VALIDATION REPORT

Client: e7 Fund for Sustainable Energy Development

Validation of the e7 Bhutan Micro Hydro Power CDM Project

No. GR04W0001D

Revision No. 02

JACO CDM ., LTD

Date of first issue: Oct. 6, 2004	
Approved by: Nobuhisa Ito CEO, President of JACO CDM	Project No.: CDM. Val. 0401
Client: e7 Fund for Sustainable Energy Development (e7 Fund)	Client ref.: The Kansai Electric Power Co., Inc.

Summary:

JACO CDM., LTD (hereinafter JACO CDM) has performed the validation of the "e7 Bhutan Micro Hydro Power CDM Project" (hereinafter, "e7 Bhutan Project") against the requirements of the UNFCCC & host country criteria. These requirements have been listed in a Validation Protocol. (Refer to Appendix 1)

The purpose of the "e7 Bhutan Project" is to reduce GHG emissions and to contribute to the sustainable development by constructing a hydroelectric power station with a power generation capacity of 70kW in an un-electrified Chendebji village. The project is a small-scale activity of the Type I and Category is I.A. "Electricity Generation by the User", funded by e7 Fund for Sustainable Energy Development (hereinafter, e7 Fund).

This validation report summarizes the findings of the validation.

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

The responses to 3 Corrective Action Requests (CARs) and 3 Clarifications (CLs) issued by JACO CDM to the original PDD were satisfactorily provided by e7 Fund and the original PDD was revised to PDD Rev.02.

In summary, it is JACO CDM's opinion that the project, as described in the Validation Report Rev.02 of April. 2005, meets all relevant UNFCCC requirements for CDM and all relevant host country criteria and correctly applies the simplified baseline and monitoring methodology for category I.A small-scale CDM project activities. Hence, JACO CDM requests the registration of the "e7 Bhutan Micro Hydro Power CDM Project" as a CDM project.

Report No.: GR04W0001D		
Report title: Validation Report Validation of the e7 Bhutan Micro Hydro Power CDM Project		
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Date of this revision: Apr. 08, 2005	Rev. No.: 02	Number of pages: 17

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Abbreviations:

BPC	the Bhutan Power Corporation
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CERs	Certified Emission Reductions
CL	Clarification Request
CO2	Carbon dioxide
COP	Conference of the Parties
COP/MOP	Conference of the Parties serving as the Meeting of the Parties
DNA	Designated National Authority
DoE	Department of Energy (Royal Government of Bhutan)
e7 Bhutan Project	e7 Bhutan Micro Hydro Power CDM Project
e7 Fund	e7 Fund for Sustainable Energy Development
EIA	Environmental Impact Assessment
ERs	Emission Reductions
GHG	Green House Gas(es)
GWP	Global Warming Potential
HPP	Hydro Power Plant
IPP	Independent Power Producer
IPCC	Intergovernmental Panel on Climate Change
JACO CDM	JACO CDM., LTD
KP	Kyoto Protocol
kW	kilowatt
kWh	kilowatt-hour
MW	Megawatt
NECs	National Environment Commission Secretariat (Royal Government of Bhutan)
NGO	Non-government Organization
ODA	Official Development Assistance
PDD	Project Design Document
SSCDM	Small Scale CDM
UNFCCC	United Nations Framework Convention on Climate Change
VP	Validation Protocol
WH	Watt-hour
8FYP	8th five year plan
9FYP	9th five year plan

1. Introduction

1.1 Objective

The e7 Fund represented by the Kansai Electric Power Co., Inc. has commissioned JACO CDM to validate the e7 Bhutan Project. The validation serves as design verification and is a requirement of all CDM projects. The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, the monitoring plan (MP), and the project's compliance with relevant UNFCCC and host country criteria are validated in order to confirm that the project design as documented is sound and reasonable and meets the stated requirements and 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).

UNFCCC criteria refer to the Kyoto Protocol criteria and the CDM rules and modalities as agreed in the Bonn Agreement and the Marrakech Accords.

1.2 Validation Scope

The validation scope is defined as an independent and objective review of the project design document, the project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations.
Validation Protocol used for this project is attached to this report. (Appendix 1)

JACO CDM conducted the validation of the e7 Bhutan Project by the assessment of the PDD and additional documents listed in the Chapter 7 "References", also by the interviews with persons listed in the same chapter.

1. 3 Proposed CDM project

- The purpose of the e7 Bhutan Project is to reduce GHG emissions and to contribute to the sustainable development of the community by constructing a hydroelectric power station with a power generation capacity of 70kW as a CDM project in an un-electrified Chendebji village where it is otherwise very hard to construct hydroelectric power station.
- This power station is not connected to the external power grid and the project is not a part of the other big project.
- The purpose of this project meets the mission to promote sustainable development of this district.
- The project is a small-scale activity of the Type and Category is I.A. "Electricity Generation by the User" according to the Appendix B of the "Simplified modalities and procedures for small-scale CDM project activities".
- The project is funded by e7 Fund and there is no relation with public fund such as ODA.
- For the e7 Bhutan Project, the Kansai Electric Power, Co., Inc. of Japan is representing e7 Fund.
- Construction work of this hydroelectric power station is planned to start on July 2004 and the operation of the station is planned to start on May 2005. CER is to be issued in 2005 and afterwards.
- Expected operational lifetime of the project activity is 25 years.
- Calculated GHG emission reduction is 524t-CO2/year.
- Starting date of the first crediting period is 1st May 2005 and the length of the first crediting period is 7years.

1.4 Validation personnel

Validation team

Osamu KOBAYASHI	Senior Chief Engineer of JACO CDM	validation team leader
Teruo FUKUDA	Senior Chief Engineer of JACO CDM	validation team member
Yumi GOSEKI	JACO CDM	validation team member

Internal verifier

Yoshihiro OTSUKA General Manager of JACO CDM
Shigekazu OKA Manager of Audit department of JACO CDM

2. Methodology

The validation consisted of the following three phases:

i) a desk review of the project design and the baseline and monitoring plan (February to October 2004)
ii) follow-up interviews with project stakeholders (June to July 2004)
iii) the resolution of outstanding issues and the issuance of the final validation report and opinion (June 2004 to March 2005)

2.1 Review of CDM-PDD and additional documents

The PDD and additional documents were reviewed based on the Kyoto Protocol, Marrakech Accord and other UNFCCC criteria, such as "Simplified modalities and procedures for small-scale clean development mechanism project activities (FCCC/CP/2002/7/Add.3)" and it's Appendix A, B & C.

2.2 Assessment against CDM requirements

In order to ensure transparency, Small Scale CDM Validation Protocol (Version 3.0) of IETA (International Emissions Trading Association) was used. The protocol shows, in a transparent manner, criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

. It organizes, 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 Fig.1 below. The completed validation protocol is enclosed in Appendix 1 to this report.

Validation Protocol Table 1: Mandatory Requirements

Requirement	Reference	Conclusion	Cross reference
The requirements the project must meet..	Gives reference to the legislation or agreement where the requirement is found.	This is either acceptable based on evidence provided**(OK),** or a **Corrective Action Request (CAR)** of risk or non-compliance with stated requirements. The corrective action requests arenumberedand presented to the client in the Validation report.	Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is validated. This is to ensure a transparent Validation process.

Validation Protocol Table 2: Requirement checklist

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

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

Figure 1 Validation protocol tables

2.3 Types of findings

Three different types of findings are defined. (1) Non-fulfilment of Validation Protocol criteria or where a risk of the fulfilment of project objectives is identified should be reported as a "Corrective Action Request". (2) Issues requiring further elaboration are highlighted as "Clarifications". (3) Issues on which a decision cannot be reached at this stage are termed as "Observations".

1) A "Corrective Action Request" (CAR) will be issued, where:
   i) mistakes have been made with a direct influence on project results;
   ii) validation protocol requirements have not been met; or
   iii) there is a risk that the project would not be accepted as a CDM project or that emission reductions will not be certified.
2) A "Clarification" (CL) will be issued, where:
   Additional information is needed to fully clarify an issue.
3) An "Observation" (OBS) will be where:
   An issue, which is of little significance currently, may assume greater significance in due course and should be observed in the project.

