



Voluntary Carbon Standard Version 2007

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Fourth Verification Report of '300 MW Hydro Power Project of JHPL'.	Mr. H.B. Muralidhar
Client:	Project Title:
Jaiprakash Power Ventures Limited	300 MW Hydro Power Project of JHPL
Summary:	
Bureau Veritas Certification has conducted the fourth verification of the '300 MW Hydro Power Project of JHPL' project of Jai Prakash Power Ventures Limited, located at Kuppa in Himachal Pradesh State, India on the basis of Voluntary Carbon Standard 2007 for the period starting from 1st March 2010 to 31st August 2010. The verification scope is defined as a periodic independent review and ex post determination by the Designated Operational Entity of the monitored reductions in GHG emissions during defined verification period, and consisted of the following three phases: i) desk review of the project design and the baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final verification report and opinion. The overall verification, from Contract Review to Verification Report & Opinion, was conducted using Bureau Veritas Certification internal procedures. In summary, Bureau Veritas Certification confirms that the project is implemented as planned and described in validated and registered VCS Project Document (PD). Installed equipments being essential for generating emission reduction in the project activity run reliably and the monitoring instruments are calibrated appropriately as per the frequency specified in the registered VCS PD.	
Work carried out by:	Number of pages:
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Abbreviations

VCU:	Voluntary Carbon Unit
BMS:	Bureau Veritas Certification's Management System
CAR:	Corrective Action Request
FAR:	Forward Action Request
CO ₂ :	Carbon Dioxide
tCO ₂ :	Tonnes of Carbon Dioxide
DOE:	Designated Operational Entity
DG:	Diesel Generator
DR:	Document Review
GHG:	Green House Gases
I:	Interview
IETA:	International Emissions Trading Association
MV:	Means of Verification
MP:	Monitoring Plan
MR:	Monitoring Report
NEWNE:	North-East-West-North-East
NGO:	Non-Governmental Organisation
PD:	Project Document
PP:	Project Participant
UNFCCC:	United Nations Framework Convention for Climate Change
MU:	Million Units
MW:	Megawatt
HPSEB:	Himachal Pradesh State Electricity Board.
PPA:	Power Purchase Agreement
JMR:	Joint Meter Reading
VR:	Verification Report

1 Introduction

1.1 Objective

Verification is the periodic independent review and ex-post determination by the verifier of the monitored reductions in GHG emissions during defined verification period.

This is the fourth verification of the project activity. The objective of the verification is

1. To verify that the project is implemented as stated in the registered VCS PD,
2. To confirm that the monitoring system is in place and fully functional,
3. To assure that the project has generated verifiable emission reductions.

The verification shall consider both qualitative and quantitative information on emission reductions. Quantitative data comprises the monitoring reports submitted by the project entity to the verifier. Qualitative data comprises information on internal management controls, calculation procedures, frequency of emission reports, and review of calculations.

1.2 Scope and Criteria

The verification scope is defined as an independent and objective review of the VCS Project Document (PD), the project's baseline study and monitoring plan, including the monitored data and other relevant documents. The verification follows VCS 2007 criteria and latest policy announcements, from VSC Board, presently applicable to the verification of project activity.

The verification is not meant to provide any consulting towards the Client. However, stated requests for forward actions and/or corrective actions may provide input for improvement of the project monitoring towards reductions in the GHG emissions.

The verification team was provided with a monitoring report, covering the period 01st March 2010 to 31st August 2010. Based on this documentation, a document review and an on-site audit (from 28/09/2010 to 29/09/2010) was conducted. The Monitoring Report - Version 1.1, dated 23/10/2010 covering the period 01st March 2010 to 31st August 2010 serves as the basis for the assessment presented herewith.

1.3 VCS project Description

The project is a run-of-the-river hydroelectric power plant with an installed capacity of 300 MW. The diversion barrage of the project is located across river Baspa, at Kuppa in Himachal Pradesh. The powerhouse is located at Karcham village in Kinnaur District.

The project activity is an initiative of Jaiprakash Power Ventures Limited, a part of the Jaypee Group. Jaypee is a well-known business group of India and had entered into agreement with State Government of Himachal Pradesh to implement the project. The purpose of the project activity is to generate renewable electricity from hydropower and sell it to Himachal Pradesh State Electricity Board (HPSEB).

1.4 Level of Assurance

Based on the process and procedures conducted, it can be concluded that the GHG Assertion

- is materially correct and is a fair representation of GHG data and information, and
- has been prepared in accordance with the VCS 2007 standard.

