate that the project is not economically attractive and thus faces investment barriers. Project IRR has been selected as the financial indicator. The benchmark of average Prime Lending Rate at 10.5% quoted by RBI (The Reserve Bank of India) for the year 2004-05² (applicable at the time of investment decision of the project activity) has been selected as the benchmark. DNV confirms that the selected benchmark is applicable at the time of investment decision made for the project activity, and is inline with the EB guidance on Investment analysis (Para 11 which states that local commercial lending rates are appropriate benchmark for project IRR).

4.4.4 Investment analysis: Input parameters:

The financial worksheets have been evidenced and verified to be correct. The Detailed Project Report (DPR) for the project activity was prepared in June 2005 whereas the purchase order for E & M equipments & civil construction agreement was placed on 31 May 2006 /10/ & 16 October 2006 /8/. For investment analysis the project cost provided in the DPR, prior to the starting date has been used for the financial calculations & is inline with the EB guidance provided on investment analysis (Para 6) /20/. The assumptions used, base documents and the financial workings have also been verified and certified by third party chartered accountants /16/.

- a) The assessment period for the financial calculation of IRR has been considered at 30 years (lifetime of project activity) and is reasonable.
- b) A salvage value of 10% of initial project cost at the end of the lifetime of project activity has been also considered for financial analysis and is in line with the CERC guidelines.
- c) A depreciation of 90% over the period of 30 years on civil works, plant and machineries & electrical works has been assumed based on the CERC guidelines.
- d) Electricity tariff has been calculated based on the cost plus approach i.e., based on the expected operating costs incurred for respective year and 14% return on equity, based on the guidance provided by Uttaranchal Electricity Regulatory Commission dated 10 November 2005 /26/. DNV has crosschecked the approach used for tariff calculation for the project activity and confirms that the same approach has been applied by Uttaranchal Electricity Regulatory Commission while fixing the tariff for Rajwakti small hydro electric project dated 17 November 2005 & Hanumanganga small hydro electric project date 23 December 2005 /29/.
- e) 10% free supply of power to the state utility, after 15th year is as per the implementation agreement signed with government of Uttaranchal dated 28 April 2004 /24/.
- f) The estimated power generation is 31.18 GWh per year at a plant load factor of 71.18% has been considered based on the detailed hydrological and topographical Investigations carried

² <http://rbidocs.rbi.org.in/rdocs/Wss/PDFs/67614.pdf>



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out by an independent expert agency and provided in the Detailed Project Report of June, 2005 /6/, DNV has verified that even on considering 100% PLF (43.8 GWh), the IRR of the project activity is lower than the benchmark hence this parameter is not sensitive for the project activity.

The other input values used for the investment analysis like,

- a) total project cost of 289.50 million INR, debt component of 192.5 million INR and equity component (97 million INR),
- b) interest on term loan at 9.75% and interest on working capital at 11%,
- c) O & M cost (3% of the total project cost with an escalation of 5% per annum),
- d) insurance charges (1% of the project cost)
- e) total electricity generation of 31.18 GWh (calculated based on historical data on daily discharge by the regulator from 1999 – 2004),
- f) auxiliary power consumption (0.5% of total generation)
- g) & transmission losses of 5% of net generation.

have been sourced from Detailed Project Report of June 2005 prepared by Verma Associates Consulting Engineers (Hydro Power Projects) /6/. The input values and the calculations have also been certified by independent chartered accountants /16/.

DNV has compared the investment cost/MW of project activity against the cost proposed by Ministry of Non Conventional Energy Sources /25/, Uttaranchal Jal Vidyut Nigam Limited /26/ & State Bank of India (financial institution involved in projects financing) /26/ and found this to be in reasonable range. The O&M cost (3% of the total project cost with an escalation of 5% per annum), insurance charges (1% of the project cost) have been compared with the figures proposed by UERC in its tariff order dated 10 November 2005 /26/ and is found to be in same range.

All the taxes and incentives are confirmed to be as per the Indian Income Tax Act of 1961.

4.4.5 Investment analysis: Calculation and conclusion:

The calculations were provided in the excel spreadsheet and verified to be correct. The project IRR of the activity without CDM revenues is worked out at 7.18% and is less than the benchmark of 10.5%. It has also been demonstrated that the project-IRR improves to above the benchmark when considering CDM revenues.

4.4.6 Investment analysis: Sensitivity analysis:

A sensitivity analysis has been performed to demonstrate the influence of the following parameters on the project IRR.

- a) Project cost: The project IRR touches the benchmark if the project cost decreases by 15.02% /18/. However a 15.02% decrease in the project cost is considered unrealistic considering the fact that project cost is already facing cost overruns, and the same has been verified by DNV from the certificate issued by the independent Chartered Accountant /16/.
- b) Plant load factor: Even after considering 100% plant load factor the IRR of the project activity is lower than the benchmark hence this parameter has not been considered for the sensitivity analysis and this is deemed reasonable.
- c) Electricity Tariff: The project IRR touches the benchmark if the electricity tariff increases by 16.95% /20/. The tariff used in the financial analysis calculated based on the procedure



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prescribed by Uttaranchal Electricity Regulatory Commission, Tariff order dated 10 November 2005 (capacity above 1 MW and up to 25 MW). In line with the tariff order, tariff has been estimated based on a "cost-plus" approach, i.e., based on the expected operating costs incurred for respective year and return on equity. This is the approach followed by UERC in determining tariff as of now and is in line with the EB guidance on investment analysis. DNV has crosschecked the approach used for tariff calculation for the project activity and confirms that the same approach has been applied by Uttaranchal Electricity Regulatory Commission while fixing the tariff for Rajwakti small hydro electric project dated 17 November 2005 & Hanumanganga small hydro electric project date 23 December 2005 /29/. Therefore, any assumption on increase in tariff in future is uncertain today. An increase of the tariff by 16.95% is unlikely.

d) Operation and maintenance cost: It has been demonstrated that if the operation and maintenance cost is reduced by 50% the project-IRR remains below than the benchmark of 10.5%. Hence, the project IRR is not sensitive to reduction in operation and maintenance costs.

e) Salvage value: Even after 100% salvage value the IRR for the project activity is lower than the benchmark return hence this parameter has not been considered for the sensitivity analysis and this is deemed reasonable.

4.4.7 Geological Risks:

The small and mini hydro power plants in the Himalayan regions (including those in Uttarakhand) suffer from various natural calamities, which include earthquakes, landslides and flash floods. In the recent past the state (Uttarakhand) was devastated by two major earthquakes, Uttarkashi 1991 and Chamoli 1999 (project site) and a number of landslides. Out of the total area of Uttarakhand (51000 km²), 21000 km² lies in the severest zone 'V' and the rest in zone 'IV'. DNV has verified that the project activity itself falls under zone V (Chamoli), seismically the most active zone. While the barrier would be applicable to all hydropower projects located in the zone V, DNV has verified the above facts from the publically available literature surveys /31/.