The completed validation protocol is enclosed in Appendix 1 to this report.

2.4 Interviews:

JACO CDM performed interviews with the people of the Kansai Electric Power Co., Inc. representing e7 Fund listed in Chapter 6 to clarify about the PDD and environmental Impact Issues, etc.
The first interview was conducted on June 15, 2004 and the second interview was conducted on July 22, 2004.

2.5 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation was to resolve the requests for corrective actions and clarification and any other outstanding issues which needed to be clarified for JACO CDM's positive conclusion on the project design. The Corrective Action Requests and Clarification Requests raised by JACO CDM were resolved during communications between e7 Fund represented by the Kansai Electric Power Co., Inc. and JACO CDM.
To guarantee the transparency of the validation process, the concerns raised and responses given are summarised in chapter 3 below and documented in more detail in the validation protocol of Appendix 1.
Since modifications to the project design were necessary to resolve JACO CDM's concerns, the e7 Fund decided to revise the document and resubmitted the project design document as Rev.02. After reviewing the revised and resubmitted project document, JACO CDM issued this validation report and opinion.
As a rule of JACO CDM to avoid conflict of interest, Certification Determination Committee of JACO CDM, whose members are independent of JACO CDM, makes the final decision on the results of assessment before submitting the project to the CDM Executive Board for the registration as a CDM project.

3. Validation Findings

The conclusion regarding the findings of the validation is summarized in this section.
Further details of findings are presented in the validation protocol. (Refer to Appendix 1)

3.1 Compliance with each requirement under paragraph 37 of the CDM Modalities and Procedures:

3.1.1 Discussion:

Each requirement under paragraph 37 (a) to (f) is satisfied as follows.
As for the requirements under 37(g), assessment results are shown in the clause 3.2 to 3.9.

(a) Participation requirements

(a-1) As for the host Party, National Environment Commission Secretariat (NECs) of Royal Government of Bhutan approved the e7 Bhutan Project as a CDM project by the letter of 10th Feb 2004 "Approval of the Chendebji Micro Hydro Project as a pilot Clean Development Mechanism Project". It is understood that the voluntary participation requirement is approved by NEC.
As for e7 Fund, the Kansai Electric Power Co., Inc. of Japan is representing e7 Fund. DNA of Japan issued a letter dated 29 July, 2003 to the Kansai Electric Power approving the e7 Bhutan Project in accordance with the article 12.5(a) of the Kyoto Protocol. This letter is also authorizing the Kansai Electric Power Co., Inc to participate in the e7 Bhutan Project as representing e7 Fund.
(a-2) DNA:
JAPAN / "The Liaison Committee for the Utilization of the Kyoto Mechanisms"
Royal Government of Bhutan / "National Environment Commission Secretariat" (NECs)
(a-3) A Party not included in Annex I: Royal Government of Bhutan is a Party to the Kyoto Protocol

(b) Comments by local stakeholders and due account for them:

Local stakeholders' comments are invited suitably, that is, by 3 processes such as interview to villagers, workshop and public consultation in Chendebji village. It is confirmed that due account has been taken for these comments in each occasion. Villagers are eager for the village electrification by this CDM project and have no negative opinions for the project.

(c) Environmental Impacts: Suitable environmental assessment was conducted as required by the regulation of Royal Government of Bhutan and is suitably reflected into the project.

(d) Expected results in additional reduction in GHG: This project is a small-scale activity of Type I "Renewable Energy Projects" and Category I.A "Electricity generation by the user" according to the Appendix B of the "Simplified modalities and procedures for small-scale CDM project activities". An analysis of the investment barriers shows that the proposed project activity is not a likely baseline scenario and the emission reduction is additional. The reduction in GHG is estimated to be 524t-CO2/year. (ex ante)

(**e) Baseline and monitoring methodologies**: Baseline and monitoring methodologies are clearly defined in accordance with the rule of small scale project Category I.A.
Baseline is option 2 of the Category I.A. and the monitoring methodology is option (b) of Category I.A.
Considering the circumstances of the remote un-electrified village of the project, this baseline and monitoring option is appropriate.

(f) Provisions for monitoring and reporting: Monitoring methodology and plan is defined in accordance with decision 17/CP.7 and procedures defined in the rule of small scale project Category I.A.

(g) The project activity conforms to all other requirements for CDM project activities in decision 17/CP.7, the present annex and relevant decisions of COP and the Executive board.
This requirement covers wide area and detail about this is discussed in the clause 3.2 to 3.9 below.

3.1.2 Conclusion:

The project was found to comply with each requirement of (a) to (f) under paragraph 37 of the CDM modalities and procedures. Selection of Type, Category and options for baseline & monitoring are appropriate for the project circumstances. Compliance with (g) under paragraph 37 is discussed in the following clause 3.2 to 3.9.

3.2 General description of project activity:

3.2.1 Discussion

(1) The purpose and the contribution to the sustainable development: The purpose of the e7 Bhutan Project is to contribute to the sustainable development of the un-electrified Chendebji village. This is by supplying hydroelectric power to promote villager's health, economic development, education and also environmental protection by decreasing deforestation with reduced fuel-wood consumption, etc.
It is confirmed that the DNA of Royal Government of Bhutan approved this project as a CDM project which contributes to the sustainable development of the district.

(2) Type, category and technology of the e7 Bhutan Project:

The e7 Bhutan Project is constructing a hydroelectric power station with a power generation capacity of 70kW in an un-electrified Chendebji village. The electric power system is not connected to the grid and the electric power is used in the Chendebji village.
It is confirmed that the e7 Bhutan Project is not a part of a large project activity and also as shown in the PDD, the e7 Bhutan Project is a small scale project of Type Ⅰ "Renewable Energy Projects" and the Category is I.A. "Electricity generation by the user" defined in the Appendix B of the "Simplified modalities and procedures for small-scale CDM project"
The selected technology is appropriate for the remote village in such consideration as relatively simple structure, easy operation and maintenance etc.

(3) Fund: The project is done by e7 Fund for Sustainable Energy Development and there is no relation with public fund.

3.2.2 Conclusion

The project was found to comply with the condition of the small scale CDM project, that is, in such condition

as participants, technology, type and category, GHG reduction, funding condition and not a debundled component.

3.3 Baseline:

3.3.1 Discussion

(1) Title, reference and category applicable to the project activity:

The e7 Bhutan Project is a renewable energy project and the electricity by the project is supplied to users with a small amount of electricity. This meets the condition of Type and Category I.A of small-scale CDM project.

(2) Additionality:

The project proponents have chosen investment barrier .

It is confirmed by PDD B.3 that the project is not a likely baseline by the following reasons.

① Due to the geological severeness, difficulties in access, and lack of investment resources, electrification of the Chendebji village is not included in 9FYP(9^{th} five year plan) of Royal Government of Bhutan.

② Almost all the micro-HPPs (Hydro Power Plants) ever constructed in Royal Government of Bhutan were supported by foreign official assistance. These facts demonstrate that the micro-HPP is not profitable and feasible in the Chendebji village.

③ Diesel generation is the likely scenario, since initial cost of diesel generation is far lower than that of Micro-HPP.

The assertions can be confirmed with the 9FYP of Royal Government of Bhutan as follows.

> The construction of three mini-micro HPPs is planned during 9FYP period. All of them rely upon ODA. Construction cost per kW of these HPP is ranging from $5,000 to 7,500 and this is approximately 5 times of average diesel generator cost per kW.

(3) Boundary and leakage:

The definition of the project boundary is clearly indicated in the PDD in accordance with Appendix B of the "Simplified modalities and procedures for small-scale CDM project activities".

One clarification (CL.1) was pointed out with regard to the equipment used for this project. It was confirmed that it is not transferred from another activity, therefore there is no leakage outside of the boundary. This is according to the rule defined in the category I. A. of simplified modalities and procedures for SSCDM. The description was added to the PDD concerning about the new equipment used for this project.