At the beginning of the verification process related to the project's GHG assertion, the level of assurance was sought by the verification team and the client. The verification team considers the assurance level as 'limited' since some of the data used (e.g. Emission Factors) in the verification process are from the publicly available databases such as the CEA database for emission factor, for which detailed testing of the GHG assertions is beyond the domain of the project proponent, stake holders and the verification team.

2 Methodology

The verification process included a desk review and field visit in September 2010 including discussions and interviews with the project proponents and their consultants. The verification protocol utilized for this verification was as per the requirements defined in the VCS protocol. In order to ensure transparency, a verification protocol is used as part of the verification. The protocol provides to the verification team, in a transparent manner, the criteria (requirements), means of verification and the results from verifying the identified criteria. The verification protocol serves the following purposes:

- It organises, details and clarifies the requirements the project is expected to meet; and
- It ensures a transparent verification process wherein the verifier will document how a particular requirement has been verified and the result of the verification.

The verification protocol is summarized in section 6 of this report as Table 1 and 2.

3 Verification Findings

3.1 Remaining issues, including any material discrepancy, from previous verification

Following FAR was raised in the third verification of the project activity:

"The current verification period is from 1st Sep'2009 to 28th Feb'2010. The Energy meters were calibrated on 7th Jul'2009 i.e. before the verification period. The section 3.3 of the registered PD indicates calibration of energy meters will be done annually. Since, the current verification period is only for six months, the next annual calibration certificate is not available on the date of verification. However, on the basis of annexure A-1 of the JMR's provided by HPSEB, indicates "Reading of Main and Check meters are within permissible class of accuracy". Since HPSEB is a reliable government undertaking, the written assurance in this regards has

been considered authentic by the verification team. However, it needs to be ensured during the subsequent verification that errors, if any found during next annual calibration of energy meters, shall be applied to all the values between the two calibration dates and the VERs be correspondingly adjusted".

The verification team has observed that meter replacement has taken place in the present verification period (on 10th July 2010) and project participant has provided the calibration certificates, available during current verification period (RTL/NR-II/CAL/201011-25/2010, dated 16.07.2010 for meter sr. no. UPU 01762; RTL/NR-II/CAL/201011-24/2010, dated 16.07.2010 for meter sr. no. GEC 04054; RTL/NR-II/CAL/201011-23/2010, dated 16.07.2010 for meter sr. no. GEC 04052; RTL/NR-II/CAL/201011-26/2010, dated 16.07.2010 for meter sr. no. UPU 01763).

The verification team reviewed the calibration certificates and found the energy meters within their permissible class of accuracy (0.2) except meter serial no. UPU 01762. Hence, the verification team raised a clarification request (Refer to CL 1 in the Verification Protocol in section C of this report). On the basis of the response from project participant for clarification request (CL 1), the verification team observed that a remark specified in the calibration certificate (RTL/NR-II/CAL/201011-26/2010, dated 16.07.2010 for meter sr. no. UPU 01762) states that "the errors found for the meter are within the specified limit of IEC 62053-22". Secondly, it was also noted that errors, shown in the calibration certificate of the energy meter UPU 01762, are in the range of 2% and 1% current load (amp.). It was further noted by the verification team that the project participant has applied the maximum permissible error of the energy meters (0.2%) on both export and import side in the applicable monitoring periods of meter usage (July 2008 to July 2009). This adjustment in export and import has always brought the baseline emissions and emission reductions on the lower side. Hence, no adjustment required for the previously issued VCUs on the basis of

the energy meter calibration results provided in current verification period (1st March 2010 to 31st August 2010).

Taking above points into consideration, the verification team closed the clarification request (CL 1- raised in current verification period) and Forward Action request (FAR 1- raised in 3rd verification period).

3.2 Project Implementation

It has been observed during site visit that the project activity consists of renewable electricity generation from three Pelton turbines with installed capacity of 100 MW each. The electricity is generated at 13.8 kV and supplied to Jhakri sub-station after stepping up to 400kV through two transmission lines. The tri-vector main and check meters of 0.2 accuracy class are located at Jhakri sub-station and record the electricity that is imported/exported to the NEWNE grid. The meter reading is taken on 1st day of each month in the presence of the representatives of project participant and HPSEB. In addition, grid electricity import also takes place from a separate 22 kV line to the project site and an energy meter is located at HPSEB sub-station to monitor the grid electricity import from the 22 kV line. The HPSEB generates monthly invoice to the project participant against the grid electricity import from the 22 kV line.