4.4.8 Barrier due to prevailing practice: The project activity is located in state of Uttaranchal. As per estimation of Ministry of Non Conventional Energy Sources state of Uttaranchal have a potential for small hydro projects (less than 25MW) to an extent of 1478.235 MW, out of which the installations of small hydro projects of capacity less than 25 MW is only 72.45 MW constituting 4.9% of total installed capacity (data available at the time of investment decision taken for the project activity) and this capacity of 72.45MW is achieved by implementation of over 75 projects all these projects were implemented by state utility.

Lack of private participation in development of hydro power projects can also be verified from study conducted by Asian Development Bank (<http://www.adb.org/Documents/Reports/Hydropower-Devt-India>). In Appendix F of this report "Hydropower Development in India: A Sector Assessment", clearly demonstrates that the entire installed capacity is run by state owned Uttaranchal Jal Vidyut Nigam Limited (UJVNL). ADB has also pointed out in Chapter IV of this report under Private Sector Participation "Development of hydro power projects had been impeded in the past due to a variety of reasons like (a) long gestation period; (b) capital intensive nature of projects; (c)



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requirement of statutory clearances; (d) geological surprises often encountered; (e) land acquisition problems; (f) law and order problems in some cases; (g) R & R problems etc.

Even the electricity regulatory commission of Uttaranchal, UERC has observed the barriers for implementation of small hydro projects in the state of Uttaranchal which they have indicated in their tariff order dated 10 November 2005 Para 5, which states that “the reasons for higher capital cost have been stated to be higher cost of civil works, transportation of men and material, cost of construction of roads/bridges and longer transmission lines etc in the hilly regions. It was even suggested that due to peculiar, unique and widely varying characteristics of each small hydro power project, putting any ceiling on the capital cost is not correct and may lead to either under-recovery of cost incurred or may lead to reduction in capital cost by compromising on the safety, reliability and optimal design of the plant particularly on account of geological surprises”.

Thus above mentioned fact clearly demonstrates that implementation of small scale hydro projects in state of Uttaranchal is not a common practice.

4.5 Monitoring

The monitoring methodology selected complies with requirements of AMS-I.D, version 13 “Grid connected renewable electricity generation”.

Baseline Emissions: This involves the metering of the electricity generated, onsite electricity consumption, electricity imported from the grid, net electricity supplied to the grid will be measured through 0.5S accuracy level meters. The electricity exported & imported to grid will be jointly read by the project participant and the grid company once in a month through an electronic meter installed at the grid interconnection points. Data collected can be cross-checked with monthly electricity generation notes issued by the grid company. The energy supplied to the grid by the power plant will be multiplied by the combined margin emission coefficient for the northern regional grid to estimate baseline emissions. These meters will be calibrated on annual basis.

Details of the data collection and frequency of data recording and associated formats are described and found to be adequate.

Project Emissions: this involves the measurement of amount of diesel consumed in the DG set (during emergency requirements of power house) will be measured on daily basis and will be cross checked with purchase receipt.

The authority and responsibility for project management, monitoring, measurement, review and reporting has been established. Data monitored will be archived for a period of two years after the crediting period.

4.5.1 Parameters determined ex-ante

The following parameters have been determined by *ex-ante* basis by Chamoli Hydro Power Pvt. Ltd.:

- Emission factor for the northern regional grid of India has been sourced from Central Electricity Authority (CEA) baseline carbon dioxide emissions from power sector version 03 latest data available at the time of re webhosting of PDD, and the value has been fixed to 810.46 tCO₂/GWh for northern regional electricity grid based on the



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latest data available at the time of start of validation and is fixed *ex-ante* for the entire crediting period /5/.

- NCV of Diesel has been fixed from 2006 IPCC guidelines, and the value is 43 TJ/Gg.
- Oxidation factor (OX) of diesel has been fixed from 2006 IPCC guidelines, and the value is 1.
- Density of diesel consumed in the diesel generator has been sourced from the Society of Indian Automobile Manufacturers (SIAM) and the value is 0.82 kg/l /34/.

In line with the methodology, the combined margin emission factor (50:50) for the northern grid of India has been calculated to be 810.46 tCO₂/GWh, which has been sourced from Central Electricity Authority CO₂ Baseline Database. Central electricity Authority (CEA), which is an official source of Ministry of Power, Government of India have worked out baseline emission factor for various grids in India and made them publicly available ("Baseline CO₂ Emission Database Version 3.0."). This CO₂ baseline database provides information about the OM and BM factors of the regional electricity grids in India /5/. 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 2004-2005, 2005-2006 and 2006-2007 /5/. BM is calculated *ex ante* based on the 20% most recent capacity additions in the grid based on net generation for the year 2006-07 as described in ACM0002.

4.5.2 Parameters monitored ex-post

The parameters monitored *ex-post* are:

- Total electricity generated by the project activity on a monthly basis.
- Auxiliary electricity consumption of the project activity on a monthly basis.
- Electricity supplied to the grid by the project activity on a monthly basis.
- Electricity imported by the project activity on a monthly basis.
- Quantity of diesel used in DG set on daily basis.

4.5.3 Management system and quality assurance

The monitoring involves the metering of the electricity generated, onsite electricity consumption, electricity imported from the grid, net electricity supplied to the grid and quantity of Diesel consumed in the DG set (during emergency requirements of power house). Details of the data collection and frequency of data recording and associated formats are described and found to be adequate. The electricity exported to grid will be jointly read by the project participant and the grid company once in a month through an electronic meter installed at the grid interconnection points. Data collected can be cross-checked with monthly electricity generation notes issued by the grid company. The energy supplied to the grid by the power plant will be multiplied by the combined margin emission coefficient for the northern regional grid to estimate baseline emissions.

Project emissions: project emissions due to will be due to usage of Diesel (during emergency requirements of power house) will be accounted as project emissions.



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The responsibilities and authorities for project management, procedures for monitoring and reporting, and QA/QC procedures have been systematically established and formalised.

4.6 Estimate of GHG Emissions

Baseline Emission (BE_y): The baseline emissions has been estimated based on net electricity supplied (after deducting auxiliary consumption & electricity import from grid) by the hydro power plant that replaces fossil fuel based electricity generation in the northern regional electricity grid. The grid emission factor for the northern regional grid has been sourced from Central Electricity Authority CO₂ Baseline Database Version 03 and the value is 810.46 tCO₂/GWh.

Project Emission (PE_y): the project activity will be equipped with diesel generator to meet the emergency requirements of the power house; hence emissions due to usage of diesel will be accounted as project emissions. The project proponent will monitor the amount of diesel consumed throughout the crediting period on daily basis whereas the NCV, density & oxidation factor of diesel has been fixed *ex ante*.

Leakage: no sources of emissions were identified. The electricity generating equipment is not transferred from any other activity.

$$ER = BE_y - PE_y$$

The project is expected to result in emission reductions of approximately 23 880 tCO₂e yearly over its 10 years fixed crediting period.

4.7 Environmental Impacts

The proposed project is a run-off-river hydropower plant and the environmental impacts of the project are not considered significant. As per the requirement of Ministry of Environment and Forests, government of India, EIA is not required for small hydroelectric projects so the proposed project does not need to conduct Environmental Impact Assessment. There is no specific requirement of consent to establish or consent to operate for small hydro power projects in state of Uttarakhand.

