

SEVENTH VERIFICATION REPORT OF '300 MW HYDRO POWER PROJECT OF JHPL'



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Summary:

Bureau Veritas Certification has conducted the seventh 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 3.2 for the period starting from 1st January 2012 to 30th June 2012. The project activity is a 300 MW Hydro-electric project located across river Baspa in Himachal Pradesh, India. The project activity supplies electricity to the state electricity utility (Himachal Pradesh State Electricity Board).

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 registered project document including the baseline and the monitoring plan;
- ii) Physical site inspection and follow-up interviews with project stakeholders;
- iii) Resolution of outstanding issues and the issuance of the final verification report including verification opinion.

The overall verification, from Contract Review to Verification Report & Opinion, was conducted using Bureau Veritas Certification internal procedures. On the basis of the physical site inspection of the project activity and review of the documents submitted by the project participant, the Bureau Veritas Certification confirms that, for the current verification period from 1st January 2012 to 30th June 2012, the project has been implemented as planned and described in the registered project document. The necessary equipments, installed for generating emission reductions in the project activity, runs reliably and the measuring equipments, essential for the measurement of the electricity from the power plant, have been calibrated appropriately. This verification report pertains to the seventh periodic monitoring period starting from 1st January 2012 to 30th June 2012 (including both days). All the Clarification Requests (CL) and Corrective Action Request (CAR) have been successfully closed by the verification team based on the satisfactory response from the project participant. The verification team confirms that total GHG reductions achieved during the seventh periodic verification from 1st January 2012 to 30th June 2012 (including both days) are 3,43,852 tCO₂e and that emission reductions are calculated without material misstatements.

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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 seventh periodic verification of the project activity '300 MW Hydro Power Project of JHPL'. The objective of the verification is:

- i. To verify that the project activity is implemented as per the description contained in the registered VCS PD.
- ii. To confirm that the monitoring system is in place and fully functional,
- iii. To assure that the project has generated verifiable emission reductions.

The verification process considers both qualitative and quantitative information on emission reductions. Quantitative data comprises the monitoring reports, emission reduction spreadsheet and sources of input values to the monitoring report submitted by the project entity to the verification team. Qualitative data comprises information on internal management controls, calculation procedures, and procedures for transfer, frequency of emission reports, review and internal audit of calculations/data transfers.

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 Standard Version 3.0 criteria and latest policy announcements, from VCS 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 1st Jan 2012 to 30th June 2012. Based on this documentation, a document review was conducted. The Monitoring Report – Version 03, dated 27/09/2012 covering the period of 1st Jan 2012 to 30th June 2012 serves the basis for the verification assessment presented herewith.

1.3 Level of assurance

Verification is a requirement for all VCS projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of emission reductions. Based on the process and procedure conducted, it can be concluded that the GHG assertion is materially correct and is a fair representation of GHG data and information which has been prepared in accordance with the VCS Standard 3.0 for the current verification period. The verification team considers the assurance level as 'limited' since some of the data used (E.g.

Emission factor) are from the publicly available databases such as the IPCC database, CEA database for emission factor of the grid, for which detailed testing of GHG assertion is beyond the domain of project proponent, stake holder and the verification team.

1.4 Summary Description of the Project

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). The project participant has also installed two DG sets of 625kVA capacity at the project site which are used by the project participant in case of the exigency. 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 electricity generated by the project activity is stepped up to 400 kV and is evacuated by two circuits of 400 kV lines from the power station to Jhakri substation, which is about 55 Km from the site. The continuous monitoring, hourly measurement and monthly recording of the electricity supplied to the grid and supplied from the grid to the project activity is carried out on both the circuits of the 400kV lines by a set of main and check electronic tri-vector meters of 0.2 accuracy class. The recording of the net electricity supplied to the grid is carried out jointly on monthly basis by the representatives of HPSEB and project participant and a monthly JMR (Joint Meter Reading) Report is issued jointly by the HPSEB representatives and the representatives of the project participant.

2 VALIDATION PROCESS, FINDINGS AND CONCLUSION

2.1 Validation Process

Not applicable as the project activity has already been validated as per the VCS 2007.1 Standard.