The project participant has installed two D.G. sets of 625 KVA each for the back up purpose. The project participant has also stored SF₆ gas in five cylinders at site in case of requirements of filling of SF₆ gas in the switchgear assembly. It has been observed that the project participant has bought a new Digital Pressure Indicator (a hand held instrument for the monitoring of SF₆ pressure in the switchgear assembly) and the new instrument will be used for the monitoring of SF₆ pressure in the switchgear assembly during subsequent monitoring period as per the monitoring frequency specified in the registered VCS PD. The project participant has provided the details of the new DPI instrument in section 7.1.4 of the monitoring report and submitted the calibration certificate of the same.

The document review and subsequent physical verification carried out on 28th & 29th September 2010 confirmed that project proponent has implemented the project activity as per the description provided in the registered VCS PD and the equipments, specified in the registered PDD are in place and operational. The ownership of the project activity also remains with Jaiparkash Power Ventures Limited (JPVL) only.

3.3 Completeness of Monitoring

The verification report is based on the observations/discussions during the site visit and the monitoring report submitted by the Project Proponent, Version 1.1 dated 23/10/2010. The monitoring methodology used for the project activity is as per the methodology ACM 0002, Version 8. The title of the monitoring methodology is "Consolidated monitoring methodology for grid connected electricity generation from renewable sources".

The parameter to be monitored for calculation of emission reductions is the "net electricity supplied to the grid by the project activity".

Emission Reductions:

The following algorithm calculates the emission reductions,

$$ER_y = BE_y - PE_{y1} - PE_{y2} - PE_{y3} - L_y$$

The emission factor is calculated based on the "Tool to calculate the emission factor for an electricity system" Version 1.1, as indicated in the approved methodology ACM 0002, Version 8. Since the project activity would supply electricity to NEWNE grid, the value of the grid emission factor, utilized for the project activity, is based on the version 4 of the CEA (Central Electricity Authority) CO₂ database for the NEWNE grid.

The grid emission factor, calculated on the basis of the combined margin is 0.805 tCO₂/MWh and is fixed ex-ante.

The electricity generated by the project activity is supplied to the substation located at Jhakri through two transmission lines of 400 KV each. The substation is owned and operated by the HPSEB. Each of these transmission lines consists of a main meter and a check meter. The meters are tri-vector meters of 0.2 accuracy class. The net electricity supplied to the grid by the project activity is calculated based on 100% measured values of electricity export and import (export-import). Based on the readings of the main meters, a monthly statement "Joint Meter Reading (JMR) for energy received at Jhakri from Baspa II Hydro Electric Project (3*100 MW)" is generated by HPSEB.

The main and check meters are under control of state electricity utility (HPSEB) and HPSEB is the responsible entity for the calibration of main and check meters. The calibration frequency is on annual basis. It was observed from the JMR that main and check meters for both the lines were calibrated in July 2010. The project proponent has provided the calibration certificates for main and check meters (for July 2010). The details on the same has been discussed in section 3.1 above.

Apart from the system of monitoring the net electricity supplied to the grid by the project activity, there is also a monitoring system in the control room of the powerhouse of the project activity wherein monitoring of the data on a real time basis is also done.

The monitoring period is from 1st March 2010 to 31st August 2010, both days inclusive, as indicated in the monitoring report.

Baseline emissions:

The net electricity supplied to the grid by the project activity was monitored by means of metering arrangements on the 400 kV lines from the project activity site to the Jhakri sub-station.

The meters are capable of monitoring the exports as well as imports from and to the project activity. The difference between the total exports and the total imports is the net electricity export by the project activity to the grid.

The net electricity supplied to the grid by the project activity was also crosschecked with the invoices for energy sale raised by the project participant for the respective months of the verification period. It was observed that the net electricity supplied to the grid values are taken from the JMR (which is used for the emission reduction calculations) were same as delivered energy claimed in the invoices raised by the project participant.

- During site visit, the verification team physically verified all the energy meters and found that the installed meters were of the same specifications and accuracy class as stated in the VCS-PD
- Each month, HPSEB issues a document titled "Annex A -1" to the project participant, along with the JMR. The Annex A-1 of the JMR is used by HPSEB for the purpose of comparison of main and check meter readings. It was noted by the verification team that Annex A-1 of JMR, in a brief remark, certifies that "Reading of Main and Check meters are within permissible class of accuracy", for every month in the current monitoring period (1st March 2010 to 31st August 2010). Since HPSEB is a reliable Government entity, the remark on the Annex A-1 JMR has been considered authentic by the verification team.

Although the Annex A-1 records available from the HPSEB (A Government entity) certify that the main and check meters were functioning within their permissible class of accuracy for each month for present monitoring period, the project participant deducted the export values by 0.2% while at the same time increasing the import values by 0.2%.