4.8 Comments by Local Stakeholders

The project proponent has consulted all relevant stakeholders for the project activity. The project has received the no objection certificate (NOC) from Uttarakhand Jal Vidyut Nigam Limited (UJVNL), Uttarakhand Power Corporation Limited (UPCL), Irrigation department, Revenue Department, Local village Panchayat, Forest Department & Uttarakhand Electricity Regulatory Commission (UERC). Letter of consent from the identified stakeholders have been provided for verification /9/ /17/ /18/ /19/ /22/ & /23/. The project has not received any adverse comments.

4.9 Comments by Parties, Stakeholders and NGOs

The PDD version 00 dated 25 December 2005 was made publicly available on DNV's climate change website³ and Parties, stakeholders and NGOs were through the CDM website invited

³ <http://cdm.unfccc.int/Projects/Validation/DB/AQP1VHW4OGVDRCKYH6JS3RAM5U4IDE/view.html>



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to provide comments during a 30 days period from 17 Dec 2006 to 15 Jan 2007. One comment was received during this period.

The PDD of 01 May 2008 was again re-webhosted on 08 May 2008 due to revision of the applied version of AMS-I.D to invite comments during a 30 days period from 09 May 2008 to 07 June 2008. No comments were received during this period.

Comment by: J.M. Singh, IRADe

Inserted on: 08 January 2007

Subject: Comment on Investment Barrier

Comments: Please refer B.3 section of PDD. It is mentioned in PDD that the project proponent requires investing 291.07 millions altogether for the project activity, which works out to be 58.21 millions per MW. The cost of the project the investment per MW is too high compared to investment required for setting up of a conventional power project. How project developer is claiming that the cost of this project is higher side? Can developer give some proof for example installed cost HEP commissioned in Uttaranchal during 2005-06 or comparison present installed cost of HEP in Uttaranchal.

PP Response:

In the PDD, the project proponent has compared the installation cost of the proposed project with the installation cost of conventional power plants. The investment required for the proposed hydel project is Rs. 291.07 million or Rs.58.21 million per MW. The cost of investment is high compared to other conventional power plant. That can be ascertained from the various news items published in the leading news papers of the country. Some of these are furnished below with source of data and we also furnish hard copies of the same.

Date and name of publication	Details	Total investment	Cost per MW
14 th June, 2004 Financial Express	250 MW New green field coal based power plant in Mundra, Gujarat proposed by Adani Group.	Rs.10000 millions	Rs.40 million
17 th June, 2004 Financial Express	Reliance Group and Govt. of Uttar Pradesh have planned worlds largest gas based power project in the state of Uttar Pradesh with a capacity of 3740MW	Rs.110000 millions	Rs.29.41 million
15 th July, 2004	Gujarat Government	Rs.244800	Rs.36 million



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Financial Express	has plans to commence construction of 6 power plants with a capacity of 6800 MW at Pipava in Gujarat	millions	
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We further furnish the estimated cost of installing small hydro project in Uttaranchal from the tariff order of Uttaranchal Electricity Regulatory Commission who has estimated the cost of Rs.56.00 million to Rs.61.00 million per MW which further prove that the investment required for small hydro project is much higher compared to conventional power projects.

DNV Response:

DNV would like to clarify that the investment cost stated in the initially webhosted PDD was INR. 291.07 million. During the validation, it was observed that this cost included the pre operative expense which is not inline with the EB guidance on investment analysis. Hence DNV requested project proponent to exclude this cost from investment cost & consider only project cost applicable at the time of investment decision made. Based on which project proponent has revised the project IRR calculation sheet, with a revised project cost of Rs. 289.5 million provided in the DPR, applicable at the time of investment decision was considered now for investment analysis. DNV has also verified the letter from the independent statutory auditor that the actual implementation cost of the project activity had overshoot the cost assumed in the DPR, hence use of project cost provided in DPR is conservative and is inline with guidance provided by EB “guidance on Investment analysis” Para 6 “Input values used in all investment analysis should be valid and applicable at the time of the investment decision taken by the project participant”.

DNV has verified from the news paper cuttings that the information provided in table provided in PP response is correct.

DNV would like to clarify that the investment cost/MW of conventional plant can not be compared with small hydro power projects as small hydro power projects poses unique challenges:⁴

1. Lack of Hydrological data: SHPs are constructed mainly on small streams or on the tributaries of rivers, whereas the hydrological data is available for major rivers. So the hydrological data for SHPs is interpolated/correlated which can not be very accurate. The occurrence of flash floods can not be ascertained due to non availability of this data and also it creates problem to optimize the design. It may also lead to under utilization or over estimation of the available potential.
2. Seismic Zone: As we all know that major part of the Uttaranchal state is under seismic Zone-V as the case of the project activity⁵. So it is always susceptible to Earthquakes and the structural design has to take care of this, which in turn increases the cost

⁴

http://www.iitr.ac.in/departments/AH/uploads/File/hshs/Presentations/Links/Technical%20Papers/Institutional%20Arrangements%20and%20Resources/Er%20SP%20Singh_Development%20of%20SHP%20Projects.pdf



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3. Uncertain Geological Conditions: Himalaya is among the youngest mountains so the Geological Conditions are very uncertain. Loose River bed Material (RBM), Unstable Slopes, Land/Avalanche Slides is encountered frequently.
4. Tunneling (especially small sized, as applicable for SHPs) a new practice being adopted, is very difficult due to the uncertainty of Geology.
5. Unpredictable Geographical Conditions: Cloud bursting and slope failures have to taken care while constructing the SHPs. This is responsible to increase the cost as certain safety/protection works are to be done. To overcome the above problems the detailed investigation as required for LHPs is also required for SHPs. So the cost/MW as well as the time for construction increases.
6. Remote Locations: Due to the remote locations, that to in the hilly terrain, big initial investment is required for the construction of approach roads and in the transportation of construction material, subsequently increasing the cost.
7. Requirement of long transmission lines.

DNV would also like to clarify that project specific investment cost/MW in state of Uttaranchal is not available in the public domain. However, DNV has compared the Investment cost/MW of the project activity with values provided by Ministry of New & Renewable Energy (Maximum permissible installation cost Rs 70 Million INR/MW for small hydro power projects in north-eastern region, Sikkim, Jammu and Kashmir, Himachal Pradesh, and Uttaranchal) /25/, Uttaranchal Jal Vidyut Nigam Limited (ceiling of 60 Million INR/MW for small hydro power projects in Uttaranchal) /26/ & State Bank of India, financial institution involved in projects (ceiling of Rs. 50-60 Million INR/MW) and found to be in same range.

APPENDIX A

CDM VALIDATION PROTOCOL

Table 1 Mandatory Requirements for 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 CAR-1	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	OK CAR-1	Host country approval needs to be presented for verification.
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 does not involve public funding from Annex I Parties.