2.2 Validation Findings

2.2.1 Gap Validation

Not applicable as the project activity has already been validated as per the VCS 2007.1 Standard.

2.2.2 Methodology Deviations

Not applicable as the project activity has already been validated as per the VCS 2007.1 Standard. The validation report of the project activity was also reviewed and it was observed that no methodology deviations have been sought during the validation of the project activity.

2.2.3 New Project Activity Instances

The project activity is not a grouped project.

2.3 Validation Conclusion

Not applicable as the project activity has already been validated as per the VCS 2007.1 Standard. This report pertains to the seventh periodic verification period of the project activity which starts from 1st Jan 2012 to 30th June 2012.

3 VERIFICATION PROCESS

3.1 Method and Criteria

The overall verification, beginning from the Contract Review to Verification report, certification statement & opinion, was conducted using Bureau Veritas Certification internal procedures. The project is already validated and registered as a VCS project with the registry (Project ID 92). The verification criteria followed by the project participant is based on the VCS Standard 3.0. The verification process consists of following activities:

- i) *Desk review of the registered project document including the baseline and the monitoring plan;*

This process consists of the review of the current and previously approved documents related to the project activity including validation report, registered Project Document (PD), and previously approved monitoring report and the verification report. The current documents include the Monitoring report for the current verification period emission reduction spreadsheet and other supporting documents (JMR, data log sheets, calibration certificates, invoices etc.) pertaining to the current verification period.

- ii) *Physical site inspection and follow-up interviews with project stakeholders;*

The second step involves the physical site visit to ensure that project activity is being implemented and operated as per the project description contained in the registered PD. The activity also includes the follow-up interviews with the various plant personals involved in the operation of the project activity.

- iii) *Resolution of outstanding issues and the issuance of the final verification report including verification opinion*

The third step involves the resolution of the CAR/CL raised. Verification process also includes raising the requests for corrective actions and clarification and any other outstanding issues that needed to be clarified for Bureau Veritas Certification before conclusion on the GHG emission reduction calculation.

Findings established during the initial verification could either be seen as a non-fulfilment of criteria ensuring the proper implementation of a project or where a risk to deliver high quality emission reductions is identified. Corrective Action Requests (CAR) is issued, where:

- Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient;

- Mistakes have been made in applying assumptions, data or calculations of emission reductions, which will impair the estimate of emission reductions;
- Issues identified in a FAR during validation to be verified during verification have not been resolved by the project participants;
- The verification team may also use the term Clarification Request (CL), if information is insufficient or not clear enough to determine whether the applicable VCS requirements is met.

3.2 Document Review

The verification team has assessed the accuracy of the project description through a combination of steps consisting of review of contract related to the project activity, Scrutiny of technical specification and interview of the project proponent and their representatives. Following supporting documents were reviewed for the current verification period:

- Registered PD, Validation Report, previously approved Monitoring Report and the previous Verification Report of the project activity.
- Monitoring report and emission reduction spreadsheet for the current verification period.
- Monthly JMR reports, monthly Invoices and calibration certificates of the energy meters pertaining to the current verification period.
- Log books of diesel consumption, invoices of HPSEB for 22 kV line grid import by the project activity.
- Log book records of the weight measurement of the SF₆ gas cylinders stored at the project site and calibration certificates of the Weighing machine.
- Daily alarm log sheets of the SF₆ gas pressure dip, pressure measurement log sheets in various compartments and calibration certificates of the digital pressure indicator.

3.3 Interviews

The verification team from Bureau Veritas Certification conducted interviews with project stakeholders/consultants to confirm selected information and to resolve issues identified in the document review. Representatives of M/s Jaiprakash Power Ventures Ltd. and M/s. Emergent Ventures India Private Limited were interviewed. The main topics of the interviews are summarized in Table below:

Interviewed organization	Interview topics
M/s. Jaiprakash Power Ventures Ltd	- Project description - Operational aspects

	- Monitoring plans and Data recording procedures - QA/ QC Procedures - Internal review / verification mechanism - Emission reduction calculation procedures
M/s. Emergent Ventures India Private Limited	- Monitoring report - Emission reduction calculation procedures

3.4 Site Inspections

This is seventh periodic verification of the project activity. The periodic verification takes place two times in a year and the physical site visit for the immediate earlier verification period carried out by two member verification team took place from 22/03/2012 to 23/03/2012 and the period when site visit conducted, falls under the current verification period.

