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## Verification Report

### **Aqua Power Private Limited**

(Formally known as Aqua Power Limited)

Periodic Verification of the Registered CDM Project

“Lohgarh, Chakbhai and Sidhana Mini Hydroelectric Projects”

UNFCCC 00000327-CDMP

Monitoring period 03: 01-05-2007 to 30-06-2008

Report No. 1224621

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TÜV SÜD Industrie Service GmbH  
Carbon Management Service  
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| <b>Subject:</b>  |                     |          | Third Periodic Verification   |              |
| <b>Executing Operational Unit:</b>   |                     |          |   |              |
| TÜV SÜD Industrie Service GmbH, Carbon Management Service<br>Westendstrasse 199 - 80686 Munich, Federal Republic of Germany  |                     |          |   |              |
| <b>Project Participant (client):</b>   |                     |          |   |              |
| Aqua Power Private Limited<br>B-37, Sector-1, Noida-201301<br>Uttar Pradesh<br>India.  |                     |          |   |              |
| <b>Registration number / Project Title</b>   |                     |          | Project 0327: “Lohgarh, Chakbhai and Sidhana Mini Hydroelectric Projects”     |              |
| <b>Monitoring period:</b>  |                     |          | 01-05-2007 to 30-06-2008  |              |
| <b>First Monitoring Report (version/date)</b>  |                     |          | Version 00 / 11.07.2008   |              |
| <b>Final Monitoring Report (version/date)</b>  |                     |          | Version 02 / 06.01.2009   |              |
| <b>Summary:</b><br>TÜV SÜD Industrie Service GmbH has performed the Third periodic verification of the registered CDM project: “Lohgarh, Chakbhai and Sidhana Mini Hydroelectric Projects”. The purpose of the project is to generate electricity by utilizing the water which is flowing through the existing canal system and supply electricity to Punjab State Electricity Board (PSEB). As per the PDD the project activity has installed turbines in the 3 sites such as Lohgarh, Chakbhai and Sidhana and the combined generation capacity is 5.2 MW.<br>The management of Aqua Power Private Limited is responsible for the preparation of the GHG emissions data and the reported GHG emission reductions.<br>A document review, followed by a site visit was conducted to verify the information submitted by the project participant regarding the present verification period. Based on the assessment carried out, the verifier confirms: <ul style="list-style-type: none"><li>the project has been implemented and operated in accordance with the description given in the registered PDD, registration date 30-04-2006.</li><li>the project is completely implemented as described in registered PDD.</li><li>the monitoring plan complies with the applied methodology (AMS.I D, version 07) and except the frequency of calibration (accuracy checks) of the electricity meters. For details see chapter 3.5.</li></ul> Installed equipments essential for generating emission reductions run reliably and the meters are calibrated appropriately. The project is generating emission reductions as a CDM project. The verifier can confirm that the GHG emission reductions are calculated without material misstatements. Our opinion refers to the project’s GHG emissions and resulting GHG emission reductions reported, both determined due to the valid and registered project’s baseline, its monitoring plan and its associated documents.<br>Based on the information we have seen and evaluated we confirm that the implementation of the project resulted in 32 242 t CO <sub>2e</sub> of emission reductions during the verification period 01-05-2007 to 30-06-2008. |                     |          |   |              |
| Verification team: <ul style="list-style-type: none"><li>Bratin Roy (Assessment Team Leader (ATL), Lead Auditor Environmental Management Systems (ISO 14001), Local Expert, GHG Auditor)</li><li>Supratik Dutta (GHG auditor, technical expert)</li></ul>  |                     |          | Internal Quality Control:<br>Cuiyun Zhang (Deputy head of Certification Body) |              |



## Abbreviations

|                        |   |
|------------------------|---|
| <b>APPL</b>            | Aqua Power Private Limited  |
| <b>BM</b>              | Build Margin  |
| <b>CAR</b>             | Corrective Action Request   |
| <b>CDM</b>             | Clean Development Mechanism   |
| <b>CDM-EB</b>          | CDM Executive Board   |
| <b>CER</b>             | Certified Emission Reduction  |
| <b>CM</b>              | Combined Margin   |
| <b>CMP</b>             | Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol |
| <b>CO<sub>2e</sub></b> | Carbon dioxide equivalent   |
| <b>CR / CL</b>         | Clarification Request   |
| <b>DNA</b>             | Designated National Authority   |
| <b>DOE</b>             | Designated Operational Entity   |
| <b>EF</b>              | Emission Factor   |
| <b>EIA / EA</b>        | Environmental Impact Assessment / Environmental Assessment                            |
| <b>ER</b>              | Emission Reduction  |
| <b>FAR</b>             | Forward Action Request  |
| <b>GHG</b>             | Greenhouse Gas(es)  |
| <b>GWP</b>             | Global Warming Potential  |
| <b>IPCC</b>            | Intergovernmental Panel on Climate Change   |
| <b>IRL</b>             | Information Reference List  |
| <b>KP</b>              | Kyoto Protocol  |
| <b>MP</b>              | Monitoring Plan   |
| <b>MR</b>              | Monitoring Report   |
| <b>NGO</b>             | Non-Governmental Organisation   |
| <b>OM</b>              | Operational Margin  |
| <b>PDD</b>             | Project Design Document   |
| <b>PP</b>              | Project Participant   |
| <b>PSEB</b>            | Punjab State Electricity Board  |
| <b>PPA</b>             | Power Purchase Agreement  |
| <b>PLF</b>             | Plant Load Factor   |
| <b>SSC</b>             | Small Scale Project Activities  |
| <b>TÜV SÜD</b>         | TÜV SÜD Industrie Service GmbH  |
| <b>UNFCCC</b>          | United Nations Framework Convention on Climate Change                                 |
| <b>VVM</b>             | Validation and Verification Manual  |

## Main Documents (referred to in this report)

|                              |   |            |
|------------------------------|---|------------|
| Methodology (name / version) | AMS I D, Version 07   |            |
| Registered PDD:              | Registration date 30-04-2006, neither version nor date is available in the registered PDD   |            |
| Revised Monitoring Plan:     | -   |            |
| Scope                        | 1   |            |
| Technical Area               | 1.1   |            |
|                              | Version   | Date       |
| Published Monitoring Report  | 00  | 11-07-2008 |
| Revised Monitoring Report    | 02  | 06-01-2009 |
| Project documentation link:  | <a href="http://cdm.unfccc.int/Projects/DB/TUEV-SUED1142612177.68/view">http://cdm.unfccc.int/Projects/DB/TUEV-SUED1142612177.68/view</a> |            |

| Table of Contents  | Page |
|--|------|
| 1 Introduction .....   | 4    |
| 1.1 Objective .....  | 4    |
| 1.2 Scope .....  | 4    |
| 1.3 GHG Project Description .....  | 4    |
| 2 Methodology .....  | 6    |
| 2.1 Verification Process .....   | 6    |
| 2.2 Verification Team .....  | 6    |
| 2.3 Review of Documents .....  | 6    |
| 2.4 On-site Assessment and follow-up Interviews .....                                    | 7    |
| 2.5 Quality of Evidence to Determine Emission Reductions .....                           | 7    |
| 2.6 Resolution of Clarification and Corrective and Forward Action Requests .....         | 7    |
| 2.7 Internal Quality Control .....   | 8    |
| 3 Verification Results .....   | 9    |
| 3.1 FARs from Validation / Previous Verification .....                                   | 9    |
| 3.2 Project Implementation in accordance with the registered Project Design Document ... | 9    |
| 3.3 Compliance of the Monitoring Plan with the Monitoring Methodology .....              | 10   |
| 3.4 Compliance of the Monitoring with the Monitoring Plan .....                          | 10   |
| 3.5 Assessment of Data and Calculation of Greenhouse Gas Emission Reductions .....       | 12   |
| 4 Summary of Findings .....  | 13   |
| 5 Verification Statement .....   | 16   |

Annex 1: Verification Protocol

Annex 2: Information Reference List

## 1 INTRODUCTION

### 1.1 Objective

The company's name has been changed from “Aqua Power Limited” to “Aqua Power Private Limited”. As per CDM modalities and procedures, same information has been updated to UNFCCC secretariat and Designated National Authority of India. Management structure of the company remains same.

Aqua Power Private Limited has commissioned an independent verification by TÜV SÜD Industrie Service GmbH (TÜV SÜD) of its registered CDM project: “Lohgarh, Chakbhai and Sidhana Mini Hydroelectric Projects”.