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 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	The PDD uses the Small Scale CDM Project Design Document format, template 2, which is valid up to the 22 June 2007.
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	OK	Table 2, Section G

Requirement	Reference	Conclusion	Cross Reference/ Comment
	Scale CDM Project 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 are invited to provide comments through the CDM website http://www.dnv.com/certification/climatechange/Projects/ProjectDetails.asp?ProjectId=901 during a 30 days period through 17 December 2006 to 15 January 2007. One comment has been 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/ /9/ /10/	DR/I	The project qualifies as a small scale CDM project activity, since the nominal installed capacity of the project is 5 MW, which is less than the 15MW qualifying capacity as per the simplified modalities and procedures for small-scale CDM project activities. It involves the installation of 2x2.5 MW horizontal Francis turbines 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/I	There are no other projects registered in the previous two years, under 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/ /4/	DR	The project activity is a run-of-the-river hydro power plant exporting power to the northern grid of India and 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/ /4/	DR	The Debal hydro power plant is located in the village Debal of Narain Bagar taluk of Chamoli District, in the state of Uttaranchal, India. Debal village is located at a distance of 240 km from Rishikesh which is the nearest railway station. The geographical co-ordinates of the location is 79°35"E (longitude) and 30°5"N (latitude).		OK
A.2.2. Are the project's system (components and facilities used to mitigate GHG's) boundaries clearly defined?	/1/ /4/	DR	The projects system boundaries include the diversion structure, water conducting system, feeder channel, desilting tank, power channel, fore-bay tank, penstock, power house, and tail race channel.		OK
A.2.3. Does the project design engineering reflect current good practices?	/1/ /6/ /10/	DR/I	Yes. The project design reflects current good practice through the use of two horizontal Francis turbines with 2.5MW capacity each along with synchronous generators.		OK
A.2.4. Will the project result in technology transfer to the host country?	/6/ /10/	DR/I	The project activity is unlikely to result in any 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	<p>The project will require minimal additional training and maintenance efforts, as this involves setting up of a small hydro project using indigenous technologies, simple to operate and maintain.</p> <p>The provisions for meeting the training and maintenance requirements need to be evidenced.</p>	CL-1	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	Yes, the proposed project activity helps to improve the economic and social conditions in the region through generation of jobs during construction and operation phase of the project and also helps improve the rural infrastructure.		OK
A.3.2. Will the project create any adverse environmental or social effects?	/1/	DR/I	The project is not likely to create any adverse environmental or social impacts.		OK
A.3.3. Is the project in line with sustainable development policies of the host country?	/1/ /2/	DR/I	The project activity is inline with the sustainable development policies stipulated by India which include the four indicators, viz: environmental, social, economic and technological well being. However, this needs to be confirmed as approval from the DNA of India is not evidenced.	CAR-1	OK
A.3.4. Is the project in line with relevant legislation and plans in the host country?	/1/ /17/ /18/ /19/ /22/ /23/ /30/	DR	Approval for the project activity from the MoEF needs to be submitted. The various consents for establishment and operation of the project from the State Pollution Control Board need to be submitted. No objection form Irrigation department for the project and certificate for electrical installation from State Electrical Inspectorate, the power purchase agreement and Licence under Factory Act, need to be submitted.	CL-2	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
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/ /4/	DR	Yes, the project applies one of the simplified baseline methodologies AMS I.D, proposed for the small-scale project activity under category 1, energy industries (renewable/non-renewable sources).		OK
B.1.2. Is the baseline methodology applicable to the project being considered?	/1/ /4/	DR	Yes, the project involves energy generation utilising hydro power for a grid system which is fed by fossil fuels and non fossil fuel generating plants		OK
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/ /6/ /8/ /9/ /10/	DR	The project proponent has chosen to prove the additionality of the project activity based on investment barrier, prevailing practice and other barriers. <u>Barriers due to prevailing practices:</u> It has been argued that the Indian power scenario is mainly		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
	/11/ /12/ /13/ /14/ /9/ /16/ /20/ /21/		<p>dominated by fossil fuel fired power plants, due to the higher rates of return and lower risks involved. However, due to the high potential for hydro resources in the state of Uttaranchal, large hydro power plants co-exist with the fossil fuel fired power plants. The state however, constitutes only 62.19MW of the total potential of 1478.23 MW for small hydro power plants (SHP). However it is not clear from PDD that how it is a barrier for the project. Needs to be demonstrated with facts and figures.</p> <p><u>Investment Barrier:</u> The project investment cost is stated to be 58.21 million/MW of power generated. The project proponent has worked out the IRR without the CDM revenues to be 10.35%, with an improvement to 14.02% with the CDM revenues.</p> <p>The presented analysis requires additional information such as the detailed IRR calculation which needs to be submitted. The investment cost of 291.07 million, the PLF and the O&M costs of 3% considered for the IRR calculation need to be justified. The benchmark considered for this project needs to be stated and the source needs to be provided. Also DPR for the project need to be presented for verification.</p> <p>It is argued that the landslides and digging of hill slopes in the region renders the power plants inoperative through most periods. Due to this, the project proponent had to make additional investments to build tunnels instead of the open channels, which are further affected because of the location being inaccessible, non availability</p>	<p>CL-3</p> <p>CL-4</p>	