The verification team reviewed all the records of the sold electricity and the JMR reports (issued by the state electricity utility which is a government entity) for the current verification period (seventh periodic verification) that there is no change in the project design. Hence, the verification team did not carry out separate physical site visit for the current verification period.

3.5 Resolution of Any Material Discrepancy

The project activity is already registered as a VCS project with the registry under the project title '300 MW Hydropower Project by JHPL' and running successfully in accordance with the project design reported in the registered PD. The verification team confirms that there are no remaining issues or any material discrepancy in the project activity as the project is already registered under VCS (Project ID 92). However, certain CAR/CLs were raised by the validation team during the current verification period and discussed under section 4 of the verification report.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The project activity consists of renewable electricity generation from three Pelton wheel 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. A set of main and check meters are installed on both the transmission lines of the project and the energy meters are installed at the power house of the project activity (the location of the energy meters was changed only during the sixth periodic verification of the project activity and accordingly the project participant has reported the deviation in the monitoring report in accordance with section 3.6 of the VCS Standard. In accordance with the section 3.6 of the VCS Standard, "Deviations from the monitoring plan (ie, the procedures for monitoring and measurement) set out in the project description are permitted provided the project remains in compliance with the applied methodology. Monitoring plan deviations shall be described and justified in the monitoring report. Monitoring plan deviations shall be validated at the time of verification and their consequences shall be reported in all subsequent verification reports". As continuous

monitoring, at least hourly measurements and at least monthly recording is being followed for the net electricity being supplied to the project activity (before and after the change in the location of the energy meters). In addition, the data cross-checking procedures, calibration procedures, frequency of calibration and data uncertainty procedures remains same as it was provided in the registered PD. Hence, the verification team confirms that change in the location of the energy meters does not affect the compliance of the project monitoring plan with approved monitoring methodology ACM 0002 version 8.0 and accepted the deviation reported by the project participant.

The meter reading is taken on 1st day of each month in the presence of the representatives of project participant and HPSEB and a JMR report is issued. The JMR reports are duly signed and detailed energy generation statement of the project activity recorded jointly on monthly basis by the HPSEB Superintending Engineer and the Joint Vice President of the company (JPVL). 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 also 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.

The monitoring methodology used for the project activity is ACM 0002, Version 8 (which is an approved monitoring methodology by the CDM Executive Board). The title of the monitoring methodology is "Consolidated monitoring methodology for grid connected electricity generation from renewable sources". The key parameter to be monitored for calculation of emission reductions is the "net electricity supplied to the grid by the project activity". The same is being monitored by the project participant through installation of the main and check meters on the both the 400kV transmission lines of the project activity.

The records of the sold electricity from the project are verified by a government agency and the periodic calibration of the energy meters is also carried out by a government agency (Power Grid Corporation of India). The results of calibration of the energy meters are concluded in accordance with the IEC-62053 which is an internationally traceable energy meter calibration standard published by International Electro-technical Commission (IEC) for Static meters for active energy (classes 0.2S and 0.5S). There are other three monitoring parameters i.e. project emissions from the operations from the DG sets during the exigency, project emissions from the grid import from 22kV line and leakage due to use of SF₆ gas used as an insulation agent in the circuit breakers.

The validation team also confirms that monitoring of all the parameters has been carried out in accordance with the monitoring plan of the registered PD and the equipments used for the measurement have been calibrated appropriately in accordance with the periodic frequency specified in the monitoring plan.

Hence the verification team confirms that both, the project design and the monitoring arrangement of the project activity, are in accordance with the registered Project Document of the project activity.