The said percentage corresponds to the specified error limit of the main and check meters and a calculation of the net energy exports arrived at in such a manner would be on the conservative side. However, the results of calibration of the main and check meters at a future date may indicate error in any of the meters beyond the permissible limit of 0.2%. Hence, the verification team has also raised a Forward Action Request (Refer to FAR 1 in the Verification Protocol in section 6 of this report) which requires that errors, if found would also be applied to the monitored values within the current verification period and that a corresponding adjustment also be made in the VCU's that have been claimed in the current monitoring period. The project participant has also provided a response acquiescing to the same.

Project emissions:

The project participant monitored the following sources of Project emissions in the project activity:

- a. Emissions due to operation of two DG sets of 625 KVA each (PEy1):

Monitoring of the diesel consumed in these DG sets is done on a daily basis. The consumption of diesel is recorded in a daily logbook, which is common for both the DG sets. The diesel tanks for the DG sets have been provided with a graduated level tube on which the start and end level readings of the diesel inside the tank can be taken. The diesel consumption in DG set is calculated taking the difference between the measured initial and final level readings of the level tube.

The project emissions for the verification period have been calculated based on the quantity of diesel consumed (in litres), density of diesel and the emission factor as per the IPCC default values. The values of density of the diesel (0.860 kg/litre) and EF_{diesel} (3.186tCO₂/tonne) taken for the calculation of project emissions due to diesel are based on IPCC published data.

The verification team during the site visit has crosschecked the data provided to them with the daily logbook and confirms that there is no discrepancy in the readings.

b. Electricity imports from the grid to meet the daily electricity requirements at the project site (PE_{y2}):

Electricity is imported into the project activity through the 22 kV line to meet the daily power needs of the project activity. The metering of this electricity import is done through a separate energy meter. The meter located at 22kV line is HPSEB (a govt. entity) property and HPSEB is responsible for the calibration of the meter. The verification team has observed during site visit that the meter installed to measure grid import on the 22 kV line is of 0.5 accuracy class with a multiplication factor of 2000. The HPSEB generates monthly invoice for the electricity import from 22kV line and the HPSEB invoices from 1st March 2010 to 31st Aug. 2010 (current monitoring period) have been referred to by verification team to crosscheck the electricity import from 22 kV line.

c. Leakage of SF₆ Gas (PE_{y3}):

There is storage of SF₆ at site, in cylinders (5 number of cylinders in total), which is used as top-up material in the switchgear assembly, in case of any loss of SF₆. It is only in the event of leakage of the SF₆ gas that the stored SF₆ would be needed to top up the quantity leaked. The project participant has regularly inspected and maintained the records of the pressure of SF₆ gas in the feeders, breakers and bays as per the description stated in the registered VCS PD.

For the purpose of monitoring, the quantity of SF₆ gas that could be required for top up filling, an electronic balance has also been procured, which can measure the weight of the 5 SF₆ cylinders.

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From the monthly records of SF₆ gas pressure monitoring and the records of weighment of the SF₆ gas cylinders it was observed by the verification team that no abnormal situations of SF₆ pressure drop necessitating top up filling had arisen during the verification period.

Cylinder No	Weight of SF₆ in cylinder on 04/12/2009	Weight of SF₆ in cylinder on 09/09/2010
	Kg	kg
1	592.2	592.2
2	39.4	39.4
3	38.4	38.4
4	41.7	41.7
5	41.8	41.8
Total	753.5	753.5

The verification team cross checked the physical stock of SF₆ quantity in the cylinders taken on 04/12/2009 and on 09/09/2010 (i.e. before and after the current monitoring period), which reveals that there is no consumption from the stock.

Therefore, it could be confirmed that there had been no leakage of SF₆ gas during this period and hence the project emissions due to SF₆ leakage were Nil. The verification team found from records maintained that the monitoring instruments that were used, viz., the Digital Pressure Indicator (DPI) and the electronic weighing balance had been calibrated by the project participant as per the frequency intervals specified in the monitoring plan of the registered VCS PD.

Overall, the verification team confirms that the project participant has monitored all the parameters necessary for the monitoring of baseline and project emissions during the verification period. The monitoring of these parameters has been carried out as per the requirements of the monitoring specified in the methodology chosen for this project. Also, the data obtained as a result of the monitoring is accurate and reliable for the purpose of correct computation of the emission reductions.

3.4 Accuracy of Emission Reduction Calculations

Project participant provided the spreadsheet versions of calculations of emission reductions, project emissions and leakage, including the algorithms used in the calculations. The spreadsheet contains a detailed calculation of the baseline emissions, project emissions and leakage emissions. The leakage emissions were Nil in the current monitoring period.