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			<p>of skilled labour and transport of basic materials like the cement and steel from about 240kms distance adding to the project cost.</p> <p><u>Other Barriers:</u> The variations/fluctuations in the tariffs provided by the UREC have been argued to be highly uncertain. The variations in tariff may be substantiated with data source. Also the lack of hydrological data in the catchments has been stated to pose problems with respect to uncertainty in the hydro resources availability, which eventually affects the PLF of the power plant. However the hydrological report prior to investment decision needs to be provided for verification to support this.</p>	CL-5	
B.2.2. Is the application of the baseline methodology and the discussion and determination of the chosen baseline transparent and conservative?	/1/ /4/	DR	<p>Yes, the project is located in the state of Uttaranchal which forms part of northern India, hence the baseline scenario has been appropriately considered to be the grid mix in the northern region grid of India. The weighted average of current generation mix has been chosen for estimating baseline emission factor.</p> <p>The grid emission factor has been used from the official CEA website.</p>		OK
B.2.3. Are relevant national and/or sectoral policies and circumstances taken into account?	/1/	DR	Yes, the national policies favour the development of renewable energy sources.		OK
B.2.4. Is the baseline selection compatible with the available data?	/1/ /5/	DR	Project proponent is requested to correct combined margin emission factor for northern grid of India.	CAR-3	OK
B.2.5. Does the selected baseline represent the most likely scenario describing what would	/1/ /4/	DR	The Indian scenario for power generation is dominated by the fossil fuels and hence it is		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
have occurred in absence of the project activity?			likely that the regional grids will continue to remain dependent on fossil fuel energy for the fixed 10 years of the crediting period.		
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?	/6/ /8/ /10/ /12/	DR	The start date of the project activity is March 2005, with a total operational lifetime of 30 years. However exact start date and evidence for the same need to be substantiated.	CL 9	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	The project has clearly defined and selected a fixed 10 year crediting period, starting from the date of registration of the project with UNFCCC or date of commissioning of the project, which ever is later.		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/ /4/	DR	Yes, the methodology adopted - "Metering the Electricity Generated by renewable technology", is in accordance with clause 13 of AMS I.D of Appendix B of Simplified M&P for small scale CDM project activities		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
D.1.2. Is the monitoring methodology applicable to the project being considered?	/1/ /4/	DR	Yes. The project activity is generation of electricity (2 X 2.5 MW) of 5 MW using the run of the river hydro potential and exporting it to the grid. Emission reduction is equal to the product of the net power exported by the project activity and the emission factor of the grid. Hence, metering of the electricity generated, auxiliary consumption and emission factor of the grid need to be monitored. Thus, the choice of methodology is appropriate.		OK
D.1.3. Is the application of the monitoring methodology transparent?	/1/ /4/	DR	Yes		OK
D.1.4. Will the monitoring methodology give opportunity for real measurements of achieved emission reductions?	/1/ /4/	DR	Yes, the monitoring methodology will provide an opportunity for real measurements of the emission reductions that can be achieved.		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/ /4/	DR/I	As the project activity is equipped with diesel generator to meet the emergency requirements of power house; hence emissions due to usage of diesel need to be accounted as project emissions.	CAR-2	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/ /4/	DR/I	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.		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/	DR/I	Yes, the data will be archived in paper form and archived until 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/ /4/	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/ /4/	DR	Yes.		OK
D.4.4. Will the indicators give opportunity for real measurements of baseline emissions?	/1/ /4/	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	Yes, the Board of Directors are responsible for project management.		OK
D.5.2. Is the authority and responsibility for registration monitoring measurement and reporting clearly described?	/1/	DR/I	The General manager assisted by a team appointed by Board of Directors are responsible for monitoring, measurements and reporting. Evidence for the same needs to be substantiated.	CL-6	OK
D.5.3. Are procedures identified for training of monitoring personnel?	/1/	DR/I	Procedures for training of the monitoring personnel need to be submitted.	CL7	OK
D.5.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR	As the project activity is a mini-hydro project, no emergencies are foreseen.		OK
D.5.5. Are procedures identified for calibration of monitoring equipment?	/1/	DR/I	Yes, procedures have to be identified for monitoring of calibration equipments.	CL7	OK
D.5.6. Are procedures identified for maintenance of monitoring equipment and installations?	/1/	DR/I	Procedures for maintenance of monitoring equipments need to be provided.	CL7	OK
D.5.7. Are procedures identified for monitoring, measurements and reporting?	/1/	DR/I	Procedures for monitoring measurements and reporting need to be evidenced.	CL7	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/I	Procedures for the day-to-day handling of records need to be identified.	CL7	OK
D.5.9. Are procedures identified for dealing with	/1/	DR/I	Yes.		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	Formal procedures need to be evidenced for internal audits for GHG project compliance need to be evidenced.	CL7	OK
D.5.11. Are procedures identified for project performance reviews?	/1/	DR	Same as above	CL7	OK
D.5.12. Are procedures identified for corrective actions?	/1/	DR/I	Same as above	CL7	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/I	As the project activity is equipped with diesel generator to meet the emergency requirements of power house; hence emissions due to usage of diesel need to be accounted as project emissions.	CAR-2	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
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/ /4/	DR/I	According to the simplified baseline and monitoring methodology for category I.D small-scale projects, leakage shall be considered, only if the project involves transfer of energy equipment from or to another activity. Since this is not the case in this project, no leakage needs to 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/ /4/	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. The project has chosen the northern regional grid which is conservative.		OK
E.3.2. Are all aspects related to direct and indirect baseline emissions captured in the project design?	/1/ /4/	DR	All the emissions related to direct and indirect emissions have captured in the project design.		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.
	/4/				
E.3.4. Do the methodologies for calculating baseline emissions comply with existing good practice?	/1/	DR	Yes.		OK
E.3.5. Are the calculations documented in a complete and transparent manner?	/1/ /5/	DR/I	Project proponent is requested to correct combined margin emission factor for northern grid of India.	CAR-3	OK
E.3.6. Have conservative assumptions been used?	/1/ /5/	DR/I	Project proponent is requested to correct combined margin emission factor for northern grid of India.	CAR-3	OK
E.3.7. Are uncertainties in the baseline emissions estimates properly addressed?	/1/ /4/	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/ /4/ /5/	DR/I	Yes. The project replaces fossil fuel-based electricity generation in the northern grid. While the project emissions are zero, the project is likely to result in a total emission reductions of 210 310 tonnes of CO ₂ e per year. Project proponent is requested to correct combined margin emission factor for northern grid of India.	CAR-3	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	/1/ /30/	DR	As per the latest EIA notification, from the MoEF, no EIA study is required for run of the river hydro		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
the project activity?			projects.		
F.1.2. Does the project comply with environmental legislation in the host country?	/1/ /17/ /18/ /19/ /22/ /23/ /30/	DR/I	As on A.3.4	CL2	OK
F.1.3. Will the project create any adverse environmental effects?	/1/	DR/I	The project is unlikely to create any adverse environmental impacts.		OK
F.1.4. Have environmental impacts been identified and addressed in the PDD?	/1/	DR/I	The project is unlikely to create any adverse environmental impacts.		OK
G. Comments by Local Stakeholder Validation of the local stakeholder consultation process.					
G.1.1. Have relevant stakeholders been consulted?	/1/ /17/ /18/ /19/ /22/ /23/	DR/I	Stakeholders have been identified and the process of inviting their comments undertaken. The identified stakeholders include the UPCL, UERC, irrigation department, forest department and the village panchayat.		OK
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/ /18/ /19/ /30/	DR/I	The following details need to be clarified: <ul style="list-style-type: none"> • Date when the public hearing was held. • The communications processes adopted for intimation/consultation of the stakeholders meeting. • The recorded minutes of the meeting. • Local populace, if any in the region who 	CL7	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			are part of the stakeholder consultation process as well.		
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/ /17/ /18/ /19/ /22/ /23/	DR	There is no stakeholder consultation process required by the regulations/laws in the India for small scale run-of-the-river hydro power projects.		OK
G.1.4. Is a summary of the comments received provided?	/1/ /17/ /18/ /19/ /22/ /23/	DR	No negative comments have been received for the proposed project activity.		OK
G.1.5. Has due account been taken of any comments received?	/1/	DR	Same as G.1.5.		OK