(4) Baseline:

Considering the circumstances of the remote un-electrified village of the project, it is reasonable to apply the most compact system construction made of one micro hydro generator and one group of consumers.

In this system construction, output of the hydro generator is the same as the energy consumption of the consumers.

In this case, considering the monitoring convenience, it is appropriate to apply baseline option 2 (monitoring of generator output) of Category I. A. of simplified modalities and procedures for SSCDM. As for the baseline calculation, IPCC default value for emission coefficient of diesel generation unit is used and this is in line with Category I.A. Also, considering the fluctuation of the hydroelectric power of the run-of-river type, it is reasonable to estimate the baseline by ex post data monitored by WH meter connected at the generator terminal. (Refer to fig. 5 of PDD.)

3.3.2 CARs and CLs

No.	CARs and CLs	Conclusion following e7 Fund response
1	**CL1:** It should be clarified that the equipment of the project is new. If the renewable energy technology is equipment transferred from another activity, leakage calculation is required.	It was confirmed that the equipment is not transferred from another activity and the description was added in the PDD. No further action required.

3.3.3 Conclusion

The project was found to comply with the requirements of Category I. A. of simplified modalities and procedures for SSCDM.

3.4 Duration of the project activity / Crediting period:

3.4.1 Discussion

As for the expected project activity, 25years are taken and this is reasonable considering the long life of hydro generation facilities. As for the first crediting period, 7years are taken and this is reasonable.

3.4.2 Conclusion

The project was found to comply with the requirements of CDM project.

3.5 Monitoring methodology and plan:

3.5.1 Discussion

The proposed monitoring method is using a watt-hour meter which is connected at the terminal of the generator to measure the output of the generator and this is appropriate and in accordance with the monitoring criteria of Category I.A. This method is also suitable for the ex post calculation of baseline emission rates in the e7 Bhutan Project, whose type is a run-of-river micro hydropower generation.

As for monitoring management, JACO CDM had pointed out one Corrective Action Request (CAR 1) about the authority and responsibility of the project management.

Among the participants, this matter was discussed and the owner of the project and organization were decided as for operation, maintenance, management and monitoring of the project.

3.5.2 CARs and CLs

No.	CARs and CLs	Conclusion following e7 Fund response
1	**CAR1:** The owner of the project is not clear. The authority and responsibility of project management, monitoring, measurement, review and reporting has not been clearly established in the PDD.	The owner of the project and organization was decided as for operation, maintenance, management and monitoring of the project. This decision ensures the authority and responsibility of the project. The description was added about monitoring management in the PDD. The CAR1 was closed.

3.5.3 Conclusion

One CAR was found in monitoring management such as monitoring authority, responsibility and monitoring procedures. Among the project participants, decision was made as for the monitoring management In accordance with this decision, PDD was revised and the CAR1 was closed. Other points about the monitoring methodology and plan were found to comply with the requirement of the UNFCCC criteria.

3.6 Calculation of GHG emission reduction by sources:

3.6.1 Discussion

(1) Formulae used:

One CAR (CAR 2) was pointed out to make clear the option about the calculation formula in the PDD.

About this point, option was identified as “option 2” and PDD was revised accordingly. One CL (CL2) was pointed out about distribution loss in the formula.

As for the distribution loss, the distribution line is about 3km and distribution loss is negligibly small and it is reasonable to take the loss factor “0” from conservative calculation viewpoint. PDD was revised accordingly.

(2) Table providing values obtained:

In the original PDD, the calculated values are also shown in the end of clause E.1.
One CAR (CAR 3) was pointed out regarding the calculation result to be used for CER, ex ante value or ex post value.
At the same time, it was pointed out that in the original PDD there was confusion about the column for formula and calculated results.
After communication between e7 Fund and JACO CDM, the PDD was revised to avoid confusion between the PDD clause E.1.1 for calculation formula and the PDD clause E.1.2 for calculated values.
A small table was provided in the PDD clause E.1.2 for GHG reduction results obtained by the calculation formulae. At the same time, in this table the column of ex ante values and column for ex post values were distinguished clearly. Also, a description was added to indicate that the ex post kWh value by metering the electricity generated is used for actual GHG emission reduction calculation.
This project is a run-of-river type hydro generation project and using ex post value is appropriate from accuracy point of view.
One CL (CL3) was pointed out about the justification of 95% capacity factor, when taking into account seasonal water flow change. Appropriate explanation was added in the PDD including monitoring after operation of the plant and the CL3 was closed.

3.6.2 CARs and CLs

No.	CARs and CLs	Conclusion following e7 Fund response
1	**CAR2:** As for the baseline of SSCDM Category I.A, option 1 or option 2 should be identified.	Option was identified as "option 2" and PDD was revised accordingly. CAR2 was closed.
2	**CAR3:** It shall be stated that ex post calculation will be done using metered electricity generated.	Suitable correction was introduced and PDD was revised accordingly. Reasonable justification for applying ex post calculation of GHG emission was added in the PDD. (This project is a run-of- river micro hydropower generation and ex-post calculation gives more accurate GHG emission data.) CAR3 was closed.
3	**CL2:** Explanation about average technical distribution losses of diesel powered mini-grid should be added for the calculation of baseline emission.	Distribution loss was taken as "0" considering the length of the distribution lines and conservative viewpoint. The PDD was revised accordingly. No further action required.
4	**CL3:** Appropriateness of 95% capacity factor should be clarified taking into account seasonal water flow change.	Appropriate explanation was added in the PDD including monitoring after operation of the plant. No further action required.

3.6.3 Conclusion:
After revision, the PDD is complying with the requirements of the CDM and description is clear and appropriate.

3.7 Environmental impact:
3.7.1 Discussion:

JACO CDM reviewed the related documents, conducted interviews to e7 Fund representatives and recognizes that the project is in accordance with the requirements of Royal Government of Bhutan and UNFCCC criteria and also documents of environmental impacts are sufficient.

(1) e7 Fund conducted a feasibility study on this e7 Bhutan Project and environmental assessment according to the assessment method on the project implementation stipulated in "Royal Government of Bhutan, environmental Assessment Act 2000, Environment Assessment Process Manual". The feasibility study report was made on Sept. 2003, includes following items and points out potential environmental impacts.

- Description of Existing Environment: Study Zone, Natural Components and Socioeconomic Components
- Potential Source of Impacts: During the Construction Phase, During the Operation Phase
- Environment Management Plan: Mitigation Measures Proposed during the Construction Phase, Mitigation Measures During the Operation Phase, Monitoring Program, Health and Safety

(2) Based on above study, National Environment Commission (NECs) Secretariat of Royal Government of Bhutan issued a letter about Environmental Clearance for Construction of the e7 Bhutan Project. (Refer to Annex 5 of the PDD) dated 25 Nov. 2003. According to this letter, e7 Fund studied and made a report "EIA clearance condition and mitigation measures to be included in the Bidding Document of the e7 Bhutan Project". This is satisfying above requirement and is reflected to the Bidding document of the construction.

(3) In addition to above, e7 Fund conducted an investigation about river fish (brown trout) and proposed measures for environmental impacts to these fishes during construction and operation period of the e7 Bhutan Project. By the interview with the participants, JACO CDM confirmed that this proposal was approved by NECs.

(4) JACO CDM got the information through the interview to e7 Fund representatives about the monitoring plan of e7 Fund during first 2 years period after starting of the power station operation. According to this monitoring plan, in addition to the monitoring directly required for CDM, analysis of the socioeconomic condition of the villagers, analysis of the impact of the flow reduction upon the presence of brown trout are planned.

These items are added in the revised PDD.

3.7.2 Conclusion:

This project is a small scale CDM project but according to the requirement of Royal Government of Bhutan (Environmental Assessment Act, 2000 and relevant regulations), the environmental assessment was conducted and suitable measures including additional monitoring items by e7 Fund were implemented in the project.

The project complies with the requirements of the CDM and the local regulations.