The default data used in the emission reduction calculations is the grid emission factor. The value of the grid emission factor 0.805 tCO₂e, fixed ex-ante for the project activity, is taken from the version 4 of the publicly available CO₂ database of the Central Electricity Authority (CEA) and the same is considered to be appropriate by the verification team.

3.5 Quality of Evidence to Determine Emission Reductions

The critical parameters used for the determination of emission reductions are a) the Joint Meter Readings (JMRs) for determining the power export to the grid, b) project emissions due to the use of diesel for operation of the Diesel Generator sets, c) the electricity imports for use at the project site to meet the daily electricity requirements and d) the project emissions owing to leakage due to the use of SF₆.

The data pertaining to the above-mentioned parameters are maintained in identified records for the entire monitoring period. All the data is in compliance with the figures stated in the monitoring report. For the current verification period (from 1st March 2010 to 31st August 2010), the monthly records of alarm conditions due to pressure drop of SF₆ gas in the breaker, feeder or bays indicated that no abnormal conditions had arisen during that period.

Moreover, it was observed during site visit that stored quantity of SF₆ (kept in five cylinders at project site) did not change during the current verification period. Hence, it was concluded by the verification team that the available evidence related to monitoring of SF₆ gas leakage was sufficient for the purpose of estimation of the project emissions occurred.

3.6 Management and Operational System

The organizational structure includes site shift-in-charges, involved in the day-to-day operations of the plant. They are also responsible for the preparation of daily reports. Site supervisors are responsible for checking the reliability of data and also monthly report preparation. Staff (Officers & Technicians) at the Power plant were found to be competent. All the collated data are reviewed by the senior management at site and also by the top management at Head Office.

4 Verification conclusion

The verification scope is as an independent and objective review of the VCS project description document, the project's baseline study and monitoring plan and other relevant documents. The review is to verify the implementation of the monitoring plan as defined in the VCS PD.

The period for the verification is from 1st March 2010 to 31st August 2010 (including both days). The verification of the monitoring data indicate that total amount of emission reductions for the monitoring period (after rounding off monthly emission reductions to the lower value) to be 746,235 tCO₂ equivalent.

Considering the emission reductions computation the cumulatively achieved VCUs (after rounding off monthly emission reductions to the lower value) have the figure of 746,235 tCO₂, from 01/03/2010 to 31/08/2010 (including both days) .

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The calculations of emission reductions are found to be correct. The baseline for the northern (NEWNE) grid has been taken for arriving at emission reductions due to the project activity. The grid emission factor of 0.805 tCO₂/MWh was found to be correct.

Appropriate procedures for maintaining the confidentiality and safe custody of the validation or verification documentation and for retaining them for a period sufficient to meet the needs of the client, the responsible parties, the GHG programmes to which they subscribe, and in accordance with legal and professional requirements of record retention have been established.

The verification team confirms that the project is implemented as planned and described in the VCS PD. The reporting procedures reflect the content of the monitoring plan. The monitoring mechanism is effective and reliable. The reported data are accurate and correct based on all the records provided to the verification team during the verification. The installed equipment being essential for generating the emission reductions run reliably and the monitoring equipment is calibrated appropriately.

Reporting period: From 01/03/2010 to 31/08/2010
(including both days)

Voluntary Carbon Units during the reporting period are as follows:

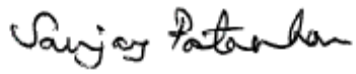
Project emissions:	4079	t CO ₂ equivalents
Baseline emissions:	750317	t CO ₂ equivalents
Emission reductions:	746,235	t CO ₂ equivalents

The reporting period has been split into four parts and the Voluntary Carbon Units (VCUs) are as follows:

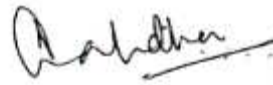
- From 01/03/2010 to 15/06/2010: 283124 tCO₂e VCUs
- From 16/06/2010 to 30/06/2010: 81737 tCO₂e VCUs
- From 01/07/2010 to 31/07/2010: 194439 tCO₂e VCUs
- From 01/08/2010 to 31/08/2010: 186935 tCO₂e VCUs

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The Voluntary Carbon Units between 01/03/2010 to 31/08/2010 have been split into four parts.