Appendix: A

A.1. Letter of approval					
A.1.1 Is the LoA received directly from the DNA or through the project participant.	/1/ /2/	DR/I	The Letter of Approval has been provided by the project proponent and same has been verified from DNA of India's website.		OK
A.2. Project design					
A.2.1 Does the PDD describe the CDM project activity with all relevant elements in a transparent and accurate way?	/1/	DR	Yes, the CDM project activity has been described adequately in the CDM PDD.		OK
A.2.2 Has the CDM project activity at the start of the validation been constructed or does the CDM project activity use existing facilities or equipment?	/1/	DR/I	The project activity is installation of new run of river hydro power project.		OK
A.2.3 Is the project a large scale project, a small scale project with average annual emission reductions above 15 000 tonnes or a bundled small scale project? Has on-site visit been carried out?	/1/	DR/I	No, site visit for the project activity was not conducted as the project activity was under construction at that time.		OK
A.2.4 Does the project activity involved alteration of existing installations? If so, have the differences between pre-project and post-project activity been clearly described in the PDD?	/1/	DR/I	No, the project activity is installation of new run of river hydro power project.		OK
A.3. Project emissions not addressed by the methodology					
A.3.1 Does the methodology describe all project emission source for the project activity that contributes all 1% of the emission reductions? Sources that the methodology considers not to take into account are not relevant (e.g. cement and iron consumption for building hydropower plants).	/1/ /4/	DR	Yes.		OK
A.4. Documentation of baseline emissions					
A.4.1 Documentation of the baseline determination: a. All assumptions and data used by the project	/1/ /4/	DR	Yes, refer section B.2 of the validation Table: 2		OK

<p>participants are listed in the PDD and related document to be submitted for registration. The data are properly referenced.</p> <p>b. All documentation is relevant as well as correctly quoted and interpreted.</p> <p>c. Assumptions and data can be deemed reasonable</p> <p>d. Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD.</p> <p>e. The methodology has been correctly applied to identify what would occurred in the absence of the proposed CDM project activity</p>					
A.5. Documentation of the calculations					
<p>A.5.1 Algorithms and/or formulae used to determine emission reductions</p> <ul style="list-style-type: none"> • All assumptions and data used by the project participants are listed in the PDD and related document submitted for registration. The data are properly referenced • All documentation is correctly quoted and interpreted. • All values used can be deemed reasonable in the context of the project activity • The methodology has been correctly applied to calculate the emission reductions and this can be replicated by the data provided in the PDD and supporting files to be submitted for registration. 	/1/ /4/	DR	Yes, refer section B.4, B.5, B.6 & B.7 of the validation Table:2		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 The DNA of Host Country India approval is yet to be received.	Table 1	The Host Country Approval received from Indian DNA is enclosed.	Letter of Approval Dated 16 April 2007 has been verified by DNV. OK Accepted. CAR 1 Closed.
CAR 2 As the project activity is equipped with diesel generator to meet the emergency requirements of power house; hence emissions due to usage of diesel need to be accounted as project emissions.	D.2.1 E.1.1	PDD has revised & project emissions have now been considered from DG set. Revised PDD version 02 Attached.	The project proponent has revised the PDD and emissions due to usage of diesel have been accounted as project emissions in revised PDD version 02 dated 23 June 2009 & PP will monitor the diesel consumption. OK Accepted. CAR 2 Closed.
CAR 3 Project proponent is requested to correct combined margin emission factor for northern grid of India applicable at the re-webhosting of PDD and financial spreadsheet & emission reduction calculation also need to be revised based on the same.	B.2.4 E.3.5 E.3.6	The grid emission factor for Northern grid of India applicable at the re-webhosting of PDD has been used now. Revised PDD version 04, revised financial spreadsheet & ER sheet is enclosed.	Project proponent has corrected the combined margin emission factor for northern grid of India based on the CEA database version 03 and same has been incorporated in revised PDD version 04. Revised PDD, financial spreadsheet & emission reduction sheet has been reviewed by DNV. OK Accepted. CAR 3 Closed
CL 1 The project will require minimal additional training and maintenance efforts, as this	A.2.5	The initial training to the operating personnel for the smooth operation and maintenance of the electro-mechanical	The initial training to the operating personnel for the smooth operation and maintenance of the electro-mechanical

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
<p>involves setting up of a small hydro project using indigenous technologies, simple to operate and maintain.</p> <p>The provisions for meeting the training and maintenance requirements need to be evidenced.</p>		<p>equipments will be provided by the equipment supplier. (Evidence in the form of letter No. BFL/MKT/MUN/354/352 dated 10th August, 2007 confirming the training to the PP's personnel is attached. as Annexure)</p> <p>The maintenance of the plant and machinery is covered by the purchase contract executed with the machinery supplier and extract of the relevant clause from the contract is furnished to DOE.</p>	<p>equipments will be provided by the equipment supplier prior to the start of project operations. This has been verified by DNV from equipment supplier.</p> <p>The maintenance of the plant and machinery is covered by the purchase contract executed with the machinery supplier & has been verified by DNV.</p> <p>OK Accepted.</p> <p>CL 1 Closed.</p>
<p>CL 2</p> <p>Approval for the project activity from the MoEF needs to be submitted. The various consents for establishment and operation of the project from the State Pollution Control Board need to be submitted. No objection form Irrigation and certificate for electrical installation from State Electrical Inspectorate, the power purchase agreement and Licence under Factory Act, need to be submitted.</p>	B.10.4	<p>Permissions obtained by the Project proponent from the following agencies are furnished as attachments.</p> <ul style="list-style-type: none"> • NOC from irrigation department • NOC from the forest department • NOC from the village panchayat • NOC from State Electrical Inspectorate • Permission from the Revenue Department • Copy of Power Purchase Agreement • The company has signed an implementation agreement in April 2004. 	<p>All necessary consents for the project activity have been obtained for the project activity.</p> <p>As per Ministry of New & Renewable Energy no consents are required for hydro power projects less than 25MW.</p> <p>OK Accepted</p> <p>CL 2 Closed.</p>

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
		<p>As per MoEF recent notification, the projects with a capacity of less than 25 MW also need not have any Environmental Clearance. Evidence for the same is available at http://envfor.nic.in/legis/eia/so-60(e).pdf</p> <p>The power evacuation from the project activity commenced from 1st September, 2007. Therefore, there is no specific requirement for obtaining “consent to establish” from pollution control department” and the above notification is an evidence in this regard. Evidence for the Commercial Operation Date is also available for verification.</p>	
<p>CL 3</p> <p><u>Barriers due to prevailing practices:</u> It has been argued that the Indian power scenario is mainly dominated by fossil fuel fired power plants, due to the higher rates of return and lower risks involved. However, due to the high potential for hydro resources in the state of Uttaranchal, large hydro power plants co-</p>	B.10.4	<p>Establishment of small hydro projects in the northern grid is not a common practice. As it can be seen from the CEA annual report that Northern grid is dominated from fossil fuel based power plants.</p> <p>Establishment of small hydro projects in the state of Uttaranchal is not a common</p>	<p>Project proponent is requested to correct prevailing practice barrier as Comparison of grid with not reflect the correct picture as even if the complete potential of small hydro is exploited in that case also this will remain below 10% of energy supplied by conventional plants.</p>

