

**SECOND MONITORING REPORT**

**DATED 4<sup>th</sup> MAY, 2007**

**FOR THE PERIOD**

**01<sup>ST</sup> APRIL 2006 TO 30<sup>TH</sup> APRIL 2007**

**“Lohgarh, Chakbhai and Sidhana Mini Hydroelectric Projects”**

**Aqua Power Limited**

**Reference No.UNFCCC00000327 - CDMP**

**Project Location:**

**Bhatinda Branch Canal, District Sangrur,  
Punjab, India”**

**Aqua Power Limited**

**B-37, Sector-1, Noida – 201301**

**Uttar Pradesh, India**

**Fax No. 91-0120-2443723**



### Current Status of the Project

There Mini Hydroelectric Power projects aggregating to 5.20 MW at Lohgarh, Chakbhai and Sidhana on the Bhatinda Branch canal, District Sangrur, Punjab, India are being set-up. Mini Hydroelectric Project at Lohgarh (2MW) was commissioned in October 2005 and at Chakbhai (2MW) was commissioned in November 2004. The plants are operating successfully. The Mini Hydroelectric project at Sidhana (1.2MW) is under construction.

The major equipments have been supplied by reputed contractors as under:

S.No.	MHP	Equipment	Qty	Supplier
1	Lohgarh	Turbine & its accessories	2	Boving Fouress Limited, Bangalore
		Induction Generator	2	
2	Chakbhai	Turbine & its accessories	2	Boving Fouress Limited, Bangalore
		Induction Generator	2	
3	Sidhana	Turbine & its accessories	1	Boving Fouress Limited, Bangalore
		Induction Generator	1	

The Company provided the entire equity and loan was taken from consortium of banks viz. Canara Bank, UTI Bank and Corporation Bank.

During the present monitoring period i.e. 01st April 2006 to 30th April 2007, the two (2) Plants under operation achieved net energy generation of 24.17 Million kWh.



## **Statement to What Extent the Project has been Implemented as Planned**

The projects were completed as planned and described in the Project Design Document (PDD)

The project at Lohgarh (2MW) is in operation continuously (with outages – forced & planned) since October 2005, Chakbhai (2MW) is in operation since November 2004 and Sidhana (1.2MW) is under construction.

The purpose of the projects is to generate electricity by utilizing water flowing through the existing canal system.



## **Monitoring Period**

This is the second monitoring report associated with the project activity. The previous monitoring report covered the period from 20/11/2004 to 31/3/2006 (Both days included) and the CERs for the same have already been issued.

The period covered in this monitoring report is from 01/04/2006 to 30/04/2007 (Both days included). This monitoring report does not cover any period of time covered by the previous monitoring report.

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## **Sustainability – Economic and Social Well-being**

The project activity has resulted in sustainable development in the region as follows:

1. Generating clean power by utilizing water has helped in eliminating an equivalent carbon dioxide, sulphur dioxide, nitrogen oxides, SPM *etc.* which would have been otherwise generated to produce electricity.
2. Power generation from a renewable source like water has helped to substitute & conserve considerable amount of finite, non-renewable energy resource (coal & natural gas).
3. Project activity has resulted in creation of direct and in-direct employment in the vicinity.
4. Additional economic benefits have accrued by creation of business opportunity for local stakeholders such as villagers, local shop owners, small contractors, schools, hospitals, etc.
5. Project Area has been lighted with road reflectors and flash lights 24 hours a day which has provided security for the local people commuting in odd hours.
6. Project activity has contributed its share in reducing the demand-supply gap in the power deficit state of Punjab.
7. Helped in Up-gradation of old rural grids and strengthening of country's rural electrification coverage.
8. Helped in strengthening of existing irrigation canals, bridges, roads by up-gradation of these structures.
9. Mechanical Trash racks and trash cleaning machines helped remove trash in the canal resulting in flow of clean water in the canal for irrigation and drinking purposes.
10. Project activity serves a small demonstrative project for clean renewable energy generation in the state. (As these projects are being the first private sector small hydropower projects in the state)
11. Project activity would also contribute to the state exchequer.



## **Obtained Parameters According to Monitoring Plan**

For the project, following parameters were monitored on a continuous basis.

### **Energy:**

- i. Electronic energy meters installed for measuring the gross power generation (export) as well as auxiliary power consumption (import) at the grid interconnection point for all 3 schemes.
- ii. Hourly data recording of the relevant parameters and also the recording of total energy generated for every 8 (eight) hours shift.
- iii. Daily readings were aggregated to monthly readings.
- iv. Monthly reports stating the gross auxiliary and net energy exported were prepared by shift-in-charge and verified by plant managers.
- v. Monthly joint meter readings are taken at interconnection point and certified by representatives of Aqua Power Limited (APL) and the purchaser i.e. Punjab State Electricity Board (PSEB).
- vi. The joint meter readings are used to raise invoice for sale of net energy to PSEB.
- vii. The finance department cross checks the data provided by plant managers.



**Power Generation:**

Month-wise data on Net Power Exported and Net Emission Reductions is given below for the monitoring period:

As mentioned in the Project Design Document, Emission reductions are calculated based on the power exported to the grid minus power imported from the grid during shut-down and start-ups by the power plant.