Sanjay Patankar
Team Leader



H.B. Muralidhar
Internal Technical Reviewer

5 Reference documents

1. Monitoring report version 1.1 dt. 23/10/2010
2. Emission reduction calculation sheet
3. JMR's for the Months March 2010 to August 2010
4. Invoices rose by the project proponent for the period March 2010 to August 2010
5. Energy meter calibration certificate No. RTL/NR-II/CAL/200910-037/2009.
6. Energy meter calibration certificate No. RTL/NR-II/CAL/200910-038/2009
7. Energy meter calibration certificate No. RTL/NR-II/CAL/200910-035/2009
8. Energy meter calibration certificate No. RTL/NR-II/CAL/200910-036/2009
9. Energy meter calibration certificate No. RTL/NR-II/CAL/201011-23/2010, dated 16.07.2010
10. Energy meter calibration certificate No. RTL/NR-II/CAL/201011-24/2010, dated 16.07.2010
11. Energy meter calibration certificate No. RTL/NR-II/CAL/201011-25/2010, dated 16.07.2010
12. Energy meter calibration certificate No. RTL/NR-II/CAL/201011-26/2010, dated 16.07.2010
13. Electronic balance calibration certificate no. 0450467
14. Monthly HPSEB invoices for 22 kV line import from 1st March 2010 to 31st August 2010
15. DPI calibration certificate No. QLC/CAL/10/032064 dated 09/09/2010
16. DPI calibration certificate dated 6th May 2009
17. Daily Monitoring Report of SF₆ Gas pressure
18. Log book weighing record of SF₆ gas cylinder

6 Verification Protocol

TABLE 1 VERIFICATION REQUIREMENTS

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
1 Project implementation in accordance with the registered project design document					
It is assessed if the VCS project activity has been implemented and operated as per the registered PDD					
a Are all physical features of the proposed VCS project activity, proposed in the registered PD, in place?			The project activity is a grid connected hydro power with 3 x 100 MW Pelton turbines generating power at 13.8 KV. The generated power is further stepped up to 400 KV and evacuated by two circuits to the Jhakri substation. There are two standby DG sets of 625 KVA each in the project activity. The verification team observed that the project activity has been implemented in line with the registered VCS PD with regard to the technology involved, project equipments, monitoring and measuring instruments.	OK	OK
b Have the project participants operated the proposed VCS project activity as per the registered PD?			The project participant has operated the VCS project activity as per the description provided in the registered VCS PD.	OK	OK
c Is the proposed VCS project implemented against the description in the PD?			The project participant has operated the VCS project activity as per the description provided in the registered VCS PD.	OK	OK
d Was an on-site visit conducted?			Yes. The onsite visit was conducted from 28/09/2010 to 29/09/2010 by a three member team.	OK	OK
e If not, justify the rationale of the decision.			The onsite visit was conducted from 28/09/2010 to 29/09/2010 by a three member team.	OK	OK

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
2 Compliance of the monitoring plan with the monitoring methodology					
It is assessed if the monitoring plan of the proposed VCS project activity is in accordance with the applied methodology					
a Is the validated monitoring plan in accordance with the approved methodology applied by the proposed VCS project activity?			The validated monitoring plan of the project activity is based on previously approved CDM methodology ACM 0002, version 8, "Consolidated baseline methodology for grid-connected electricity generation from renewable sources".	OK	OK
b If no, was a request for revision of the monitoring plan was done? (The DOE may request for revision of the monitoring plan covering the monitoring period under verification, for approval by the Board)			The validated monitoring plan, adopted in the project activity is as per the requirements of the methodology ACM 0002 version 8. Hence, request for the revision of the monitoring plan was not carried out.	OK	OK
c Are there any monitoring aspects of the project activity that are not specified in the methodology, particularly in the case of small-scale methodologies (e.g. additional monitoring parameters, monitoring frequency and calibration frequency)?			There are some additional parameters besides the requirement of the methodology ACM 0002 and have been already identified in the validated monitoring plan. As per requirements of the validated monitoring plan (based on large scale CDM methodology ACM 0002, version 8), following additional parameters needs to be monitored: 1) QSF6 –Quantity of SF6 loss during the year 2) PBAY VT , PBREAKER & Pfeeder : Pressure of SF6 gas in the breaker, bay and feeder. 3) Qdiesel –Quantity of diesel consumed in the DG sets 4) E22 kV – Electricity imports from the 22kV line.	OK	OK