The objective of the verification work is to comply with the requirements of paragraph 62 of the CDM Modalities and Procedures. According to this assessment TÜV SÜD shall:

- ensure that the project activity has been implemented and operated as per the registered PDD “Lohgarh, Chakbhai and Sidhana Mini Hydroelectric Projects” registered on 30-04-2006, and that all physical features (technology, project equipment, monitoring and metering equipment) of the project are in place,
- ensure that the published MR and other supporting documents provided are complete and verifiable and in accordance with applicable CDM requirements,
- ensure that actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan and the approved methodology,
- evaluate the data recorded and stored as per the “Methodology for Renewable electricity generation for a grid”, AMS I.D Version 07.

### 1.2 Scope

The verification scope is defined as an independent and objective review and ex-post determination of the monitored reductions in GHG emissions by the Designated Operational Entity. The verification is based on the submitted monitoring report, the validated project design documents including its monitoring plan and validation report, first and second periodic verification reports, the applied monitoring methodology, relevant decisions, clarifications and guidance from the CMP and the EB and any other information and references relevant to the project activity's resulting emission reductions. These documents are reviewed against the requirements of the Kyoto Protocol, the CDM Modalities and Procedures and related rules and guidance.

TÜV SÜD has, based on the requirements in the VVM applied a rule-based approach. The principles of accuracy and completeness, relevance, reliability and credibility were combined with a conservative approach to establish a traceable and transparent verification opinion.

The verification considers both quantitative and qualitative information on emission reductions.

The verification is not meant to provide any consultancy towards the client. However, stated requests for clarifications, corrective and/or forward actions may provide input for improvement of the monitoring activities.

### 1.3 GHG Project Description

|                             |  |
|-----------------------------|--|
| Project activity:           | <b>“Lohgarh, Chakbhai and Sidhana Mini Hydroelectric Projects”</b> |
| UNFCCC registration number: | 0327   |
| Project Participants:       | Aqua Power Private Limited   |



Location of the project: Sangrur, Punjab  
Date of registration: 30-04-2006  
Starting date of the crediting period: 20-11-2004

### **Technical description of the project**

Lohgarh: The power house comprises of two induction generators of each capacity 1000 KW. The full-Kaplan turbines and accessories of this project site were supplied by Boving Fouress Limited, Bangalore which is the reputed supplier of the host country. The power is generated at a voltage of 6.6 K V, which is further stepped up to the 11KV to match the supply PSEB point sub station voltage level.

Chakbhai: The power house comprises of two induction generators of each capacity 1000 KW. The full-Kaplan turbines and accessories of this project site were supplied by Boving Fouress Limited, Bangalore which is the reputed supplier of the host country. The power is generated at a voltage of 6.6 KV which is further stepped up to the 11KV to match the supply PSEB point sub station voltage level.

Sidhana: The power house comprises of an induction generators of capacity 1200 KW. The full-Kaplan turbine and accessories of this project site were supplied by Boving Fouress Limited, Bangalore which is the reputed supplier of the host country. The power is generated at a voltage of 6.6 KV, which is further stepped up to the 11KV to match the supply PSEB point sub station voltage level.

## 2 METHODOLOGY

### 2.1 Verification Process

The verification process is based on the approach depicted in the Validation and Verification Manual.

Standard auditing techniques have been adopted. The verification team performs first a desk review, followed by an on-site visit which results in a protocol including all the findings. The next step is to close out the findings through direct communication with the PPs and finally prepare the verification report. This verification report and other supporting documents then undergo an internal quality control by the CB “climate and energy” before submission to the CDM-EB.

### 2.2 Verification Team

The appointment of the team takes into account the coverage of the technical area(s), sectoral scope(s) and relevant host country experience for verifying the ER achieved by the project activity in the relevant monitoring period for this verification.

The verification team was consisting of the following members:

| Name           | Qualification | Coverage of technical area          | Coverage of sectoral scope          | Host country experience             |
|----------------|---------------|-------------------------------------|-------------------------------------|-------------------------------------|
| Bratin Roy     | ATL           | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Supratik Dutta | GHG-A         | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

**Bratin Roy** is an Assessment Team Leader at TÜV SÜD South Asia, TÜV SÜD Group and lead auditor for quality, environment and occupational health and safety management system (according to ISO 9001, ISO 14001 and OHSAS 18001) and an auditor for CDM/JI projects at TÜV SÜD South Asia. He holds a master degree in environmental science. He is based in Pune, India. Mr. Roy has worked for 7 years as a consultant in the field of cement industries, renewable and non-renewable energy sources, and energy distribution equipment, especially biomass and solar energy. He has received extensive training in the CDM and JI validation and verification processes and has already participated in several CDM/JI project assessments.

**Supratik Dutta** is a GHG auditor at TÜV SÜD South Asia, TÜV SÜD Group and also a certified lead auditor for environmental management systems (according to ISO 14001). He holds a post-graduate degree energy management. He is based in Kolkata, India. He has received extensive training in the CDM validation and verification process and participated already in several CDM project assessments. He is GHG auditor for the sectoral scopes 1, 2, 3, 4.

### 2.3 Review of Documents

The Monitoring Report version 00 was submitted by the PP which was made publicly available on the UNFCCC website before the verification activities started. The published MR was assessed based on all the relevant documents as listed earlier. The aim of the assessment in the desk review was to verify the completeness of the data and the information presented in the MR. The compliance check of the MR with respect to the monitoring plan depicted in the registered PDD and the applied methodology was carried out. Particular attention to the



frequency of measurements, the quality of the metering equipment including calibration requirements, and the quality assurance and quality control procedures was paid. The evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions was also carried out. A complete list of all documents reviewed is available in Annex 2 of this report.

## **2.4 On-site Assessment and follow-up Interviews**

On 11-09-2008 and 12-09-2008, TÜV SÜD performed a physical site inspection and on-site interviews with project stakeholders to:

- confirm the implementation and operation of the project,
- review the data flow for generating, aggregating and reporting the monitoring parameters,
- confirm the correct implementation of procedures for operations and data collection,
- cross-check the information provided in the MR documentation with other sources (raw data),
- check the monitoring equipments against the requirements of the PDD and the approved methodology, including calibrations, maintenance, etc.,
- review the calculations and assumptions used to obtain the GHG data and ER,
- identify if the quality control and quality assurance procedures are in place to prevent or correct errors or omissions in the reported parameters.

A list of the persons interviewed during this verification activity is included in Annex 2.

## **2.5 Quality of Evidence to Determine Emission Reductions**

Among many others the following relevant and reliable evidences have been used by the audit team during the verification process:

- Joint meter recording sheets for each month (IRL 7)
- Accounting records (invoices raised for net electricity export),(IRL 7)
- Daily, weekly and monthly gross energy generation and auxiliary consumption measured at plant and recorded in log sheets (IRL 9)
- Quality assurance documents such as maintenance, outages records etc. (IRL 14)
- Calibration certificates from state electricity board agency for main and check meters of the project activity. (IRL 8)

Sufficient evidence covering the full verification period in the required frequency is available to validate the figures stated in the final MR. The source of the evidences will be discussed in chapter 3 of this report. Specific cross-checks have been done in cases that further sources were available. All figures in the monitoring report were cross-checked by the audit team against the raw data. The data collection system meets the requirements of the monitoring plan as per the methodology.

## **2.6 Resolution of Clarification and Corrective and Forward Action Requests**

The objective of this phase of the verification process was to resolve any outstanding issues which needed to be clarified for TÜV SÜD's positive conclusion on the GHG emission reduction calculation. The findings raised as Forward Action Requests (FARs) (if any) indicated in previous reports (validation/verification) were clarified during communications between the PP and TÜV SÜD.





To guarantee the transparency of the verification process, the concerns raised, based on the desk review and subsequent on-site audit assessment and follow up interviews, together with the responses given are documented in Annex 1 (verification protocol).

A Corrective Action Request is raised where TÜV SÜD identifies:

- non-conformities in monitoring and/or reporting with the monitoring plan and/or methodology;
- that the evidence provided is not sufficient to prove conformity;
- mistakes in assumptions, data or calculations that impair the ER;
- FARs stated during validation that are not solved until the on-site visit.

A Clarification Request is raised where TÜV SÜD does not have enough information or the information is not clear in order to confirm a statement or data.