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
<p>exist with the fossil fuel fired power plants. The state however, constitutes only 62.19MW of the total potential of 1478.23 MW for small hydro power plants (SHP). However it is not clear from PDD that how it is a barrier for the project. Needs to be demonstrated with facts and figures.</p>		<p>practice. This is evident from the MNES Annual Report 2004-05 which clearly indicates that the total potential available in the state for small hydroelectric projects at 354 sites is 1478.235 MW, out of which the installed capacity accounts to 72.45 MW at 75 sites only i.e. only 4.9%. The same fact is evident in Annexure 11B taken from CEA Annual Report 2004-05. (Evidences available at:</p> <ul style="list-style-type: none"> • http://www.mnes.nic.in/annualreport/2004_2005_English/ch8_pg1.htm as table 8.1 • http://www.mnes.nic.in/annualreport/2004_2005_English/ch8_pg2.htm as table 8.2. • http://cea.nic.in/about_us/Annual%20Report/2004-05/annex11b.pdf). <p>Hence, it is proved from the fact that against an estimated potential of 1478.23 MW under small hydro category, projects installed in the state under small hydro category is only 62.19 MW (Relevant extract from the order of the state Regulatory commission is attached). The</p>	CL Pending

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
<p>CL 3 Pending</p> <p>Project proponent is requested to correct prevailing practice barrier as Comparison of grid with not reflect the correct picture as even if the complete potential of small hydro is exploited in that case also this will remain below 10% of energy supplied by conventional plants.</p>		<p>commission also observed that “the present level of exploitation of this particular source is still disappointing and there is no noticeable trend suggesting an early tapping of the remaining potential”. This statement amply proves that setting up of small hydro projects in the state is not a common practice due to various barriers which are more clearly described in the PDD.</p> <p>This barrier is removed from the PDD as this is generic in nature & is applicable for all small scale hydro projects in Uttaranchal.</p>	<p>PP is removed prevailing practice barrier from the PDD as this barrier is applicable for all small scale hydro projects in Uttaranchal.</p> <p>Revised PDD version 02 has been reviewed by DNV.</p> <p>OK Accepted.</p> <p>CL 3 Closed.</p>
<p>CL 4</p> <p>The presented analysis requires additional information such as the detailed IRR calculation which needs to be submitted. The investment cost of 291.07 million, the PLF and the O&M costs of 3% considered for the IRR calculation need to be justified. The benchmark considered for this project needs</p>	B.2.1	<p>The input values for the project activity has been taken from DPR prepared for the project activity.</p> <p>The O & M cost, Tariff for the project activity was based on the UERC tariff order.</p> <p>Copy of DPR has submitted to DOE</p>	<p>The input values for investment analysis has been taken from detailed project report of June 2005. the O& M Cost, electricity tariff considered for the project activity is based on the UERC tariff order dated 10 November 2005.</p> <p>It has been verified by DNV that the Investment analysis conducted by PP is</p>

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
to be stated and the source needs to be provided. Also DPR for the project need to be presented for verification.			inline with CDM executive board guidance on investment analysis. OK Accepted. CL 4 Closed.
CL 5 <u>Other Barriers:</u> The variations/fluctuations in the tariffs provided by the UREC have been argued to be highly uncertain. The variations in tariff may be substantiated with data source. Also the lack of hydrological data in the catchments has been stated to pose problems with respect to uncertainty in the hydro resources availability, which eventually affects the PLF of the power plant. However the hydrological report prior to investment decision needs to be provided for verification to support this.	E.1.2	The arguments have been excluded in the revised PDD as these barriers are generic & can not be substantiated from evidences.	PP has removed other barriers from the PDD as these barriers are generic in nature and project proponent failed to demonstrate these barriers. OK Accepted CL 5 Closed.
CL 6 The Stakeholders consultation process lacks the following : <ul style="list-style-type: none"> • The details of the Mechanism of consultation • The records of the stakeholder process. 	D.2.2	The details of the stakeholder meetings have been described in Section G of the revised PDD. The meetings were conducted by the project In-charge and DGM, Mr. Babu, who along with other members of the management team addressed the stakeholders and took account of their comments. Stakeholder questionnaires were filled out by local villagers and members of the Gram Panchayat. The completed	The project proponent has conducted a stakeholder consultation at project site Local villagers and members of the Gram Panchayat participated in the stakeholder meeting. Project proponent has received all necessary consents for the project activity. OK Accepted CL 6 Closed.

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
		questionnaires have been submitted herewith for reference. A No Objection Certificate has also been attached printed on the Panchayat letterhead, both in vernacular and English.	
<p>CL 7</p> <p>The General manager assisted by a team appointed by Board of Directors is responsible for monitoring, measurements and reporting. Evidence for the same needs to be substantiated.</p> <p>Procedures for project management covering authority & responsibility, measurement, monitoring, reporting, calibration, maintenance to be formalised.</p> <p>Management system procedures related to documentation/record keeping, corrective actions, internal audits & performance reviews also to be formalised.</p>	D.5	<p>The implementation of the project was completed in July 2007. The General Manager has been entrusted with the authority and responsibility of measurement, monitoring, reporting, calibrating and maintenance.</p> <p>The General Manager is also responsible for evolving and following management systems, procedures related to documentation/record keeping, corrective actions, internal audits and performance reviews. Management systems and procedures for maintaining necessary records including audit thereof is a part of company's operational system.</p>	<p>The General Manager plant will be responsible for overall project management & will be responsible for review of procedures related to documentation/record keeping, corrective actions, internal audits and performance reviews.</p> <p>The procedures for monitoring, reporting & calibration is now formalised in revised PDD version 02 dated 23 June 2009.</p> <p>Revised PDD version 02 has been reviewed by DNV.</p> <p>OK Accepted CL 7 Closed.</p>
<p>CL 8</p> <p>The following details need to be clarified:</p> <ul style="list-style-type: none"> • Date when the public hearing was held. • The communications processes adopted for intimation/consultation of 	G.1.2	<p>As per MoEF recent notification, the projects with a capacity of less than 25 MW does not require any public hearing. Evidence for the same is available at http://envfor.nic.in/legis/eia/so 60(e).pdf</p>	<p>As per MoEF notification projects with a capacity of less than 25 MW does not require any public hearing.</p> <p>Hence public hearing is not required for project activity.</p> <p>PP has received all necessary consents</p>

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
<p>the stakeholders meeting.</p> <ul style="list-style-type: none"> • The recorded minutes of the meeting. • Local populace, if any in the region who are part of the stakeholder consultation process as well. 		<p>As such the option for the intimation/consultation with stakeholders and records of minutes does not arise.</p> <p>The stakeholders for the project activity are</p> <ol style="list-style-type: none"> 1. Government of Uttaranchal (Uttaranchal Power Corporation Limited i.e. UPCL) 2. State Irrigation department. 3. State Revenue department. 4. State Electrical Inspectorate. 5. Forest Department 6. Village Panchayat 7. State Electricity Regulatory Commission (UERC) <p>The PP has approached all the stakeholders for their approval/permission for setting up the project activity and the clearance is obtained from all the stakeholders.</p>	<p>from state authority for the project activity.</p> <p>Local villagers and members of the Gram Panchayat participated in the stakeholder meeting. PP has received the No Objection Certificate for the project activity from local village Panchayat.</p> <p>OK Accepted. CL 8 Closed.</p>
<p>CL 9</p> <p>As per the initial webhosted PDD the start date of the project activity is 25 March 2005, with a total operational lifetime of 30 years. However evidence for start date need to be submitted for verification.</p> <p>PP is also requested to substantiated how the</p>	C.1.1	<p>The Glossary of CDM (Ver 03) defines start date of the project activity as “....the earliest date at which either the implementation or construction or real action of a project activity begins” (p. 29). To facilitate clear understanding of this term, EB in its 41st meeting had</p>	<p>The starting date of the project activity is stated to be 31 May 2006, which is the date of placing the purchase order for the electro-mechanical equipments. DNV confirms that the date selected as start date is inline with CDM EB definition of start date as:</p>