3.8 Stakeholders comments:

3.8.1 Discussion

e7 Fund conducted explanation about the e7 Bhutan Project and interview during the Feasibility Study period to Chendebji villagers from 26 households out of 42 and a workshop to 15 officials from Department of Energy (DoE) and NECs etc. Public consultation session was also held to villagers from about 30 households including a substitute of the village chief as an official representative of the Chendebji village and some officials from NECs, DoE etc. Summary of the stakeholders' comments is provided in the PDD. In addition to above, in July 2004, before starting the construction work, 2nd public consultation session was conducted.

The process for receiving stakeholders' comments is appropriate, duly accounted in the PDD.

Also, the comments received from stakeholders were duly considered and included in the e7 Fund's "Environmental Clearance" document (Refer to Appendix 3).

3.8.2 Conclusion:

The procedure for collecting the stakeholders comment is found to comply with the standard.

3.9 Annexes: Information indicated in Annex 1 & 2 of the PDD are appropriate.

3.10 Summary of Assessment:

Where JACO CDM had identified issues that represented a risk to the fulfillment of the project objectives or

that needed clarification, Corrective Action Requests (CARs) or Clarifications (CLs) have been issued respectively.

The CARs and CLs are shown above and are further documented in the Validation Protocol in Appendix 1. The Validation of the original PDD for e7 Bhutan Project resulted in 3 CARs and 3CLs.

The responses to these CARs and CLs issued by JACO CDM against the original PDD were satisfactorily provided by e7 Fund and the original PDD was revised to PDD Rev.02.

4. Public Comments

4.1 How and when the PDD was made publicly available

JACO CDM established a web site for CDM-PDDs to be publicly available format with a link created through the UNFCCC CDM web site.

JACO CDM informed UNFCCC secretariat about the method to publish CDM-PDD and public comments by sending signed UNFCCC format F-CDM-REGdoeweb on May 13 2004.

The PDD had been made publicly available from Jun 4th 2004 to July 4th 2004.

PDD is available by the following URL address.

http://www.jaco-cdm.com/eigo/BhutanPDDFinal.pdf

4.2 How comments were received and made publicly available

In the page of "e7 Bhutan Micro Hydro Power CDM Project" in the UNFCCC web site, at the beginning of public comment period, the procedure for handling comments is not directly posted on web site but indicating an e-mail address of a contact person as a trigger to access the procedure.

Later the procedure was revised to a direct system by providing a button "Add Comment".

One comment was received from Dominica with Dominican time of 5.55 AM of July 05, 2004.

Therefore, this comment was sent 9.55 hours after the end of 30days public comment period for the e7 Bhutan Project. Considering this situation, this received comment is not an official public comment but should be taken as a reference comment.

4.3 Account taken for comments received

The comments are about the potential environmental impact. As for the environmental impact of the project, JACO CDM recognizes that suitable measures had been taken as shown in F "Environmental impact" of the PDD. The comment has been kept publicly available in JACO CDM home page.

4.4 Received comments

The received comment is attached to this report. Refer to Appendix 2.

5. Validation opinion

Unqualified validation opinion

JACO CDM has performed a validation of the e7 Bhutan Project on the basis of UNFCCC criteria and relevant host country criteria.
The review of the project design document and the subsequent follow-up interviews have provided JACO CDM with sufficient evidence to determine the fulfillment of stated criteria.

The validation consisted of the following three phases: i) a desk review of the project design, the baseline and monitoring plan (February to October 2004), ii) follow-up interviews with project stakeholders (June to July 2004) and iii) the resolution of outstanding issues and the issuance of the final validation report and opinion (June 2004 to March 2005).

JACO CDM confirmed by the letter of Royal Government of Bhutan that Royal Government of Bhutan had approved the project as a Clean Development Mechanism Project.

The project is a small scale CDM project of Type I and Category I.A. and the PDD Rev.02 and additional documents satisfy the necessary conditions for it. An analysis of the investment barriers demonstrates that the proposed project activity is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity. Given that the project is implemented as designed, the project is likely to achieve the estimated amount of emission reductions.

The monitoring plan sufficiently specifies the monitoring requirements of the main project indicators. Project management and QA/QC procedures are established.

The responses to 3 Corrective Action Requests (CARs) and 3 Clarifications (CLs) issued by JACO CDM to the original PDD were satisfactorily provided by e7 Fund and the original PDD was revised to PDD Rev.02.

The e7 Bhutan Project contribute not only to reduce the GHG emission but also to sustainable development of the Chendebji village because of various positive effects such as health, economic development, education, and environmental protection etc. This is well in accord with the purpose of CDM.

In summary, it is JACO CDM's opinion that the project, as described in the PDD Rev.02 of March 29, 2005 meets all relevant UNFCCC requirements for CDM and all relevant host country criteria and correctly applies the simplified baseline and monitoring methodology for category I.A small-scale CDM project activities.
Hence, JACO CDM requests the registration of the "e7 Bhutan Micro Hydro Power CDM Project" as a CDM project.

6. References

Category 1 Documents:

These documents have been provided by the Kansai Electric Power, Co., Inc. and relate directly to the GHG component of the project. These have been used as direct sources of evidence for the validation conclusions, and part of these documents have been further checked through interviews with key personnel.

/1/ Project Design Document "e7 Bhutan Micro Hydro Power CDM Project"
/2/ Letter of Royal Government of Bhutan "Approval of the Chendebji Micro hydro Project as a pilot Clean Development mechanism Project 27th February 2004
/3/ Letter of Government of Japan "Approval of CDM project under the Kyoto Protocol by the Government of Japan" July 29, 2003
/4/ e7 Bhutan Micro hydro Power CDM project; Feasibility Study Report Sept. 2003 - Chapter 6 "Environmental Assessment"
/5/ EIA clearance condition and its solution included into the Bidding Document for power station (2004/1/28) (Appendix 3)

Category 2 Documents:

These background documents related to the design and/or methodologies employed in the design or other reference documents. These documents have been used to check project assumptions and confirm the validity of information given in the Category 1 documents and interviews.

/6/ Terms of Reference for CDM Validation and Registration for the "e7 Bhutan Micro Hydro Power CDM Project" February 2 2004
/7/ Power infrastructures in Royal Government of Bhutan (existing & future) (part of 8th & 9th 5year plan of Royal Government of Bhutan)
/8/ Environmental Assessment Act 2000 of Royal Government of Bhutan
/9/ Regulation for the Environmental Clearance of projects Feb. 2001 (NEC)
/10/ Regulation on Strategic Environment Assessment Feb. 2001 (NEC)
/11/ Sectoral Guidelines for Hydro Power 11/1/2002 (NEC)
/12/ State of the Environment Bhutan 2001 (UNEP)
/13/ Design Drawings for e7 Bhutan Project
General Plan
Intake Weir Plan, Section
Open Canal Plan
Settling Basin Plan, Section
Power House Plan
/14/ Bidding Documents: Related part of above f of Category 1 documents. (Section III Part II, Section IV Part I)
/15/ Video tapes of site survey and photographs (by Kansai Electric Power Co. Inc. / Jul. 2004)

Name of persons interviewed:

/16/ Takao SHIRAISHI General Manager / International Network Group / Corporate Planning Department / The Kansai Electric Power Co., Inc.
/17/ Toru YAMANAKA Senior Manager / Environmental Planning / Office of Environment / The Kansai Electric Power Co., Inc.
/18/ Hirofumi KAZUNO Manager / Global Environment Group / Office of Environment / The Kansai Electric Power Co., Inc.
/19/ Keiji FUJIMOTO / Global Environment Group / Office of Environment / The Kansai Electric Power Co., Inc.

History of Revision

(This shows the major differences between this validation report (Rev.02) and the report (Rev.01) prepared at witnessing of JACO CDM., LTD for accreditation. The validation report (Rev.02) is against the latest version of PDD Rev.02.)

Revision 01: Oct.06, 2004 (Original Validation Report)

Revision 02: Apr.08, 2005

(1) **Validation entity**: The validation entity to which the validation team of e7 Bhutan Project belongs has been changed from Japan Audit and Certification Organization for Environment and Quality (JACO) to JACO CDM., LTD. This is due to the organization change, that is, JACO-CDM Division became independent of JACO as newly established JACO CDM., LTD. The members of validation team are not changed.