A Forward Action Request is raised where TÜV SÜD identifies that monitoring and/or reporting required special attention or adjustments for the next verification period.

Information or clarifications provided as response to a CAR, CL or FAR could also lead to a new CAR.

## **2.7 Internal Quality Control**

As an ultimate step of verification the final documentation including the verification report and the protocol have to undergo an internal quality control by the Certification Body (CB) “climate and energy”, i.e. each report has to be finally approved either by the Head of the CB or the Deputy. In case one of these two persons is part of the assessment team the approval can only be given by the other one. If the documents have been satisfactorily approved, the Request for Issuance is submitted to the CDM-EB along with the relevant documents.

### 3 VERIFICATION RESULTS

In the following sections the results of the verification are stated. The verification results relate to the project performance as documented and described in the final Monitoring Report (06-01-2009, version 02). The verification findings for each verification subject are presented below:

#### 3.1 FARs from Validation / Previous Verification

A FAR related to the frequency of calibration of energy meter was included in the last periodic verification. During on site audit DOE has checked the same with the submitted calibration records. It was found that project proponent submitted an application letter for energy meters calibration to the state electricity board for calibrating the meters within six months. However, state electricity board has calibrated these meters with some delays. As the project proponent sent an application for calibration to state electricity board before the due date of meter calibration and PP has no authority over the Government agency for calibration DOE has accepted the approach with a deduction based on the maximum inaccuracy specification of the meters as per the EB guidance for the delayed calibration months. Further details are available in the chapter 4 of this report.

#### 3.2 Project Implementation in accordance with the registered Project Design Document

The project is fully implemented according to the description presented in the PDD. The Sidhana unit of the project activity has been commissioned during present monitoring period dated on 25<sup>th</sup> October 2007. Sidhana plant has not been commissioned since starting date of the crediting period due to the incompleteness of the canal works. The verifier confirms, through the visual inspection that all physical features of the proposed CDM project activity including data collecting systems and storage have been implemented in accordance with the registered PDD. The project activity is completely operational and the same has been confirmed on-site.

No data and/or variables presented in the MR differ significantly from the stated in the registered PDD, which would cause an increment of the ER in this period or in future periods in relation to the estimates in the registered PDD.

It was found that during present monitoring period, monitored emission reductions (32,242 tCO<sub>2</sub>) are bigger than the estimated ones in the registered PDD (31,454 tCO<sub>2</sub>; considering the monitoring period). Project Proponent has clarified that according to page 9 of registered PDD, Lohgarh, Chakbhai and Sidhana units of the project activity would achieve a generation of 87.99 million KWh, 114.72 million KWh & 66.11 million KWh units which in turn envisaged an emission reduction of 82965, 108167 & 62334 tCO<sub>2</sub> (Total 253467 tCO<sub>2</sub>) over a period of 9, 10 & 9 years respectively. Its means, per annum of the entire monitoring period, units of Lohgarh, Chakbhai and Sidhana would achieve a generation of 9.78, 11.47 & 7.35 (Total 28.59) million kWh units with Plant Load Factor ("PLF") 56%, 65% & 70% (average 63%) respectively and accordingly emission reduction would be reduced to 26961 tCO<sub>2</sub>.

During the current monitoring period, the project activity has resulted into a total emission reduction of 32242 tCO<sub>2</sub> based on the generation of 15.81, 13.40 & 5.09 million kWh units with PLF of 77%, 66% & 65% (average 70%) for MHP Lohgarh, MHP Chakbhai & MHP Sidhana respectively.



As PLF of the present monitoring period of the project activity was more than the PLF as calculated from the PDD therefore emission reductions from the current monitoring period were also bigger than the estimated ones in the registered PDD.

### 3.3 Compliance of the Monitoring Plan with the Monitoring Methodology

The monitoring plan is in accordance with the approved methodology, AMS I.D, Version 07, applied by the proposed CDM project activity. Neither a revision nor a deviation to the monitoring plan has been requested to the CDM Executive Board.

### 3.4 Compliance of the Monitoring with the Monitoring Plan

The monitoring has been carried out in accordance with the monitoring plan contained in the registered PDD. All parameters were monitored and determined as per the Monitoring Plan.

The verification of the parameters required by the monitoring plan are provided as follows:

|                                 |  |
|---------------------------------|--|
| <b>Data / Parameter:</b>        | 1  |
| Data unit:                      | kWh  |
| Description:                    | Energy exported  |
| Source of data used:            | Export and Import Meter reading log book. Joint meter reading statement and invoices. The equipment used has been calibrated according to the requirements of the approved monitoring plan. The calibration has been done by PSEB Meter Mobile Testing Squad (MMTS), Patiala . This agency has been accredited by state electricity board to do this kind of job, Thus it can be concluded that the company is well qualified. |
| Means of verification/Comments: | The data in the CER calculation tool and monitoring report have been verified from the monthly joint meter reading statements and also from the daily export meter reading of the meter as recorded in the the plant log book.   |
| Cross-check                     | Values in the calculation sheet have been cross checked with invoices  |

|                                 |   |
|---------------------------------|---|
| <b>Data / Parameter:</b>        | 2   |
| Data unit:                      | kWh   |
| Description:                    | Energy imported   |
| Source of data used:            | Meter reading log book, Joint meter reading statement and invoices. The equipment used has been calibrated according to the requirements of the approved monitoring plan. The calibration has been done by PSEB Meter Mobile Testing Squad (MMTS), Patiala. This agency has been formed by state electricity board. This agency has been accredited by state electricity board to do this kind of job, Thus it can be concluded that the company is well qualified. |
| Means of verification/Comments: | The data in the CER calculation tool and monitoring report have been verified from the monthly joint meter reading statements and also from the daily import meter reading of the meter as recorded in the plant log book.  |
| Cross-check                     | Values in the calculation sheet have been cross checked with  |



|  |          |
|--|----------|
|  | invoices |
|--|----------|

|                                 |   |
|---------------------------------|---|
| <b>Data / Parameter:</b>        | 3   |
| Data unit:                      | kWh   |
| Description:                    | Net saleable energy   |
| Source of data used:            | Joint meter reading statement and invoices.   |
| Means of verification/Comments: | The data in the CER calculation tool and monitoring report have been verified from the monthly joint meter reading statements and also from the daily meter reading of the meter as recorded in the the plant log book. |
| Cross-check                     | Values in the calculation sheet have been cross checked with the total electricity generation as recorded in the plant log book.  |

|                                 |   |
|---------------------------------|---|
| <b>Data / Parameter:</b>        | 4   |
| Data unit:                      | kWh   |
| Description:                    | Energy generated  |
| Source of data used:            | Generation meter reading and plant log book. The calibration of these meters has been carried out as prescribed by manufacturer. The calibration has been done by Advance control System (ACS) who is the accredited and registered by National Accreditation Board for Testing and Calibration Laboratories (NABL), Govt. Of India, to do the calibration of energy meter. |
| Means of verification/Comments: | The data in the CER calculation tool and monitoring report has been verified from the plant log book which records the initial and final meter reading of the generation meter in an hourly basis.  |
| Cross-check                     | The value has been cross checked with the nameplate capacity of the turbine.  |

|                                 |  |
|---------------------------------|--|
| <b>Data / Parameter:</b>        | 5  |
| Data unit:                      | kWh  |
| Description:                    | Auxiliary energy consumption   |
| Source of data used:            | Generation meter reading and plant log book<br>The calibration of the meter has been carried out as prescribed by manufacturer. The calibration has been done by Advance control System (ACS) who is the accredited and registered by National Accreditation Board for Testing and Calibration Laboratories (NABL), Govt. Of India, to do the calibration of energy meter. |
| Means of verification/Comments: | The data in the CER calculation tool and monitoring report have been verified from the monthly logbooks and from the hourly meter readings in the daily plant records.   |
| Cross-check                     | The value has been cross checked with the plant load factor  |

The calibration of all metering equipments is done regularly and the relevant calibration documents were viewed by the audit team during the on-site visit. These calibration certificates confirm the calibration status listed in the Monitoring Report for all meters. No further calibration activities are required for this CDM activity. Hence raw data of all measured parameter are reliable and serve as solid base for the reported emission reductions.