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
<p>selected start date is inline with start date definition provided by CDM EB in EB 41 meeting report Para 67.</p>		<p>clarified that “the start date shall be considered to be the date on which the project participant has committed to expenditures related to the implementation or related to the construction of the project activity. This, for example, can be the date on which contracts have been signed for equipment or construction/operation services required for the project activity.” (Paragraph 67).</p> <p>PP has entered into an agreement for civil works on 25/03/2005 for 3 MW capacity project and there is no financial commitment by the PP. Subsequently, the agreement is amended on 16.10.2006 as the capacity of the project has been enhanced to 5MW. Before the date of this amended civil works contract, the PP has executed agreement for supply of Electro Mechanical equipment on 31/05/2006 for 5MW capacity project. Hence, the same date is considered as start date of the project activity as it was on this day the real action of the project activity began and the project participant committed expenditure related to the construction of the project activity. The start date of</p>	<p>CDM EB had clarified in its 41st meeting that “the start date shall be considered to be the date on which the project participant has committed to expenditures related to the implementation or related to the construction of the project activity”. Though the project proponent had entered into an agreement for civil works on 25 March 2005 for 3 MW capacity project, but this date can not be considered as start date of the project activity as the project proponent had not made any financial commitment in this regard, the project participant had made the first financial commitment on 31 May 2006 when the project proponent executed an agreement for supply of Electro Mechanical equipment for the project activity. Subsequently, the civil construction agreement was amended on 16 October 2006 as the capacity of the project has been enhanced to 5MW and then the payment in this regard was made. Hence, 31 May 2006, date of placing the purchase order for the electro-mechanical equipments has been considered as start date of the project activity.</p> <p>OK Accepted.</p>

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
		the project activity given in the PDD, therefore, is in conformity with the Glossary of CDM Terms as well as the decision given by EB vide Paragraph 67 of EB 41.	CL 9 Closed.

APPENDIX B

CERTIFICATES OF COMPETENCE



CERTIFICATE OF COMPETENCE

Vidyacharan Astakala

Qualification in accordance with DNV’s Qualification Scheme CDM/JI (ICP-8-1-CDMJl-i1)

GHG Auditor:	Yes				
Technical Area	CDM Validator	CDM Verifier	Sector Expert	Methodology Expert	Technical Reviewer
Landfill gas					
Renewables	Hydro power	Jan 2009	Jan 2009		
	Wind power				
	Other renewable				
Biomass	Jan 2009	Jan 2009		Jan 2009	Jan 2009
Grid connection of isolated system					
Cement					
Waste-heat / waste-gas recovery					
Efficiency of thermal power plants					
Coal mine methane					
Fuel switch					
Manure management					
Waste / wastewater treatment					
Energy efficiency	Jul 2009	Jul 2009			
N ₂ O					
HFCs					
Flare reduction					
PFCs					
Charcoal					
CO ₂ recovery					
Transport					
Non-renewable biomass					
Biofuel					
Pipeline leakage reduction					
SF ₆					

Høvik, 9 July 2009

Michael Lehmann

Michael Lehmann
Technical Director, Climate Change Services



CERTIFICATE OF COMPETENCE

Raman Venkata Kakaraparthi

Qualification in accordance with DNV’s Qualification Scheme CDM/JI (ICP-9-8-i1-CDMJJ-i1

GHG Auditor:	Yes				
Technical Area	CDM Validator	CDM Verifier	Sector Expert	Methodology Expert	Technical Reviewer
Landfill gas	Jan 2009				
Hydro power	Jan 2009				
Renewables	Jan 2009	Jan 2009		Jan 2009	Jan 2009
Wind power					
Other renewable					
Biomass	Jan 2009				
Grid connection of isolated system					
Cement					
Waste-heat / waste-gas recovery	Jan 2009	Jan 2009	Jan 2009		
Efficiency of thermal power plants			Jan 2009		
Coal mine methane					
Fuel switch			Jan 2009		
Manure management					
Waste / wastewater treatment	Jan 2009				
Energy efficiency	Jan 2009	Jan 2009	Jan 2009		
N2O					
HFCs	Jan 2009	Jan 2009			
Flare reduction					
PFCs					
Charcoal					
CO2 recovery			Jan 2009		
Transport					
Non-renewable biomass					
Biofuel					
Pipeline leakage reduction					
SF6					

Høvik, 9 January 2009

Michael Lehmann

Michael Lehmann
Technical Director, Climate Change Services



CERTIFICATE OF COMPETENCE

Mathsy Kutty

Qualification in accordance with DNV’s Qualification Scheme CDM/JI (ICP-9-8-i1-CDMJ1-i1

GHG Auditor:	Yes				
Technical Area	CDM Validator	CDM Verifier	Sector Expert	Methodology Expert	Technical Reviewer
Landfill gas	Jan 2009				
Hydro power	Jan 2009				
Renewables	Wind power			Jan 2009	Jan 2009
Other renewable					
Biomass					
Grid connection of isolated system					
Cement					
Waste-heat / waste-gas recovery					
Efficiency of thermal power plants					
Coal mine methane					
Fuel switch					
Manure management					
Waste / wastewater treatment				Jan 2009	Jan 2009
Energy efficiency					
N2O					
HFCs					
Flare reduction					
PFCs					
Charcoal					
CO2 recovery					
Transport					
Non-renewable biomass					
Biofuel					
Pipeline leakage reduction					
SF6					

Høvik, 9 January 2009

Michael Lehmann

Michael Lehmann
Technical Director, Climate Change Services



CERTIFICATE OF COMPETENCE

Gaurav Srivastava

Qualification in accordance with DNV’s Qualification Scheme CDM/JI (ICP-8-1-CDMJi-i1)

GHG Auditor:	Yes				
Technical Area	CDM Validator	CDM Verifier	Sector Expert	Methodology Expert	Technical Reviewer
Landfill gas					
Hydro power					
Renewables Wind power					
Other renewable					
Biomass					
Grid connection of isolated system					
Cement					
Waste-heat / waste-gas recovery					
Efficiency of thermal power plants					
Coal mine methane					
Fuel switch					
Manure management					
Waste / wastewater treatment					
Energy efficiency					
N ₂ O					
HFCs					
Flare reduction					
PFCs					
Charcoal					
CO ₂ recovery					
Transport					
Non-renewable biomass					
Biofuel					
Pipeline leakage reduction					
SF ₆					

Høvik, 5 November 2009

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