Due to this organization change, JACO CDM., LTD applied for accreditation on October 15, 2004 and was accredited as provisional DOE at the CDM Executive Board of February 23, 2005 for validation function for the sectoral scopes 1, 2 and 3.

(2) **Summary**: One "Clarification (CL)" which was pending in the PDD Rev.01 was made clear. Reflecting this clarification, summary was changed.

(3) **Appendix**: Some appendixes (Appendix 1,3,4,5 included in the Validation Report Rev.01) are shifted to the attached documents of registration form F-CDM-REG.

(2) **Appendix,** 8 "Procedural Report" is for witnessing purpose of AE and deleted.

(3) **Executive summary of the Validation Report Revision 01**: Consolidated to the summary of the Validation Report Rev.02 (page 2. Of this Validation Report Rev.02)

(4) **Validation Opinion**: One "Clarification" which was pending in the PDD Rev.01 was made clear. Reflecting this clarification, validation opinion was changed from "Qualified validation opinion" to "Unqualified validation opinion".

Appendix 1 Validation Protocol

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

REQUIREMENT	REFERENCE	CONCLUSION	Cross Reference/ Comment
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3	Kyoto Protocol Art. 12.2	OK.	Table 2, Section E.4.1
2. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof	Kyoto Protocol Art. 12.2, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	OK.	Table 2, Section A.3
3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC	Kyoto Protocol Art. 12.2.	OK.	Table 2, Section E.4.1
4. The project shall have written approval of voluntary participation from the designated national authorities of each party involved	Kyoto Protocol Art. 12.5a, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	OK.	Royal Government of Bhutan: Letter of Approval by DNA of Royal Government of Bhutan of February 10. 2004. Japan: Letter of Approval by DNA of Japan of July 29, 2003
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	OK	Table 2, Section B.2.1

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

REQUIREMENT	REFERENCE	CONCLUSION	Cross Reference/ Comment
	Activities §26		
7. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance	Decision 17/CP.7	OK.	PDD A.4.4
8. Parties participating in the CDM shall designate a national authority for the CDM	CDM modalities and Procedure § 29	OK.	
9. The host country shall be a Party to the Kyoto Protocol	CDM modalities and procedures § 30, 31b	OK.	
10. 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
11. 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 document is as per the SSC PDD format (Version 01).
12. 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 and B.1
13. Comments by local stakeholders are invited, and a summary of these provided	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22b	OK.	Table 2, Section G
14. 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
15. Parties, stakeholders and UNFCCC accredited NGOs have been invited to comment on the validation	Simplified Modalities and Procedures for Small	OK	Comments were invited from 4th June

REQUIREMENT	REFERENCE	CONCLUSION	Cross Reference/ Comment
requirements and comments have been made publicly available	Scale CDM Project Activities §23b,c,d		to 4th July. One delayed comment was received and has been publicly available.

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?	PDD	DR	PDD.A.4.2: The project qualifies as a renewable energy project with maximum output capacity equivalent to up to 15MW (Type I small-scale CDM project activity).	OK.	OK
A.1.2. The small scale project activity is not a debundled component of a larger project activity?	PDD	DR	PDD.A.4.5	OK.	OK
A.1.3. Does proposed project activity confirm to one of the project categories defined for small scale CDM project activities?	PDD	DR	PDD.A.4.2: The project confirms to Type I, Category I.A of the SSCDM project activities as the electricity generated will be supplied to only the Chendebji village and the electrical system is independent of the grid.	OK.	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?	PDD	DR	PDD, B.4: Spatial boundaries are clearly defined and consistent with Methodologies & Procedures for SSCDM category I.A.	OK.	OK
A.2.2. Are the project's system (components and facilities used to mitigate GHG's) boundaries clearly defined?	PDD	DR	PDD, B.4: System boundaries are clearly defined and consistent with Methodologies & Procedures for SSCDM category I.A	OK.	OK
A.2.3. Does the project design engineering reflect current good practices?	PDD /16/ /17/	DR I	PDD.A.4.2: Considering the condition of the project site, relatively simple structure using cross flow hydraulic turbine generator and simple electric system are appropriate for this project.	OK.	OK
A.2.4. Will the project result in technology transfer to the host country?	PDD /16/	DR I	PDD.A.4.2: Environmentally-friendly HPP (Hydro Power Plant) technology and operation & maintenance technology of HPP will be transferred to the host country.	OK.	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?	PDD /16/	DR I	PDD.A.4.2: e7 Fund will implement necessary training regarding the implementation of the monitoring. Large scale repair, restoration from accidents will be managed by BPC.	OK.	OK
A.3. Contribution to Sustainable Development The project's contribution to sustainable development is assessed					
A.3.1. Will the project create other environmental	PDD	DR	PDD A.2: Electrification of Chendebji village will	OK.	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
or social benefits than GHG emission reductions?	/16/ /18/	I	contribute to the positive effects such as health, economic development, education, and environmental protection.		
A.3.2. Will the project create any adverse environmental or social effects?	PDD /16/ /18/	DR I	PDD F.1: The project is a small-scale run-of-river hydro power plant and no adverse effects are foreseen.	OK.	OK
A.3.3. Is the project in line with sustainable development policies of the host country?	PDD /7/ /16/	DR I	PDD.A.4.3: The project is in line with the 9FYP (9th Five Year Plan of Royal Government of Bhutan) to promote construction of small HPP in isolated and remote areas.	OK.	OK
A.3.4. Is the project in line with relevant legislation and plans in the host country?	PDD /8/ /16/	DR I	Ditto	OK.	OK
B. **Project Baseline** The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.					
B.1. Baseline Methodology It is assessed whether the project applies an appropriate baseline methodology.					
B.1.1. Is the selected baseline methodology in line with the baseline methodologies provided for the relevant project category?	PDD	DR	PDD.B.1: Baseline (b) Option 2 of category I.A of SSCDM is selected. This baseline (b) option 2 is calculated by the output of the generator and this is suitable for the project.	OK.	OK
B.1.2. Is the baseline methodology applicable to the project being considered?	PDD /16/	DR I	Considering the condition of the un-electrified Chendebji village of the project, it is appropriate to apply the baseline option 2.	OK.	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.2. Baseline Determination It is assessed whether the project activity itself is not a likely baseline scenario and whether the selected baseline represents a likely baseline scenario.					
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?	PDD /7/ /16/ /17/	DR I	The project proponents have chosen investment barrier. PDD B.3 states the project is not a likely baseline because 1) Due to the geological severeness, difficulties in access, and lack of investment resources , electrification of the Chendebji village is not included in 9FYP(9th five year plan) of Royal Government of Bhutan. 2) Almost all the micro-HPP.s ever constructed were supported by foreign official assistance. These facts demonstrates that the micro-HPP. is not profitable and feasible in the Chendebji village 3)Diesel generation is the likely scenario, since initial cost of diesel generation is far lower than that of Micro-HPP. The assertions can be confirmed with the 9FYP. The construction of three mini-micro HPP is planned during 9FYP period, which all rely upon ODA. Construction cost per kW of these HPP is ranging from $5,000 to 7,500.	OK.	OK
B.2.2. Is the application of the baseline methodology and the discussion and determination of the chosen baseline transparent and conservative?	PDD	DR	PDD.B: Baseline methodology specified in Appendix B of M & Ps for SSCDM for Category I.A. is applied. As stated in this Appendix B, a default value of 0.9kg Co2/kWh, which is derived from	OK.	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			diesel generation units, may be used.		
B.2.3. Are relevant national and/or sectoral policies and circumstances taken into account?	PDD /7/	DR	The relevant national policy reflected in 8FYP and 9FYP is taken into account.	OK.	OK
B.2.4. Is the baseline selection compatible with the available data?	PDD	DR	Selected methodology does not need additional data except that specified within the methodology.	OK.	OK
B.2.5. Does the selected baseline represent the most likely scenario describing what would have occurred in absence of the project activity?	PDD /16/	DR I	Selected methodology indicates that the diesel generation is the most likely scenario.	OK.	OK
C. **Duration of the Project / Crediting Period** It is assessed whether the temporary boundaries of the project are clearly defined.					
C.1.1. Are the project's starting date and operational lifetime clearly defined?	PDD	DR	PDD C.1.1: Planned date for power station operation start is clearly defined as 01/05/2005. Expected life time is also clearly defined as 25 years.	OK.	OK
C.1.2. Is the crediting period clearly defined (seven years with two possible renewals or 10 years with no renewal)?	PDD	DR	PDD.C.2.1.2: It is clearly defined as 7years with two possible renewal	OK.	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
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?	PDD	DR	PDD D.1: Methodology specified in Appendix B of the simplified M & Ps for SSCDM, Category I.A. paragraph 8(b) "metering of electricity generated" is selected.	OK.	OK
D.1.2. Is the monitoring methodology applicable to the project being considered?	PDD /16/	DR I	The selected monitoring method is applicable to the project.	OK.	OK
D.1.3. Is the application of the monitoring methodology transparent?	PDD	DR	Yes.	OK.	OK
D.1.4. Will the monitoring methodology give opportunity for real measurements of achieved emission reductions?	PDD	DR	Yes.	OK.	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. Are the choices of project emission indicators reasonable?	PDD	DR	PDD. D.3: Measured electricity generated at the generator terminal is used and this is reasonable.	OK.	OK
D.2.2. Will it be possible to monitor / measure the specified project emission indicators?	PDD	DR	Yes.	OK.	OK