### **3.5 Assessment of Data and Calculation of Greenhouse Gas Emission Reductions**

All data has been available and all the parameters have been monitored in accordance with the registered monitoring plan. However,

The registered PDD states that the energy meters for measuring the electricity exported and imported by the project activity would be checked for accuracy every six months. However, as per the submitted calibration certificates of main meters, frequency of calibration dated between 10/06/2006, 01/06/2007 and 15/01/2008 at Lohgarh was not carried out within the six months as required by the monitoring plan of registered PDD.

Further, frequency of calibration between 24/02/2007 to 09/10/2007 and 09/10/2007 to 28/06/2008 at Chakbhai unit and 04/06/2007 to 19/08/2008 at Sidhana unit has not been carried out within six months as required by monitoring plan of registered PDD.

For all the above cases, project proponent has applied a deduction based on the maximum inaccuracy specification of the meters as per the EB guidance,

([http://cdm.unfccc.int/UserManagement/FileStorage/AM\\_CLAR\\_J359UPI4G71PM1QMIVS81FHIEJKYFE](http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_J359UPI4G71PM1QMIVS81FHIEJKYFE)) which is in this case ( $\pm$ ) 0.5% of export and import energy units and based on the guidelines project proponent recalculated the emission reduction in all sites of the project activity. Same calculation is now transparently defined in the revised monitoring report and excel sheet also.

The reported data has been cross checked against other sources when available as explained above in chapter 3.4.

The verifier confirms that the methods and formulae used to obtain the baseline emissions and emission reduction are appropriate. The same have been done in accordance with the methods and formulae described in the registered monitoring plan and applicable methodology.

The verifier also confirms that the emission factor (0.942 kg CO<sub>2</sub>/kWh) which has been defined in the registered PDD as ex-ante has been used correctly in the monitoring report and also the calculation of this factor was as per the requirement of AMS ID, version 07. Same has also been clearly explained in the registered PDD as well as in the validation report. .

## 4 SUMMARY OF FINDINGS

The verifier can confirm that the published MR and related documents are complete and verifiable in accordance with the CDM requirements. All the findings raised by the verification team, the responses by the PPs and the conclusion from the team are presented in Annex 1, the means of verification and resulting changes in the MR or related documents are stated as follows:

|  |
|--|
| <b>CAR 1, means of verification</b>  |
| DOE has observed that the formula described in the monitoring report of page 12 for calculation of GHG emission reduction is not in line with the registered PDD so it has been raised as a Corrective Action Request (CAR) in the verification protocol to correct the emission reduction formula according to the registered PDD. Project proponent has corrected emission reduction formula in the Monitoring Report (MR) version 02. The emission reduction formula was cross checked by DOE with guidelines of approved methodology and registered PDD.   |
| <b>CAR 1, changes in the MR or related documents</b>   |
| The GHG emission reduction formula has been corrected according to the registered PDD in the Monitoring report version 02.   |
| <b>CAR 2, means of verification</b>  |
| DOE has observed that the rated capacity and total number of the turbine for each site of the project activity was not mentioned in the monitoring report so it has been raised as a Corrective Action Request (CAR) in the verification protocol to incorporate these details in the Monitoring report. In response, project proponent has included these details in the monitoring report. The details were cross checked by DOE with the purchased order of the turbines as well as by the physical inspection of the name plate capacity.  |
| <b>CAR 2, changes in the MR or related documents</b>   |
| The rated capacity and the total number of turbines for each site of the project activity has now been included in the revised Monitoring report version 02. .   |
| <b>CAR 3, means of verification</b>  |
| During on site visit, it was observed that calibration dates of all main meters during present monitoring period of the project activity was not mentioned in page 14( meter details )of the monitoring report. A Corrective Action Request (CAR) has been raised to incorporate the meter calibration details in the revised monitoring report.   |
| DOE has further verified the calibration certificates to cross check the frequency of meter checking and/or calibration as per the registered PDD. It was evident from the calibration certificates that there was a delay of checking and/or calibration of meter.  |
| PP has referred to a deduction based on the maximum inaccuracy specification of the meters as per the EB guidance,<br><a href="http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_J359UPI4G71PM1QMIVS81_FHIEJKYFE">http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_J359UPI4G71PM1QMIVS81_FHIEJKYFE</a> which is in this case ( $\pm$ ) 0.5% of export and import energy units. Based on the above mentioned guidelines, project proponent has applied a deduction based on the maximum inaccuracy specification of the meters and recalculated the emission reduction in all sites of the project activity for the month May 2007, December 2007 and January 2008 at Lohgarh, August 2007 to October 2007 and April 2008 to June 2008 at Chakbhai site and October 2007 to June 2008 at sidhana unit. |
| <b>CAR 3, changes in the MR or related documents</b>   |
| Calibration dates of all main meters during present monitoring period of the project activity  |





|   |
|---|
| <p>has been included in the revised Monitoring report.<br/>                 PP has submitted a revised excel calculation (with due consideration of the deduction of emission reduction) sheet and monitoring report( version 02) .</p>   |
| <p><b>CR 1, means of verification</b></p>   |
| <p>During site audit, DOE has observed that the electricity generation in the month of August 2007 was more than the rated capacity of turbine at Chakbhai unit. A Clarification request (CR) has been issued by DOE to understand this reason. Project proponent clarified that as water availability was more than the design discharge therefore the turbine was operated more than the rated capacity. Project proponent has also submitted purchase agreement of turbine where it is stated that system can be operated at 15% of continuous overload from its rated design capacity. This means that project activity could generate power from turbo-generator set of 2MW+15% (i.e 2.3 MW).<br/>                 As per above in August month power plant was operated 1.35 % over than its rated design capacity but didn't not cross the maximum contractual design capacity i.e. 2.3 MW (It is including 15% extra overloading capacity from its designed capacity)</p>   |
| <p><b>CR 1, changes in the MR or related documents</b></p>  |
| <p>No changes have been made in the monitoring report due to this Clarification Request (CR).</p>   |
| <p><b>CR 2, means of verification</b></p>   |
| <p>During site audit, DOE has observed that the electricity generation in the month of October 2007 &amp; April 2008 was significantly lower than the rest of monitoring period months. A Clarification request (CR) has been issued by DOE to understand this reason. Project proponent clarified that as planned canal was closed in the month of October 2007 &amp; April 2008 for all sites of project activity electricity generation for these months were less. Project proponent has also provided plant records which demonstrate the same.</p>  |
| <p><b>CR 2, changes in the MR or related documents</b></p>  |
| <p>No changes have been made in the monitoring report due to this Clarification Request (CR).</p>   |
| <p><b>CR 3, means of verification</b></p>   |
| <p>The Sidhana unit commissioning has been delayed. A Clarification request (CR) has been issued by DOE to understand this reason. Project proponent clarified that MHP Sidhana units was delayed due to un-availability of canal closure for completing the In-canal works and additional time period required for the strengthening / raising of canal banks and remodeling of one village road bridge and one foot road bridge. This has been verified by DOE with commissioning certificate and plant records during site visit.</p>  |
| <p><b>CR 3, changes in the MR or related documents</b></p>  |
| <p>No changes have been made in the monitoring report due to this Clarification Request (CR).</p>   |
| <p><b>CR 4, means of verification</b></p>   |
| <p>The emission reductions (32,242 tCO<sub>2</sub>) of the present monitoring period are bigger than the estimated ones in the registered PDD (31,454 tCO<sub>2</sub>; considering the monitoring period). A Clarification request (CR) has been issued by DOE to understand this reason. Project Proponent has clarified that according to registered PDD the project activity had envisaged emission reductions of 82965, 108167 &amp; 62334 tCO<sub>2</sub> (Total 253467 tCO<sub>2</sub>) over a period of 9, 10 &amp; 9 years based on the generation of 87.99, 114.72 &amp; 66.11 million kWh units respectively for MHP Lohgarh, MHP Chakbhai &amp; MHP Sidhana. In consideration of the above, the project activity would result into total emission reduction of 26961 tCO<sub>2</sub> based on the generation of 9.78, 11.47 &amp; 7.35 million kWh units with Plant Load Factor (“PLF”) of 56%, 65% &amp; 70% (average 63%) over a period of 12 months respectively for MHP Lohgarh, MHP Chakbhai &amp; MHP Sidhana.</p> |
| <p>During the current monitoring period, the project activity has resulted into a total emission of 32242 tCO<sub>2</sub> based on the generation of 15.81, 13.40 &amp; 5.09 million kWh units with Plant Load Factor (“PLF”) of of 77%, 66% &amp; 65% (average 70%) for MHP Lohgarh, MHP Chakbhai &amp; MHP Sidhana respectively.</p>  |



The calculation is cross checked by DOE with the actual plant running data and hence DOE has accepted the justification given by PP related to higher generation and in turn higher emission reduction.