Billing Month	Year	Net Power Exported (kwh)				Baseline Emission Factor (tCO <sub>2</sub> /MWh)	Baseline Emissions (tCO <sub>2</sub> )
		Lohgarh	Chakbhai	Sidhan a	Total		
April	2006	832510	1056050	0	<b>1888560</b>	0.942	1779.02
May	2006	1009690	1170180	0	<b>2179870</b>	0.942	2053.44
June	2006	1184930	1432360	0	<b>2617290</b>	0.942	2465.49
July	2006	1202480	1419990	0	<b>2622470</b>	0.942	2470.37
August	2006	1278150	1520810	0	<b>2798960</b>	0.942	2636.62
September	2006	941440	1121760	0	<b>2063200</b>	0.942	1943.53
October	2006	555260	635080	0	<b>1190340</b>	0.942	1121.30
November	2006	709140	857590	0	<b>1566730</b>	0.942	1475.86
December	2006	537220	648150	0	<b>1185370</b>	0.942	1116.62
January	2007	703770	815820	0	<b>1519590</b>	0.942	1431.45
February	2007	430730	528490	0	<b>959220</b>	0.942	903.59
March	2007	826600	953090	0	<b>1779690</b>	0.942	1676.47
April	2007	834600	968660	0	<b>1803260</b>	0.942	1698.67
<b>TOTAL</b>		<b>11046520</b>	<b>13128030</b>	<b>0</b>	<b>24174550</b>		<b>22772.43</b>



## Emission Reductions

### Baseline Emissions:

Carbon Emission Factor as per the baseline adopted ( $\text{kg CO}_2/\text{kWh}$ ) – 0.942

Net energy exported ( $\text{kWh}$ ) – 24174550

Baseline emissions ( $\text{ton CO}_2$ ) – 22772.43

**Project Emissions:** NIL

### Emission Reductions:

Baseline emissions – Project emissions

= 22772.43 - NIL

= **22772 tCO<sub>2</sub>**





## Measures to Ensure the Results/Uncertainty Analysis

As per the Power Purchase Agreement (PPA), the energy exported to Punjab State Electricity Board (PSEB) is recorded from two independent set of meters – Main Meters and Check Meters. Reading of Main Meter is used for arriving at the figures of power exported after deducting auxiliary power.

In the event, the Main Meter is not in operation, then reading from Check Meter installed at the grid substation of PSEB is used for billing. Till date the main meter only has been used for billing purposes.

The calibration of monitoring equipment is being maintained as per the requirement of PSEB and the same is being done regularly. Power Generation, Export & Auxiliary Consumption are being recorded daily and the same is being verified by Plant Incharge. Since the hourly data logging is carried out along with daily reporting, the uncertainty level of the monitored data used for calculating emission reductions is low. The accuracy of the meters gets further automatically checked at the time of joint meter reading which is being taken every month by PSEB.

The following table indicated the details of Main Meter including their accuracy levels and calibration dates for all 3 plants:

Description	Lohgarh	Chakbhai	Sidhana
Type	Electronic Bidirectional Trivector Meter	Electronic Bidirectional Trivector Meter	Electronic Bidirectional Trivector Meter
S.No.	4223075	4187462	4223080
Capacity; CT Ratio	200/5 A; 200/5 A M.F. - 1	200/5 A; 200/5 A M.F. - 1	125/5 A; 200/5 A M.F. - 1.6
Accuracy level	( $\pm$ ) 0.50%	( $\pm$ ) 0.50%	( $\pm$ ) 0.50%



Make	L&T	L&T	L&T
Date of Calibration	10/2005	24/02/2007	Not Applicable; The plant is under construction
Calibration Authority	ME Lab Patiala (PSEB) / L&T	PSEB Meter Mobile Testing Squad (MMTS), Patiala	
Accuracy Level observed during calibration	Within permissible limits	(+) 0.05%	

#### **Installation of Meters:**

These meters have been installed in a temper proof strong steel compartment sealed at every open end. These compartments are again being kept under a completely closed & locked Meter Room made of RCC. The area where the meter room is located is completely fenced and protected by a barbed wire.

#### **Calibration of Meters:**

At the time of installation of the meters, the accuracy and other parameters are checked thoroughly by the manufacturer i.e. L&T and a test report is issued by L&T. The Meters are also checked for accuracy by PSEB Metering Equipment (ME) Laboratory, Patiala before installation at the site. The Meters which are within the permissible accuracy limits are jointly sealed by 2 officers of the rank of Sr. XEN (One from Sr. Ex. Engr., ME Division, Patiala and second from Sr. Ex. Engr., MMTS, Patiala).

Calibration of the Meters already in operation is carried out at site by PSEB Meter Mobile Testing Squad (MMTS), Patiala. The MMTS officer visits the site and issue a challan in respect to the confirmation of the accuracy of the meters. The date of calibration and signature of officer is indicated on the challan. These challans are laminated by a cellophane material and pasted as a seal on to the Meter Box itself.



In the event, the officer observes any fault in the meter, then the same is being replaced by the officer and a spare tested meter is installed. The faulty meter is then sent to the PSEB Metering Equipment (ME) Laboratory, Patiala wherein the same is tested and a test report is generated. The meter is again reinstalled by the engineer at the site.

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## **Roles and Responsibilities**

APL was the sole agency responsible for implementation and monitoring plan given above.

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