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
D.2.3. Do the measuring technique and frequency comply with good monitoring practices?	PDD /16/	DR I	PDD D.3: Continuous measurement by watt-hour meter, recording (by hand / electronic) by 1/day is appropriate.	OK.	OK
D.2.4. Are the provisions made for archiving project emission data sufficient to enable later verification?	PDD /16/	DR I	PDD.D.3: Paper and electronic ,kept for 9years. This is sufficient for later verification.	OK.	OK
D.3. Monitoring of Leakage It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.					
D.3.1. If applicable, are the choices of leakage indicators reasonable?	PDD /16/ /17/	DR I	It should be clarified that the equipment of the project is new. If the renewable energy technology is equipment transferred from another activity, leakage calculation is required.	CL1	OK
D.3.2. If applicable, will it be possible to monitor / measure the specified leakage indicators?			Ditto	Ditto	OK
D.3.3. If applicable, do the measuring technique and frequency comply with good monitoring practices?			Ditto	Ditto	OK
D.3.4. If applicable, are the provisions made for archiving leakage data sufficient to enable later verification?			Ditto	Ditto	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. Is the choice of baseline indicators, in particular for baseline emissions,	PDD	DR	PDD B.5.1 IPCC default value for emission coefficients of diesel generation and amount of	OK.	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
reasonable?			electricity generation by the project are used for baseline estimate and this is reasonable for the Category I.A..		
D.4.2. Will it be possible to monitor / measure the specified baseline emission indicators?	PDD /16/	DR I	Yes.	OK.	OK
D.4.3. Do the measuring technique and frequency comply with good monitoring practices?	PDD /16/	DR I	Yes. Electricity generation will be metered by the suitably trained operator and e7 Fund will supervise the monitoring during the first 2years.	OK.	OK
D.4.4. Are the provisions made for archiving baseline emission data sufficient to enable later verification?	PDD	DR	Data will be kept for 9 years.	OK.	OK
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?	PDD /16/ /18/	DR I	PDD A.4.2: Owner of the project is not clear. The authority and responsibility of project management is not clearly described.	CAR1	OK
D.5.2. Is the authority and responsibility for registration monitoring measurement and reporting clearly described?	PDD /16/ /18/	DR I	PDD A.4.2: The authority and responsibility for registration, monitoring management and reporting is not clear.	CAR1	OK
D.5.3. Are procedures identified for training of monitoring personnel?	PDD /16/	DR I	PDD A.4.2: e7 Fund will implement necessary training regarding the implementation of monitoring.	OK	OK
D.5.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	PDD /16/	DR I	PDD A.4.2: Procedures are identified for accidents or troubles.	OK	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
D.5.5. Are procedures identified for calibration of monitoring equipment?	PDD /16/	DR I	PDD D.2: procedures are identified for the maintenance and correction of meters.	OK	OK
D.5.6. Are procedures identified for maintenance of monitoring equipment and installations?	PDD /16/	DR I	PDD D.2: procedures are identified for the maintenance and correction of meters.	OK	OK
D.5.7. Are procedures identified for monitoring, measurements and reporting?	PDD /16/	DR I	To realise this procedures, it is necessary to decide the authority and responsibility for registration, monitoring management and reporting.	CAR1	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)	PDD /16/	DR I	PDD D.2: The education for operator and record handling procedures are identified.	OK	OK
D.5.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	PDD /16/	DR I	PDD D.2: The procedures are the same as existing HPP plants.	OK	OK
D.5.10. Are procedures identified for internal audits of GHG project compliance with operational requirements as applicable?	PDD	DR	No procedures for internal audits are described.	CAR1	OK
D.5.11. Are procedures identified for project performance reviews?	PDD	DR	No procedures for project performance reviews are described.	CAR1	OK
D.5.12. Are procedures identified for corrective actions?	PDD	DR	No procedures for corrective actions are identified.	CAR1	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
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 predicted 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?	PDD	DR	No direct and indirect GHG emissions are likely since the project is run-of river type hydro electric power generation.	OK.	OK
E.1.2. Have all relevant greenhouse gases and sources been evaluated?	PDD	DR	Not applicable due to above reason.	OK.	OK
E.1.3. Do the methodologies for calculating project emissions comply with existing good practice?			Ditto	OK.	OK
E.1.4. Are the calculations documented in a complete and transparent manner?			Ditto	OK.	OK
E.1.5. Have conservative assumptions been used?			Ditto	OK.	OK
E.1.6. Are uncertainties in the project emissions estimates properly addressed?			Ditto	OK.	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.					
E.2.1. Are leakage calculation required for the selected project category and if yes, are the relevant leakage effects assessed?	PDD	DR	PDD E1.2.2 Leakage calculation is not required for TYPE I category I.A project except when equipment is transferred from another activity	OK.	OK
E.2.2. Are potential leakage effects properly accounted for in the calculations (if applicable)?			NA. due to above reason.	OK.	OK
E.2.3. Do the methodologies for calculating leakage comply with existing good practice (if applicable)?			Ditto	OK.	OK
E.2.4. Are the calculations documented in a complete and transparent manner and (if applicable)?			Ditto	OK.	OK
E.2.5. Have conservative assumptions been used (if applicable)?			Ditto	OK.	OK
E.2.6. Are uncertainties in the leakage estimates properly addressed (if applicable)?			Ditto	OK.	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
E.3. Baseline GHG Emissions The validation of predicted 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?	PDD	DR	PDD B.4: Boundaries are defined as per paragraph 3 of Category I. A Appendix B to M&P of SSCDM.	OK.	OK
E.3.2. Are all aspects related to direct and indirect baseline emissions captured in the project design?	PDD	DR	All direct baseline emissions are captured.	OK.	OK
E.3.3. Have all relevant greenhouse gases and sources been evaluated?	PDD	DR	PDD E.1: Evaluated as per Appendix B to M & Ps of SSCDM.	OK.	OK
E.3.4. Do the methodologies for calculating baseline emissions comply with existing good practice?	PDD /17/ /19/	DR I	As for the baseline of SSCDM Category I.A, option 1 or option 2 should be identified.	CAR2	OK
E.3.5. Are the calculations documented in a complete and transparent manner?	PDD /16/ /17/	DR I	Explanation about average technical distribution losses of diesel powered mini-grid should be added for the calculation of baseline emission. Appropriateness of 95% capacity factor should be clarified taking into account seasonal water flow change.	CL2 CL3	OK
E.3.6. Have conservative assumptions been used?	PDD	DR	Conservative assumptions are used in distribution loss.	OK.	OK
E.3.7. Are uncertainties in the baseline emissions estimates properly addressed?	PDD /16/	DR I	It shall be stated that ex post calculation will be done using metered electricity generated.	CAR3	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
E.4. Emission Reductions Validation of baseline GHG emissions will focus on methodology transparency and completeness in emission estimations.					
E.4.1. Will the project result in fewer GHG emissions than the baseline case?	PDD	DR	The project is hydro electricity generation, no GHG emission expected.	OK	OK
F. **Environmental Impacts** It is assessed whether environmental impacts of the project are sufficiently addressed.					
F.1.1. Does host country legislation require an analysis of the environmental impacts of the project activity?	PDD /16/ /17/	DR I	PDD F.1: EIA is required as per " Environmental Assessment Act 2000" and "Environmental Clearance" (Annex 5 of PDD) has already been issued by NECs based on the EIA conducted by e7 Fund.	OK.	OK
F.1.2. Does the project comply with environmental legislation in the host country?	PDD /16/	DR I	Yes. Refer to e7 Fund's "EIA Clearance condition and its mitigation measure I the Bidding Document of the e7 Bhutan Project" Appendix 3 of the validation report.	OK.	OK
F.1.3. Will the project create any adverse environmental effects?	PDD	DR	As it is a run-of river micro-hydro power project, the impacts are expected to be minimal.	OK.	OK
F.1.4. Have environmental impacts been identified and addressed in the PDD?	PDD	DR	The environmental impacts of the project are sufficiently addressed.	OK.	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
***G.* Comments by Local Stakeholder** Validation of the local stakeholder consultation process.					
G.1.1. Have relevant stakeholders been consulted?	PDD	DR	PDD G.1: Relevant stakeholders are consulted.	OK.	OK
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	PDD	DR	Ditto	OK	OK
G.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	PDD /8/ /9/	DR	PDD G.3: The stakeholder consultation process was carried out in accordance with the regulations of 2) Almost all the micro-HPP.s ever constructed were supported by foreign official assistance. These facts demonstrates that the micro-HPP is not profitable and feasible in the Chendebji village.	OK	OK
G.1.4. Is a summary of the comments received provided?	PDD	DR	Yes. Refer to PDD G.2.	OK.	OK
G.1.5. Has due account been taken of any comments received?	PDD /5/	DR	Refer to PDD G.3 and /5/ Countermeasures to comments indicated in "Environmental Clearance" were submitted to NECs and approved.	OK.	OK