**CR 4, changes in the MR or related documents**

Justification was made in the revised monitoring report. Also, PLF calculation has been included in the CER excel sheet.

**FAR 1, means of verification**

Though main meter has not been changed in any of the sites of project activity, main, check, gross and auxiliary meters are needed to be calibrated in six month frequency to ensure the accuracy of the data measurement in the event of failure of any meter.

**FAR 1, changes in the MR or related documents**

This issue will be checked at the time of next periodic verification. Currently, there are no changes in the MR or related documents.





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## 5 VERIFICATION STATEMENT

TÜV SÜD Industrie Service GmbH has performed the third periodic verification of the CDM project: “Lohgarh, Chakbhai and Sidhana Mini Hydroelectric Projects”. The verification is based on the currently valid documentation of the UN Framework Convention on Climate Change (UNFCCC).

The management of Aqua Power Private Limited is responsible for the preparation of the GHG emissions data and the reported GHG emission reductions on the basis set out within the project's Monitoring Plan indicated in the PDD, registered on 30-04-2006 and the applied methodology AMS I.D, Version 07.

The verifier can confirm that:

- the development and maintenance of records and reporting procedures are in accordance with the registered monitoring plan;
- the project is operated as planned and described in the validated and registered project design document;
- the installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately;
- the monitoring system is in place and generates GHG emission reductions data;
- the GHG emission reductions are calculated without material misstatements;
- the monitoring plan in Monitoring Report is as per the registered PDD;
- the monitoring plan in registered PDD is as per the applied methodology except the frequency of calibration (accuracy checks) of the electricity meters. For details see chapter 3.5.

Our opinion refers to the project's GHG emissions and resulting GHG emission reductions reported both determined due to the valid and registered project's baseline, its monitoring plan and its associated documents.

Based on the information we have seen and evaluated, we confirm the following statement:

Reporting period: From 01-05-2007 to 30-06-2008

Verified emissions in the above reporting period:

|                      |        |                    |
|----------------------|--------|--------------------|
| Baseline emissions:  | 32 242 | t CO <sub>2e</sub> |
| Project emissions:   | 0      | t CO <sub>2e</sub> |
| Leakage emission:    | 0      | t CO <sub>2e</sub> |
| Emission reductions: | 32 242 | t CO <sub>2e</sub> |

Munich, 17-08-2009

A handwritten signature in black ink, appearing to read 'Cuiyun Zhang'.

Cuiyun Zhang  
Deputy head of the Certification Body  
“Climate and Energy”

India, 17-08-2009


A handwritten signature in black ink, appearing to read 'Bratin Roy'.

Bratin Roy  
Assessment Team Leader



Industrie Service


## Annex 1: Verification Protocol

|              |            |  |              |  |
|--------------|------------|--|--------------|--|
| Final Report | 2009-08-17 | Third Periodic Verification of the "Lohgarh , Chakbhai and Sidhana Mini Hydroelectric Projects " Aqua Power Private Limited ,project in Punjab , India | Page 1 of 17 | <br>Industrie Service |
|--------------|------------|--|--------------|--|


## Periodic Verification Checklist

**Table 1: Data Management System/Controls**


| Expectations for GHG data management system/controls                          | Score | Verifiers Comments<br>(including <i>Forward Action Requests</i> )   |
|---|-------|---|
| <b>1. Defined organizational structure, responsibilities and competencies</b> |       |   |
| <b>1.1 Position and roles</b>   | Full  | <p>The company's name has been changed from "Aqua Power Limited" to "Aqua Power Private Limited". As per CDM modalities and procedures, same information has been updated to UNFCCC secretariat and Designated National Authority of India. Management structure of the company remains same. The overall authority of the project is personally supervised by Mr. Amit Modi (Managing Director). Mr. Amit Modi has further selected Mr. Pushminder Singh (Project Manager), who is a graduate engineer to carry out this activity. Mr. Pushminder Singh is assisted by Mr. Anil Jagga ( Maintenance Executive ) and 1 Shift Supervisor and 1 Technical assistant (for each site – Lohgarh ,Chakbhai and Sidhana).</p> <p>Mr. Anil Jagga is an engineer who prepares the report and the same is countersigned &amp; verified by Mr. Pushminder Singh. Mr. Anil Jagga is a graduate electrical engineer (BE Electrical) trained in operation and maintenance of the plant and academically qualified to carry out the task.</p> <p>The allocation of responsibilities is documented in a written form.</p> |
| <b>1.2 Responsibilities</b>   | Full  | <p>The responsibilities are clearly defined as detailed in section 1.1 above.</p>   |

|              |            |  |              |  |
|--------------|------------|--|--------------|--|
| Final Report | 2009-08-17 | Third Periodic Verification of the "Lohgarh , Chakbhai and Sidhana Mini Hydroelectric Projects " Aqua Power Private Limited ,project in Punjab , India | Page 2 of 17 | <br>Industrie Service |
|--------------|------------|--|--------------|--|


| Expectations for GHG data management system/controls | Score   | Verifiers Comments<br>(including <i>Forward Action Requests</i> )   |
|--|---------|---|
| 1.3 Competencies needed                              | Full    | As the project employs qualified and trained engineers, all competencies needed meet the requirements, including that of operating personnel. This has been verified from the training and qualification records of employees   |
| 2. Conformance with monitoring plan                  |         |   |
| 2.1 Reporting procedures                             | Partial | <p>Export &amp; import meter readings are jointly recorded in the joint metering report and net electrical energy exported to the grid is invoiced. This parameter is most significant to determine the emission reductions from the project activity.</p> <p><b><u>Corrective Action Request No.1.</u></b></p> <p>Formula described in the monitoring report page 12 for calculation of the GHG emission reduction is not in line with the registered PDD. Correct it.</p> <p><b><u>Corrective Action Request No.2.</u></b></p> <p>Rated capacity and total no of the turbine for each site of the project activity is not transparently demonstrated in the monitoring report. Include it.</p> <p><b><u>Clarification Request No. 1.</u></b></p> <p>In the month of August 2007 chakbhai unit generation was more than the rated capacity of turbine. Clarify the same.</p> <p><b><u>Clarification Request No. 2.</u></b></p> <p>Electricity generation in the month of October 2007 &amp; April 2008 was significantly lower than the rest of monitoring period months. Clarify the same to DOE.</p> <p><b><u>Clarification Request No. 3.</u></b></p> <p>Project activity commissioning has been delayed for Sidhana Unit? Clarify this point in the monitoring report.</p> |

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|--------------|------------|--|--------------|--|
| Final Report | 2009-08-17 | Third Periodic Verification of the "Lohgarh , Chakbhai and Sidhana Mini Hydroelectric Projects " Aqua Power Private Limited ,project in Punjab , India | Page 3 of 17 | <br>Industrie Service |
|--------------|------------|--|--------------|--|


| Expectations for GHG data management system/controls               | Score | Verifiers Comments<br>(including <i>Forward Action Requests</i> )  |
|--|-------|--|
|  |       | <b><u>Clarification Request No. 4.</u></b><br>The monitored emission reductions (32,242 tCO <sub>2</sub> ) are bigger than the estimated ones in the registered PDD (31,454 tCO <sub>2</sub> ; considering the monitoring period). Clarify the reason.   |
| <b>2.2 Necessary Changes</b>                                       | Full  | No change is required in the Monitoring Plan.  |
| <b>3. Application of GHG determination methods</b>                 |       |  |
| <b>3.1 Methods used</b>  | Full  | The calculation procedures reflect the monitoring plan content. Export and import meter readings are jointly recorded in the joint metering report and net electrical energy content exported to the grid is invoiced. This parameter is most significant to determine the emission reductions from the project activity.<br>See section 2.1 |
| <b>3.2 Information/process flow</b>                                | Full  | The necessary procedures have been defined in the power purchase agreement and additional internal documents relevant for the determination of the electricity exported to the grid.   |
| <b>3.3 Data transfer</b>   | Full  | See Chapter 3.2.   |
| <b>3.4 Data trails</b>   | Full  | See Chapter 3.2.   |
| <b>4. Identification and maintenance of key process parameters</b> |       |  |