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			These parameters, although not specified by the methodology for the project activity, were required to be monitored by the project participant in order to calculate the emissions arising as a result of the project activity.		
3 Compliance of monitoring with the monitoring plan					
It is assessed if monitoring of reductions in GHG emissions to result from the proposed VCS project activity is implemented in accordance with the monitoring plan contained in the registered PDD or the accepted revised monitoring plan					
a Have the monitoring plan and the applied methodology been properly implemented and followed by the project participants?			The monitoring plan and the applied methodology ACM 0002 have been properly implemented and followed by the project participants.	OK	OK
b Have all parameters stated in the monitoring plan, the applied methodology and relevant VCS Board decisions been sufficiently monitored and updated as applicable, including:					
i Project emission parameters?			The project emission parameters stated in the monitoring plan are: 2) QSF6 –Quantity of SF6 loss during the year 3) PBAY VT , PBREAKER & Pfeeder : Pressure of SF6 gas in the breaker, bay and feeder. 4) Qdiesel –Quantity of diesel consumed in the running of D.G. sets. 5) E22 kV – Electricity imports from the 22kV line. The above parameters are sufficiently monitored	OK	OK

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			and updated as per the validated monitoring plan stated in the registered VCS PD.		
ii Baseline emission parameters?			The baseline parameter to be monitored is the “Net Electricity supplied to the grid by the project activity during the year y”. It is monitored continuously with monthly recording in the presence of SEB (State Electricity Board) officials and the PP representative as per the monitoring plan.	OK	OK
iii Leakage parameters?			There are no leakages associated with the project activity. Hence this is not applicable.	OK	OK
iv Management and operational system: the responsibilities and authorities for monitoring and reporting are in accordance with the responsibilities and authorities stated in the monitoring plan?			The management and operational staff structure assigned towards performing duties at the project activity site, is in accordance with that envisaged in the VCS-PD monitoring plan. The personnel interviewed were having adequate knowledge and experience in the management and operations of the hydro-power plant.	OK	OK
c Is the accuracy of equipment used for monitoring in accordance with the relevant guidance provided by the VCS Board and are equipment controlled and calibrated in accordance with the monitoring plan?					
i Are monitoring results consistently recorded as per approved frequency?			Yes, the monitoring results have been recorded consistently as per the approved frequency.	OK	OK
ii Have quality assurance and quality control procedures been applied in accordance with the monitoring plan ?			During the previous verification, a forward action request was raised, requiring the calibration results of the main and check meters replaced in the month of July 2009 to be checked. Accordingly, the verification team has checked the test reports (dated 16.07.2010) for the following meters :	CL 1	

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			-GEC 04052 -GEC 04054 -UPU 01762 -UPU 01763 It is observed that the error in case of meter no. UPU 01762 is upto 0.40 % in the import & export directions at 2% and 1% current load test range. The error observed exceeds the permissible error for class 0.2 meters. The project proponent is requested to explain how this error should be accounted for in relation to the import and export values for the second verification period. The main and check meters on Line 1 and Line 2 at the Jhakri sub-station were replaced on 10th July 2010 by a fresh set of already calibrated meters. It is understood that the replaced meters would be undergoing calibration not before July 2011. Hence, the results of the calibration that will be carried out for these meters at such future date needs to be verified in order to confirm the accuracy of readings reported during the present verification period. The meters in question are bearing the following serial numbers : -UPU 01237 -UPU 01235 -UPU 01238 -UPU 01236	FAR-1	

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
4 Assessment of data and calculation of greenhouse gas emission reductions					
It is assessed if GHG emission reductions achieved by / resulting from the proposed VCS project activity are calculated applying the selected methodology					
a Is a complete set of data for the specified monitoring period available? (If no, i.e., only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, the DOE shall opt to either make the most conservative assumption theoretically possible in finalizing the verification report, or raise a request for deviation if appropriate).			The project participant has provided the complete dataset for the current monitoring period from 1 st March 2010 to 31 st Aug. 2010 for the purpose of the verification of emission reductions achieved by the project activity.	OK	OK
b Has information provided in the monitoring report been cross-checked with other sources such as plant log books, inventories, purchase records, laboratory analysis?			The information provided in the monitoring report has been cross-checked by the following: a. The net electricity supplied by the project activity to the grid has been cross-checked with the invoices raised for sold electricity to HPSEB. b. The grid electricity import data from 22kV line have been cross-checked against the invoices raised by HPSEB (state electricity grid) to the project participant c. The Quantity of SF6 loss, which is zero for the period 1st March 2010 to 31st Aug. 10. The	OK	OK