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CAR1 The owner of the project is not clear. The authority and responsibility of project management, monitoring, measurement, review and reporting has not been clearly established in the PDD.	**D.5.1, D5.2, D.5.7, D.5.10～ D.5.12**	Refer to PDD Rev.02, Clause A.4.2 & Clause A.D.2. DoE of Royal Government of Bhutan will be the owner of the project and the Local Community will undertake the operation, maintenance, management and monitoring of the data of the power generated from the power plant. The monitoring of the project will be done under the technical guidance of the DoE.	Clause A.4.2 and D.2 of the revised PDD establishes the authority and responsibility for project management, monitoring, measurement, review, reporting and maintenance. **CAR1 was closed.**
CAR2 As for the baseline of SSCDM Category I.A, option 1 or option 2 should be identified.	**E.3.4**	Option was identified as “option 2” and PDD was revised accordingly.	After revision, the PDD is complying with the requirements of the CDM and description is clear and appropriate. **CAR 2 was closed.**
CAR3 It shall be stated that *ex-post* calculation will be done using metered electricity generated.	**E.3.7**	Suitable correction was introduced and PDD was revised accordingly. Reasonable justification for applying ex post calculation of GHG emission was added in the PDD. (This project is a run-of-river micro hydropower generation and ex-post calculation gives more accurate GHG emission data.)	After revision, the PDD is complying with the requirements of the CDM and description is clear and appropriate. **CAR 3 was closed.**

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CL1 It should be clarified that the equipment of the project is new. If the renewable energy technology is equipment transferred from another activity, leakage calculation is required.	**D.3.1**	The equipment is not transferred from another activity and description was added in the PDD.	The project was found to comply with the requirements of Category I. A. of small-scale CDM project No further action required.
CL2 Explanation about average technical distribution losses of diesel powered mini-grid should be added for the calculation of baseline emission.	**E.3.4**	Distribution loss was taken as “0” considering the length of the distribution lines and conservative viewpoint. The PDD was revised.	After revision, the PDD is complying with the requirements of the CDM and description is clear and appropriate. No further action required.
CL3 Appropriateness of 95% capacity factor should be clarified taking into account seasonal water flow change.	**E.3.4**	Explanation was added in the PDD including monitoring after operation of the plant.	After revision, the PDD is complying with the requirements of the CDM and description is clear and appropriate. No further action required.

Appendix 2

September 9, 2004

Explanation about a received public comment

1. Received comment

One comment was received as follows.

From: "Luis Mejia" <simapro2@verizon.net.do>
To: <soka@jaco.co.jp>
Sent: Monday, July 05, 2004 5:55 AM
Subject: COMMENTS

Q1=Luis Mejia
Q2=Simapro, S. A
Q3=Environmental
Q4=Santo Domingo
Q5=Dominican Republic
Q6=simapro2@verizon.net.do
Q7=Subject: Environmental Impact:

The project does not include the potentials environmental impacts that can occur with the construction, operation and maintenance of the project. It is necessary to mention the environmental impacts, because the monitoring must be part of the project operation. The environmental impacts are related to the followings aspects:

- Physic Environment
- Biological Environment
- Social-Cultural Environment
- The Countryside Environment

How we are discussing the occupation of a river bed, the quantity of water that is going to be affected must be indicated, the area to intervene, the time of intervention, and also the benefits extracted from this source.

2. Timing of the received comment

Above public comment was sent at 5.55 AM of Dominican time of July 05, 2004 and this means 9.55 AM of GMT. Therefore, this comment was sent 9.55 hours delayed after the end of 30days public comment period for the e7 Bhutan project.
Considering above, this is not an official public comment but should be taken as a reference comment.

However, JACO considers that the comments are pointing out important items to be implemented to the hydroelectric generation project.
Based on the review of the PDD and related documents, also by interviews to the e7 representatives, JACO recognizes that sufficient assessment and measures had already been taken to each point of public comments as shown in the following item 3.

3. Measures taken for the potential environmental impacts

3.1 Environmental assessment

In the PDD, it is briefly stated that "Environmental assessment has already been implemented・・"
This Environmental assessment was conducted at the feasibility study stage according to "Royal Government of Bhutan, Environmental Assessment Act 2000" and related regulations.

The assessment report of September 2003 covers following items;

- Description of Existing Environment
  - Study Zone
  - Natural Components
  - Socioeconomic Components
- Potential Source of Impacts
  - During the Construction Phase
  - During the Operation Phase
- Environment Management Plan
  - Mitigation Measures Proposed During the Construction Phase
  - Mitigation Measures During the Operation Phase
  - Monitoring Program
  - Health and Safety

3.2 Environmental Clearance Measures

(1) Measures during construction work
Based on above report, NEC (National Environment Commission) sent a letter "Pilot CDM project at Chendebji" (Refer to Annex 3 of the PDD).
As for each subject listed in this letter of Annex 3, measures have been taken by e7 as shown in the "EIA Clearance condition and the mitigation measures included in the Bidding Document of the e7bhutan project" (Refer to Appendix 7 of this validation report.)

These measures were agreed between Government of Bhutan and e7.

(2) Measures during operation and maintenance

The water for this power plant is not used to drinking water or other use.

The hydropower generation facility is small size but suitable care is taken for the design and location of powerhouse, piping etc. to minimize the influence to landscape.

As for social-cultural environment, the e7 Bhutan project is expected in promoting villager's health and education, economic development, etc.

About the occupation of riverbed, study was conducted for fishes in the Chendebji River. Only the presence of brown trout was confirmed and it is expected that the impact to the brown trout is small considering the quantity of water in the spawning season.