|              |            |  |              |  |
|--------------|------------|--|--------------|--|
| Final Report | 2009-08-17 | Third Periodic Verification of the "Lohgarh , Chakbhai and Sidhana Mini Hydroelectric Projects " Aqua Power Private Limited ,project in Punjab , India | Page 4 of 17 | <br>Industrie Service |
|--------------|------------|--|--------------|--|

| Expectations for GHG data management system/controls | Score   | Verifiers Comments<br>(including <i>Forward Action Requests</i> )  |
|--|---------|--|
| 4.1 Identification of key parameters                 | Full    | The critical parameter for the determination of GHG emissions is the net amount of electricity exported to grid, which is based on the electricity exported and imported. Export and import of electricity are measured by calibrated meters.  |
| 4.2 Calibration/maintenance                          | Partial | <p>The registered PDD states that the energy meters for measuring the electricity exported and imported by the project activity would be checked for accuracy every six months.</p> <p><b><u>Corrective Action Request No.3.</u></b><br/>Mention all calibration date of main meters during present monitoring period of the project activity in page 14 (meter details) of the monitoring report.</p> <p><b><u>Forward Action Request No.1.</u></b><br/>Though main meter has not been changed in any of the sites of project activity, main, check, gross and auxiliary meters are needed to be calibrated in six month frequency to ensure the accuracy of the data measurement in event of failure of any meter.</p> |
| 5. GHG Calculations                                  |         |  |
| 5.1 Use of estimates and default data                | Full    | The carbon emission factor is used as a predetermined default value, which has been defined in the PDD and confirmed during validation of the project. The same was in line with the methodology AMS ID, version 07.   |


|              |            |  |              |  |
|--------------|------------|--|--------------|--|
| Final Report | 2009-08-17 | Third Periodic Verification of the "Lohgarh , Chakbhai and Sidhana Mini Hydroelectric Projects " Aqua Power Private Limited ,project in Punjab , India | Page 5 of 17 | <br>Industrie Service |
|--------------|------------|--|--------------|--|

| Expectations for GHG data management system/controls | Score   | Verifiers Comments<br>(including <i>Forward Action Requests</i> )  |
|--|---------|--|
| <b>5.2 Guidance on checks and reviews</b>            | Full    | <p>No CDM specific internal audits are required as such because the monitoring and measurement of power exports and imports are done diligently every month as core business of the company, and hence a permanent control of the figures in joint meter readings as well as invoices raised takes place.</p> <p>Quality assurance procedures are in place as for example the joint meter reports and respective billings are reviewed for accuracy and correctness by a staff member before submission. Staffs are made aware of the quality assurance procedures.</p>  |
| <b>5.3 Internal validation and verification</b>      | Partial | <p>No CDM specific internal audits are required as such because the monitoring and measurement of power exports and imports are done diligently every month as core business of the company and hence a permanent control of the figures in joint meter readings as well as invoices raised takes place.</p> <p>Quality assurance procedures are in place as for example the joint meter reports and respective billings are reviewed for accuracy and correctness by a staff member before submission. Staff is made aware of the quality assurance procedures.</p> <p>The audit team did verify the following parameters:</p> <ul style="list-style-type: none"> <li>• Joint meter recording sheets for each month</li> <li>• Invoices raised for the months,</li> </ul> <p>See section 2.1.</p> |
| <b>5.4 Data protection measures</b>                  | Full    | <p>The key parameters are measured by calibrated meter.</p> <p>All the data are transferred to the Head Office at Noida, India, on monthly basis and kept protected.</p>   |

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|-----------------|------------|--|-----------------|--|
| Final<br>Report | 2009-08-17 | Third Periodic Verification of the “Lohgarh , Chakbhai and Sidhana Mini Hydroelectric Projects ” Aqua Power Private Limited ,project in Punjab , India | Page<br>6 of 17 | <br>Industrie Service |
|-----------------|------------|--|-----------------|--|


| Expectations for GHG data management system/controls | Score | Verifiers Comments<br>(including <i>Forward Action Requests</i> )  |
|--|-------|--|
| 5.5 IT systems                                       | Full  | The IT system is based on standard PC and MS-office solutions.<br>Hence the verification team feels confident about its use. |




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|--------------|------------|--|--------------|--|
| Final Report | 2009-08-17 | Third Periodic Verification of the "Lohgarh , Chakbhai and Sidhana Mini Hydroelectric Projects " Aqua Power Private Limited ,project in Punjab , India | Page 7 of 17 | <br>Industrie Service |
|--------------|------------|--|--------------|--|

**Table 2: GHG calculation procedures and management control testing**

| Identification of potential reporting risk   | Identification, assessment and testing of management controls  | Areas of residual risks  |
|--|--|--|
| <p>Potential reporting risks based on an assessment of the emission estimation procedures can be expected to occur in the following fields of action:</p> <ol style="list-style-type: none"> <li>1. raw data collection</li> <li>2. calculation methods</li> </ol> <p>Key source data applicable to the project assessed are hereby:</p> <ul style="list-style-type: none"> <li>• Joint meter recording sheets for each month</li> <li>• Accounting records (from invoices raised for net electricity export),</li> </ul> <p>Appropriate calibration and maintenance of equipment resulting in a high accuracy of data supplied should be in place.</p> <p>It is hereby needed to focus on those risks that impact the accuracy, completeness and consistency of the reported data. Risks are weakness in the GHG calculation systems and may include:</p> <ul style="list-style-type: none"> <li>➤ manual transfer of data/manual calculations</li> <li>➤ position of metering equipment</li> <li>➤ unclear origins of data</li> <li>➤ accuracy due to technological limitations</li> </ul> | <p>Regarding the potential reporting risks identified in the left column. the following mitigation measures have been observed during the document review and the on site mission:</p> <p>Raw data collection:</p> <p>As the project is hydro power based, the net amount of electricity exported to the grid remains to be the only parameter to be obtained for the GHG calculation.</p> <p>Key source data for this parameter are:</p> <ul style="list-style-type: none"> <li>• Joint meter readings</li> <li>• Invoices</li> </ul> <p>The main meters are installed at inter connection point and check meters at grid substation premises and this is a restricted area. The metering panel for the main meters and the check meters are sealed sheet metal enclosures. The meters are of reputed make in India.</p> <p>The allocation of responsibilities is documented in a written form.</p> <p>The necessary procedures have been defined in the power purchase agreement and additional internal documents relevant for the determination of the net electricity exported to the grid.</p> | <p>The issue remaining is whether frequency of accuracy checks of the meters is as per the registered PDD.</p> |


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|-----------------|------------|--|-----------------|--|
| Final<br>Report | 2009-08-17 | Third Periodic Verification of the "Lohgarh , Chakbhai and Sidhana Mini Hydroelectric Projects " Aqua Power Private Limited ,project in Punjab , India | Page<br>8 of 17 | <br>Industrie Service |
|-----------------|------------|--|-----------------|--|

| Identification of potential reporting risk | Identification, assessment and testing of management controls                      | Areas of residual risks |
|--|--|-------------------------|
|  | Calculation methods:<br>The calculation procedures reflect the monitoring content. |                         |

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|--------------|------------|--|--------------|--|
| Final Report | 2009-08-17 | Third Periodic Verification of the "Lohgarh , Chakbhai and Sidhana Mini Hydroelectric Projects " Aqua Power Private Limited ,project in Punjab , India | Page 9 of 17 | <br>Industrie Service |
|--------------|------------|--|--------------|--|


**Table 3: Detailed audit testing of residual risk areas and random testing**

| Areas of residual risks   | Additional verification testing performed  | Conclusions and Areas Requiring Improvement (including <i>Forward Action Requests</i> )  |
|---|--|--|
| The issue remaining is whether frequency of accuracy checks of the meters is as per the registered PDD. | There has been a complete check of data transferred from readings and invoices to the calculation tool. There was no error in such transfer. | <p>Having investigated the residual risks, the audit team comes to the following conclusion:</p> <p>Immediate action is needed with respect to the following issues in the monitoring report with reference to the registered PDD.</p> <p><b><u>Corrective Action Request No.1.</u></b><br/>Formula described in the monitoring report page 12 for calculation of the GHG emission reduction is not in line with the registered PDD. Correct it.</p> <p><b><u>Corrective Action Request No.2.</u></b><br/>Rated capacity and total no of the turbine for each site of the project activity is not transparently demonstrated in the monitoring report. Include it.</p> <p><b><u>Corrective Action Request No.3.</u></b><br/>Mention all calibration date of main meters during present monitoring period of the project activity in page 14 (meter details) of the monitoring report.</p> <p><b><u>Clarification Request No. 1.</u></b><br/>In month of August 2007 chakbhai unit generation was more than the rated capacity of turbine. Clarify the same.</p> <p><b><u>Clarification Request No. 2.</u></b><br/>Electricity generation in the month of October 2007 &amp; April 2008 was significantly lower than the rest of monitoring period months. Clarify the same to DOE.</p> <p><b><u>Clarification Request No. 3.</u></b><br/>Project activity commissioning has been delayed for Sidhana unit Clarify this point in the monitoring report.</p> |