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			same has been verified during site visit by cross-checking the physical stock of SF6 quantity in the cylinders taken on 04/12/2009 and on 09/09/2010 (i.e before and after the current monitoring period), which reveals that there is no consumption from the stock. d. SF6 loss was further crosschecked with the daily alarm logsheet. There is an alarm system for monitoring of the pressure drop in bay, breaker and bus coupler compartments filled with SF6 gas. If there is pressure drop (from the prescribed limit) in any of the compartment, it triggers an alarm in the DCS of the plant. The PP maintains daily log of the alarm. It has been crosschecked that for the current monitoring period from 1st March 2010 to 31st Aug. 2010, there was no incident of tripping of the alarm. e. The Diesel consumption for the current monitoring period from 1st March 2010 to 31st Aug. 2010 has been crosschecked with the daily diesel consumption records maintained in DG set Log book.		
c Have calculations of baseline emissions, proposed VCS project activity emissions and leakage, as appropriate, been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology document?			The calculations of baseline, project emissions have been carried out in accordance with the formulae and methods described in the registered monitoring plan and methodology ACM 0002 version 8.	OK	OK
d Have any assumptions used in emission calculations been justified?			No assumptions are involved in calculation of emission reductions.	OK	OK

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
e Have appropriate emission factors, IPCC default values and other reference values been correctly applied?			The project participant has used grid emission factor (0.805 tCO ₂ /MWh) for the purpose of calculation of baseline emissions. The grid emission factor has been determined ex ante and the value of 0.805tCO ₂ /MWh as specified in registered VCS PD, has been used by the project participant.	OK	OK

TABLE 2 RESOLUTION OF CORRECTIVE ACTION / FORWARD ACTION / CLARIFICATION REQUESTS.

Draft report clarifications and corrective action requests by verification team	Reference to checklist question in Periodic Verification Checklist	Summary of project owner response	Verification team conclusion
CL 1 During the previous verification, a forward action request was raised, requiring the calibration results of the main and check meters replaced in the month of July 2009 to be checked. Accordingly, the verification team has checked the test reports (dated 16.07.2010) for the following meters : -GEC 04052 -GEC 04054 -UPU 01762 -UPU 01763 It is observed that the error in case of meter no. UPU 01762 is upto 0.40 % in the import & export directions at 2% and 1% current load test range. The error observed exceeds the permissible error for class 0.2 meters. The project proponent is requested to explain how this error should be accounted for in relation to the import and export values for the second verification period.	Table 1 3.c.ii	As indicated in the calibration certificates- different combinations of power factor and % load have different expected error values. This meter is still within its error limits for the combination of power factor and load percentage- as certified by the testing agency in the calibration certificate. In any case the check meter does not show any such error. As a conservative estimate- 0.2% electricity was deducted from net electricity exported and added to the net electricity imported during the verification period being referred to. Also the invoices raised for the electricity were based on the JMRs these were acceptable to the government body. It is the PP's opinion that no accounting is required since: 1) The meter is within its limit of error as certified by the calibrating agency. 2) The check meter for the same	The test certificate for the said meter UPU 01762, though specifying the error as 0.40%, also states in the remarks that <i>“the errors found for the meter are within the specified limit of IEC 62053-22”</i>. The IEC 62053 is an international standard applying to Electricity metering equipment (a.c.) of which part 22 relates to static meters for active energy of class 0.2s and 0.5s. As the test certificate is issued by Power Grid Corporation of India which is a Government of India undertaking, the same can be treated as a reliable and authentic testimonial. Besides, the project proponent has already accounted for the meter error corresponding to 0.2% in the second periodic verification for the periods Oct 2008 to Feb 2009 and March 2009 to Aug 2009, by decreasing the

Draft report clarifications and corrective action requests by verification team	Reference to checklist question in Periodic Verification Checklist	Summary of project owner response	Verification team conclusion
		line does not show such an error.	export values by 0.2% and increasing the import values by 0.2%. This has resulted in a conservative computation of the emission reductions. As the error in the meter has been reasonably addressed during the preceding verification itself, the verification team considers the actions taken by project proponent to be sufficient and any further adjustment for the same is not necessary. In view of the same, CL-1 is closed.
FAR 1 The main and check meters on Line 1 and Line 2 at the Jhakri sub-station were replaced on 10th July 2010 by a fresh set of already calibrated meters. It is understood that the replaced meters would be undergoing calibration not before July 2011. Hence, the results of the calibration that will be carried out for these meters at such future date needs to be verified in order to confirm the accuracy of	Table 1 3.c.ii	The meters: -UPU 01237 -UPU 01235 -UPU 01238 -UPU 01236 Will be calibrated in July 2011, and results of the calibration will be made available to the DOE.	The calibration results for the meters referred to should be examined by the verifying DOE during the subsequent verification period and errors observed, if any, would have to be adjusted against the emission reductions claimed during that particular verification.

Draft report clarifications and corrective action requests by verification team	Reference to checklist question in Periodic Verification Checklist	Summary of project owner response	Verification team conclusion
readings reported during the present verification period. The meters in question are bearing the following serial numbers : -UPU 01237 -UPU 01235 -UPU 01238 -UPU 01236			