(3) Monitoring

In addition to the monitoring items directly linked for CDM, e7 is planning to implement the following activities as monitoring periodically during the first 2 years after the construction of the power station.

- Analysis of socio economic condition of the villagers after the electrification
- Analysis of the impact of the flow reduction upon the presence of river fishes (brown trout)

4. JACO's Opinion

Suitable environmental assessment had been conducted at the feasibility study and necessary measures including monitoring are considered and reflected into the project. This complies with the requirements of UNFCCC criteria and the project will contribute to the sustainable development of the district.

Appendix 3

2004/01/28

Table 1: EIA Clearance condition and its mitigation measure included in the Bidding Document of the e7 Bhutan Project

No.	EIA Clearance conditions shown by the Bhutan NECS	The interpretation of the definition of EIA Clearance conditions	Section referred in the Bidding Document and other references
No. 1	The decision to issue environmental clearance is based on the information submitted to the NECS vide letter No. DoE/PCD/E7(CDM)/2002-03/26 dated July 17, 2003 and the additional information submitted vide letter No. DOE/PCD/E7(CDM)/2003-04/271 dated 7 Nov. 2003.	None	———
No. 2	The construction activities must be done in accordance with the Land Act, 1979, Forest and Nature Construction Act, 1995, Environmental Assessment Act, 2000 and the Electricity Act, 2001.	The construction activities must be done in accordance with the Land Act, 1979, Forest and Nature Construction Act, 1995, Environmental Assessment Act, 2000 and the Electricity Act, 2001.	The Bidding Document (BD), Section Ⅳ, Part Ⅰ (S-Ⅳ-Ⅰ), General Requirement (GR) 1.14, Item 1.
No. 3	Construction activities shall not obstruct/hamper the usage of existing trails by the villagers	Construction activities shall not obstruct/hamper the usage of existing trails by the villagers	BD, S-Ⅳ-Ⅰ, GR 1. 14, Item 2.
No. 4	The excavated materials shall be deposited in designated areas only	The excavated materials shall be deposited in designated areas as shown on the drawing.	BD, S-Ⅳ-Ⅰ, GR 1. 3, Item (5)
No. 5	The existing stream shall be protected from construction debris/materials falling into it.	The Contractor's construction activities shall be performed by the methods that will prevent entrance or accidental spillage of solid matter, contaminants, debris and other objectionable pollutants and wastes into stream, flowing or dry water course and underground water sources.	BD, S-Ⅳ-Ⅰ, GR 1. 4.

No. 6	The project water intake shall not deprive drinking water and other water resources of the villagers.	None	Since the drinking water intake is located upstream of the water intake for the hydropower station and other water resources of the villagers are not found in the area of the hydropower station, there is no impact for the villagers
No. 7	The temporary access road, after completion of the project, must be reclaimed to its original state.	After construction, the temporary road will be re-claimed to its original states or remain after construction depending on the consensus of the villagers. If the road has to remain, necessary approval should be obtained from concerned authority (ies)	BD, Section III, Part II (S-III-II), Condition of Particular Applications (CPA), Sub-Clause 2.5
No. 8	Construction of the temporary road shall be done using backhoe tractor and traxcavator (excavator)	Construction of the temporary road shall be done not using blasting, but by using backhoe tractor and traxcavator only.	BD, S-IV-I, GR 1. 14, Item 3.
No. 9	The excavated material, particularly, from the construction of temporary road – topsoil – must be stored in designated areas only. The deposited topsoil shall be protected from rain and wind. The topsoil must be reused in restoring the temporary road.	The excavated material, particularly, from the construction of temporary road – topsoil – must be stored in designated areas only. The deposited topsoil shall be protected from rain and wind to avoid causing topsoil to be flowed out and too much dust. The topsoil must be reused in restoring the temporary road.	BD, S-IV-I, GR 1. 14, Item 4.
No. 10	The generation of dust from the construction activities shall be suppressed by spraying water at least twice a day.	The generation of dust from the construction activities shall be suppressed by spraying water at least twice a day in such cases that much dust is raised by the construction activities or the Employer directs.	BD, S-IV-I, GR 1. 14, Item 5.

No. 11	Construction of water intake shall not be done during the spawning season of the fishes	Construction of water intake shall be done not affecting spawning of the brown trout during spawning season, i.e. from the last week of October to the first week of November. The spawning season will be verified by the nearest forest office.	- BD, S-IV-I, GR 1. 14, Item 7. - According to our environmental engineers' (fish experts) assumption, because of the high altitude of Lamchela Chu, there is probably no other significant fishes except brown trout. - e7 will investigate what kind of fishes are dwelling in Lamchela Chu, Chendebji, at the next mission to Bhutan before construction work starts. - During construction period, the local engineer (Employer's representative) will monitor the nature of brown trout in Lamchela Chu, Chendebji. - For reference e-mail from DOE dated December 30, 2003. Thank you very much for showing so much concern over the fishes issue. But I am glad to inform you that when I checked with NECS this morning, they also felt that the only fish available is brown trout in that river. They further clarified that when they mentioned fishes, it only referred to relevant species which in our case is brown trout. Therefore, please act on the assumption that there is only brown trout in Lamchela Chu. Thank you and with best regards, Karma Tshering.

No. 12	The Department of Energy (DOE) is responsible for directing the contractor for provision of proper sanitation facilities to the workforce employed at the project site.	The Contractor shall be required to prepare an occupational health and safety measure program focusing fresh water supply, sanitation and sewage treatment. In this connection, the Contractor will provide water supply facility, sanitation facilities and a sewage tank.	BD, S-III-II, CPA 20
No. 13	The DOE must submit a separate application for construction of transmission line to the NECS for clearance.	The Contractor is requested to fulfil the necessary items of the Environmental Assessment Guideline for the Transmission and Distribution Lines as per attached in this section for EIA Clearance → or any other revised guideline in force	BD, S-IV-I, GR 1. 14, Item 8.
No. 14	The contractor must ensure that occupational health and safety measures implemented at all times during construction of the project.	- The Contractor shall be required to prepare an occupational health and safety measure program focusing fresh water supply, sanitation and sewage treatment. In this connection, the Contractor will provide water supply facility, sanitation facilities and a sewage tank. - The Contractor shall prepare the safety plan for the workers and villagers during construction period.	BD, S-III-II, CPA 20, 21
No. 15	Visual impact due to the project construction must be minimized by not uprooting/cutting trees unnecessarily, within or outside the construction area and also by planting trees after project activity completion in consultation with the nearest Forest Office.	Visual impact due to the project construction must be minimized by not uprooting/cutting trees unnecessarily, within or outside the construction area and also by planting trees at project activity completion in consultation with the nearest Forest Office.	BD, S-IV-I, GR 1. 14, Item 6.

No. 16	The clearance holder shall submit detailed implementation measures prior to the initiation of the construction activities.	The Contractor shall submit the detailed construction program, which complies with all provisions in Environmental Clearance for Micro Hydropower in Chendebji village issued by National Environment Commission Secretariat (NECS) and which shall be approved by the Employer prior to the commencement of the construction.	BD, S-IV-I, GR 1. 14, Item 9.
No. 17	It is the responsibility of the DOE to conduct routine environmental monitoring and maintain records.	The Contractor shall cooperate with DOE and C7 to do environmental monitoring during construction period.	BD, S-IV-I, GR 1. 14, Item 10.
No. 18	Should any dispute arise due to the implementation of these activities, the project proponent is responsible for resolving it amicably, and	Besides, the Contractor shall establish communication plan to notify the issues to the villagers and to keep a permanent communication link between the workers and villagers during construction period.	BD, S-III-II, CPA 21.
No. 19	Should the applicant violate any of the aforementioned condition, this Environmental Clearance shall be revoked without any liability on the part of the NECS.	- None → and between any other involved parties	
No. 20	The Environmental Clearance is valid for Eighteen (18) months from the date of issue.	- None	process for the extension of DOE can ~~extend~~ the validity of the Environmental Clearance, if required.