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|--------------|------------|--|---------------|--|
| Final Report | 2009-08-17 | Third Periodic Verification of the "Lohgarh , Chakbhai and Sidhana Mini Hydroelectric Projects " Aqua Power Private Limited ,project in Punjab , India | Page 10 of 17 | <br>Industrie Service |
|--------------|------------|--|---------------|--|

| Areas of residual risks | Additional verification testing performed | Conclusions and Areas Requiring Improvement (including <i>Forward Action Requests</i> )  |
|-------------------------|---|--|
|                         |   | <p><b><u>Clarification Request No. 4.</u></b><br/>The monitored emission reductions (32,242 tCO<sub>2</sub>) are bigger than the estimated ones in the registered PDD (31,454 tCO<sub>2</sub>; considering the monitoring period). Clarify the reason.</p> <p><b><u>Forward Action Request No.1.</u></b><br/>Though main meter has not been changed in any of the sites of project activity, main, check, gross and auxiliary meters are needed to be calibrated in six month frequency to ensure the accuracy of the data measurement in event of failure of any meter.</p> |




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|--------------|------------|--|---------------|--|
| Final Report | 2009-08-17 | Third Periodic Verification of the "Lohgarh , Chakbhai and Sidhana Mini Hydroelectric Projects " Aqua Power Private Limited ,project in Punjab , India | Page 12 of 17 | <br>Industrie Service |
|--------------|------------|--|---------------|--|

| Draft report corrective and forward action requests by audit team | Summary of project owner response  |                                   |             |   | Audit team conclusion  |
|---|--|-----------------------------------|-------------|---|--|
|   |  | (6 months from Last Calibration ) | Calibration | days from due date                                | Chakbhai site shows that frequency of calibration were not carried out with in the six months as required by the monitoring plan of registered PDD.<br>For both the above cases, project proponent has now applied a deduction based on the maximum inaccuracy specification of the meters as per the EB guidance, ( <a href="http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_J359UPI4G71PM1_QMIVS81FHIEJKYFE">http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_J359UPI4G71PM1_QMIVS81FHIEJKYFE</a> ) which is in this case (±) 0.5% of export and import energy units and based on this recalculated energy units emission reduction in all sites of the project activity. Same calculation should be transparently defined in the revised monitoring report and excel sheet also.<br><b>Response by audit team:</b><br>Still last calibration date of main and check meter before 01/06/2007 at |
|   | Lohgarh  | 10 Apr, 07                        | 01 June, 07 | 50days ( 30 days of the currenmonito ring period) |  |
|   | Lohgarh  | 01 Dec, 07                        | 15 Jan, 08  | 45 days   |  |
|   | Lohgarh  | 15 July, 08                       | 16 July, 08 | Nil   |  |
|   | Chakbhai   | 24 Aug, 07                        | 09 Oct, 07  | 47 days   |  |
|   | Chakbhai   | 09 Apr, 08                        | 28 June, 08 | 80 days   |  |
|   | Sidhana  | 04 June, 07                       | 19 Aug, 08  | Current Monitoring Period                         |  |
|   | 3. The project proponent based on EB guidelines has applied a corrective action based on the maximum accuracy specification of the meter i.e. Emission reduction has been recalculated after giving a effect of (±) 0.5% of the export and |                                   |             |   |  |


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|--------------|------------|--|---------------|--|
| Final Report | 2009-08-17 | Third Periodic Verification of the "Lohgarh , Chakbhai and Sidhana Mini Hydroelectric Projects " Aqua Power Private Limited ,project in Punjab , India | Page 13 of 17 | <br>Industrie Service |
|--------------|------------|--|---------------|--|

| Draft report corrective and forward action requests by audit team   | Summary of project owner response   | Audit team conclusion   |        |             |   |              |  |             |   |  |
|---|---|---|--------|-------------|---|--------------|--|-------------|---|--|
|   | <p>import for the period tabulated below:</p> <table><tr><th>Name of the site</th><th>Period</th></tr><tr><td>MHP Lohgarh</td><td>May 2007, December 2007 and January 2008.</td></tr><tr><td>MHP Chakbhai</td><td>August 2007 to October 2007 and April 2008 to June 2008.</td></tr><tr><td>MHP Sidhana</td><td>October 2007 to June 2008.(Plant Commissioned on 25<sup>th</sup> October 2007)</td></tr></table> <p><b><u>Response by project proponent:</u></b></p> <p>Necessary inclusions have been made in the revised Monitoring Report.</p> | Name of the site  | Period | MHP Lohgarh | May 2007, December 2007 and January 2008. | MHP Chakbhai | August 2007 to October 2007 and April 2008 to June 2008. | MHP Sidhana | October 2007 to June 2008.(Plant Commissioned on 25 <sup>th</sup> October 2007) | <p>Lohgarh site have not mentioned. Also, last calibration date of main and check meter before 09/10/2007 at chakbhai site and 19/08/2008 at sidhana site need to be mentioned in the monitoring report.</p> <p><b><u>Final response by audit team:</u></b></p> <p>last calibration date of main and check meter before 01/06/2007 at Lohgarh site and last calibration date of main and check meter before 09/10/2007 at chakbhai site and 19/08/2008 at sidhana site have now mentioned.</p> <p>This issue is now resolved<br/><input checked="" type="checkbox"/></p> |
| Name of the site  | Period  |   |        |             |   |              |  |             |   |  |
| MHP Lohgarh   | May 2007, December 2007 and January 2008.   |   |        |             |   |              |  |             |   |  |
| MHP Chakbhai  | August 2007 to October 2007 and April 2008 to June 2008.  |   |        |             |   |              |  |             |   |  |
| MHP Sidhana   | October 2007 to June 2008.(Plant Commissioned on 25 <sup>th</sup> October 2007)   |   |        |             |   |              |  |             |   |  |
| <p><b><u>Clarification Request No. 1.</u></b></p> <p>In the month of August 2007, chakbhai unit generation was more than the rated capacity of turbine. Clarify the same.</p> | <ol style="list-style-type: none"><li>1. The rated capacity of machines of MHP Chakbhai is 2 X 1000 KW with 15% continuous overload (Proof of 15% continuous overload in the form of agreement with supplier is attached as Annex-4).</li><li>2. The gross generation at 100% PLF and at 115% PLF is 1.48 million units and 1.71 million units respectively.</li><li>3. The gross generation in the month of August 2007 is 1.50 million units, which is exceeding the 100% PLF by 1.35% but</li></ol>  | <p>The gross generation can be possible at Chakbhai 1.48 million (2*1000*24*31) units.</p> <p>However, during the month of August 2007 generation was 1.5 million units which mean project activity was operated 1.35% additional loading from its designed</p> |        |             |   |              |  |             |   |  |


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|--------------|------------|--|---------------|--|
| Final Report | 2009-08-17 | Third Periodic Verification of the "Lohgarh , Chakbhai and Sidhana Mini Hydroelectric Projects " Aqua Power Private Limited ,project in Punjab , India | Page 14 of 17 | <br>Industrie Service |
|--------------|------------|--|---------------|--|

| Draft report corrective and forward action requests by audit team  | Summary of project owner response  | Audit team conclusion   |
|--|--|---|
|  | <p>it is with in the limit of 115% PLF (□dmissible overload capacity).</p> <p>4. The generation of the machine depends on the availability of Water and Head. In the month of August 2007, the water availability was more than the Design Discharge and the design of the Turbine is such that it can be operated continuously at 15% overload therefore the generation has exceeded the 100% PLF but it is well within the limits of 115% PLF.</p> | <p>generation capacity. Project proponent has submitted purchase agreement of turbine where it is stated that system can be operated at 15% of continuous overload from its rated generation capacity. This means that project activity could generate power from turbo-generator set of 2MW+15% (i.e 2.3 MW).</p> <p>As in August month water availability was more therefore power plant was operated 1.35 % more than its rated generation capacity but didn't not cross the maximum contractual generation capacity i.e. 2.3 MW (It is including 15% extra overloading capacity from its designed capacity).<br/> <input checked="" type="checkbox"/></p> |
| <p><b>Clarification Request No. 2.</b></p> <p>Electricity generation in the month of October 2007 &amp; April 2008 was significantly lower than the rest of monitoring period months. Clarify the same to DOE.</p> | <p>During the monitoring period under review, the electricity generation during the month of October 2007 and April 2008 of all sites of project activity was significantly lower than the rest of the month due to the planned canal closure during these months. The copy of log book has already been provided.</p>   | <p>According to the submitted plant records, it is now clear that due to planned canal closure for few days in the month of October 2007 &amp;</p>  |




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|--------------|------------|--|---------------|--|
| Final Report | 2009-08-17 | Third Periodic Verification of the "Lohgarh , Chakbhai and Sidhana Mini Hydroelectric Projects " Aqua Power Private Limited ,project in Punjab , India | Page 15 of 17 | <br>Industrie Service |
|--------------|------------|--|---------------|--|

| Draft report corrective and forward action requests by audit team   | Summary of project owner response   | Audit team conclusion  |
|---|---|--|
|   |   | <p>April 2008, the electricity generation was significantly less than the rest of the monitoring period months.</p> <p><input checked="" type="checkbox"/></p>   |
| <p><b><u>Clarification Request No. 3.</u></b><br/>Project activity commissioning has been delayed for Sidhana unit Clarify this point in the monitoring report.</p> | <p>As mentioned in the second monitoring report that the MHP Sidhana units was delayed due to un-availability of canal closure for completing the In-canal works and additional time period required for the strengthening / raising of canal banks and remodeling of one village road bridge and one foot road bridge.</p> | <p>Due to un-availability of canal closure for completing the In-canal works and additional time period required for the strengthening / raising of canal banks and remodeling of one village road bridge and one foot road bridge, sidhana unit commissioning of the project activity has been delayed. DOE has cross checked the same with plant records. This issue is now resolved.</p> <p><input checked="" type="checkbox"/></p> |
| <p><b><u>Clarification Request No. 4.</u></b><br/>The monitored emission reductions (32,242</p>   | <p>As per the registered Project Design Document (PDD) the project activity had envisaged emission reductions of 82965, 108167 &amp;</p>  | <p>As PLF of the present monitoring period of the</p>  |

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|--------------|------------|--|---------------|--|
| Final Report | 2009-08-17 | Third Periodic Verification of the "Lohgarh , Chakbhai and Sidhana Mini Hydroelectric Projects " Aqua Power Private Limited ,project in Punjab , India | Page 16 of 17 | <br>Industrie Service |
|--------------|------------|--|---------------|--|

| Draft report corrective and forward action requests by audit team  | Summary of project owner response  | Audit team conclusion  |
|--|--|--|
| tCO <sub>2</sub> ) are bigger than the estimated ones in the registered PDD (31,454 tCO <sub>2</sub> ; considering the monitoring period). Clarify the reason. | <p>62334 tCO<sub>2</sub> (Total 253467 tCO<sub>2</sub>) over a period of 9, 10 &amp; 9 years respectively for MHP Lohgarh, MHP Chakbhai &amp; MHP Sidhana based on the generation of 87.99, 114.72 &amp; 66.11 million kWh units. In consideration of the above, the project activity would result into total emission reduction of 26961 tCO<sub>2</sub> based on generation of 9.78, 11.47 &amp; 7.35 million kWh units over a period of 12 months respectively for MHP Lohgarh, MHP Chakbhai &amp; MHP Sidhana.</p> <p>During the current monitoring period the project activity has resulted into a total emission of 32242 tCO<sub>2</sub> based on the generation of 15.81, 13.40 &amp; 5.09 million kWh units for MHP Lohgarh, MHP Chakbhai &amp; MHP Sidhana respectively.</p> <p>The higher generation during the current period as comparing with the generation envisaged in the registered PDD resulted into higher emission reductions during the current monitoring period are due to the following reasons:</p> <ol style="list-style-type: none"> <li>1. The current monitoring period under review is of 14 months (1st May 2007 to 30th June 2008). By taking into the consideration the current monitoring period, the project activity was had been resulted into a total emission of 31454 tCO<sub>2</sub> (26961/12 months*14 months) as per the registered PDD.</li> <li>2. During the current monitoring period the project activity has achieved better energy generation, which has resulted into higher emissions of 32242 tCO<sub>2</sub> as against 31454 tCO<sub>2</sub> units of carbon emissions envisaged in the PDD due to the fact that estimated emissions reductions calculated in the PDD at the time of registration were based on PLF of 56%,</li> </ol> | <p>project activity was more than the PLF as calculated from the PDD the emission reductions from the current moniotring period were also bigger than the estimated ones in the registered PDD.</p> <p><input checked="" type="checkbox"/></p> |


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|--------------|------------|--|---------------|--|
| Final Report | 2009-08-17 | Third Periodic Verification of the "Lohgarh , Chakbhai and Sidhana Mini Hydroelectric Projects " Aqua Power Private Limited ,project in Punjab , India | Page 17 of 17 | <br>Industrie Service |
|--------------|------------|--|---------------|--|

| Draft report corrective and forward action requests by audit team  | Summary of project owner response  | Audit team conclusion   |
|--|--|---|
|  | 65% & 70% (average 63%) respectively for MHP Lohgarh, MHP Chakbhai & MHP Sidhana. However, during the current monitoring period the site at MHP Lohgarh, MHP Chakbhai & MHP Sidhana has achieved a PLF of 77%, 66% & 65% (average 70%) respectively due the better water availability in the canal. The PLF calculation as envisaged at the time of registration of PDD and actual PLF achieved is attached in the CERs calculation sheet. |   |
| <b>Forward Action Request No.1.</b><br>Though main meter has not been changed in any of the sites of project activity, main, check, gross and auxiliary meters are needed to be calibrated in six month frequency to ensure the accuracy of the data measurement in event of failure of any meter. | The requirement will be met in future.   | This issue is pending and will be checked at the time of next periodic verification.<br><input checked="" type="checkbox"/> |



## Annex 2: Information Reference List



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|-------------------------|--|----------------|--|
| Final Report 2009-08-17 | Third Periodic Verification of the "Lohgarh , Chakbhai and Sidhana Mini Hydroelectric Projects " Aqua Power Private Limited ,project in Punjab , India<br>Information Reference List | Page<br>2 of 2 | <br>Industrie Service |
|-------------------------|--|----------------|--|

| Reference No. | Document or Type of Information   |
|---------------|---|
|               | submitted September 2008  |
| 10            | Sample copy of comparison of main and check meter for Lohgarh ,Chakbhai and Sidhana units for the period of May 07 to June 08, submitted September 2008   |
| 11            | Consent to operate certificate for water and air consent from state pollution control board for Lohgarh ,Chakbhai and Sidhana units, submitted September 2008   |
| 12            | Revised Host country Approval, dated 06.05.2008, submitted September 2008   |
| 13            | Canal closure evidence, dated nil, submitted September 2008   |
| 14            | Outages records for Lohgarh ,Chakbhai and Sidhana units for the period of May 07 to June 08, submitted September 2008   |
| 15            | Extract copy of purchase order on generation capacity of turbine, dated nil, submitted January 6, 2009  |
| 16            | Final Monitoring Report for "Lohgarh, Chakbhai and Sidhana Mini Hydroelectric Projects", Reference no. UNFCCC 00000327-CDMP, for the period May 1, 2007 to June 30, 2008, version 02, submitted January 6, 2009                 |
| 17            | Final emission reduction excel sheet for the period May 1, 2007 to June 30, 2008 of the project activity, dated nil, submitted January 2009   |
| 18            | Verification Report of the 2 <sup>nd</sup> periodic verification for "Lohgarh, Chakbhai and Sidhana Mini Hydroelectric Projects", Reference no. UNFCCC 00000327-CDMP, report no.1001746, dated 12.03.2008, revision.01, TUV SUD |