4.2 Accuracy of GHG Emission Reduction or Removal Calculations

The emission reduction calculations can be explained from the following algorithm:

$$\text{ERy} = \text{BEy} - \text{PEy1} - \text{PEy2} - \text{PEy3} - \text{Ly}$$

Where ERy: Emission reductions accrued during the current verification period

BEy: Baseline emissions for the current monitoring period

PEy1: Project emissions due to operation of two DG sets of 625 kVA during exigency

PEy2: Project emissions from the grid electricity import from separate 22kV line

PEy3: Project emissions due to any leakage of SF₆ being used as a insulating agent in the circuit breakers and bus bar

Ly: Leakage emissions

Baseline emissions (BEy)

The verification team confirms that project participant has computed the baseline emissions in accordance with the guidance provided in the methodology. The net electricity supplied by the project activity to the grid has been multiplied with the NEWNE grid electricity emission factor.

The validation team confirms through the review of the monitoring arrangements and the JMR reports provided by the government entity HPSEB (Himachal Pradesh State Electricity Board) that for the entire current periodic verification, the electricity exported to the grid and imported from the grid was monitored through high accuracy class bi-directional tri-vector energy meters capable of continuous monitoring, hourly measurement. The recording of the data was carried out on monthly basis. This is in accordance with the applied methodology and the monitoring plan of the PD. The net electricity supplied to the grid was also cross-checked by the validation team through the invoices raised by the project participant for the sold electricity.

In the calculation of the baseline emissions, 0.65% transmission loss is being considered by the state electricity utility (HPSEB) as the location of the energy meters is changed from the sub-station of the HPSEB to power house of the project activity. This change in the project design took place in the sixth periodic verification. Hence, the net energy supplied to the grid has been considered after deduction of the 0.65% transmission losses which is conservative and in accordance with the current practice being followed in the project activity after the change in the locations of the energy meters.

In addition, the project participant has also applied 0.2% of the maximum permissible errors (which is the accuracy class of the energy meters) on both import and export side for the conservativeness of the emission reductions as due to the annual calibration frequency, the calibration certificates are not available for the meters after the completion of the monitoring period.

However, the HPSEB (which is a state electricity utility) issues a document titled “Annex A –1” to the project participant, along with the JMR. The Annex A-1 of the JMR is used 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 remark, certifies that “Reading of Main and Check meters are within permissible class of accuracy”, for every month. Since HPSEB is a reliable Government entity, the remark on the Annex A-1 JMR is 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 the conservativeness of the emission reductions, the project participant deducted the export values by 0.2% while at the same time increasing the import values by 0.2% for the present monitoring period. 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.

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

Hence, the validation team confirms that the baseline emissions computed for the current verification are appropriate and conservative and the commutation approach provided under emission reduction spreadsheet is correct. The total baseline emissions for the current verification period from 1st Jan. 2012 to 30th June 2012 (Including both days) are 345255 (rounded down value).

Project emissions from operation of DG sets (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 participant has provided consolidated monthly records for the diesel consumption. Details of the diesel consumption for the current verification period and accrued project emissions from the diesel consumption are provided below:

Month	Diesel consumption	Project Emission (PE _{y1})
	(litres)	(tCO ₂)
Jan 2012	21782	59.682
Feb. 2012	12032	32.967
Mar 2012	15912	43.598
Apr 2102	12291	33.677
May 2012	4685	12.837
June 2012	3147	8.623
Total	69849	191.383

The project emissions for the verification period are calculated by the project participant 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 and have been fixed ex ante.

The verification team has crosschecked the above reported with the diesel consumption records provided by the project participant and confirms that diesel consumption and project emissions reported in the monitoring report are without any material misstatement.

Project emissions due to grid electricity import from the 22kV line (PEy2)

Electricity is also imported to the project through a separate 22 kV line to meet the daily power requirements. The metering of this electricity import is done through a separate energy meter. The meter is located at the HPSEB sub-station on 22kV line. The energy meter is under the property of the HPSEB and HPSEB is responsible for the calibration of the 22kV energy meter. 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 Jan 2012 to 30th June 2012 (current verification period) have been referred to by verification team to crosscheck the electricity import from 22 kV line as provided in the monitoring report of the current verification period.

During the review of the data of the electricity import from the 22kV line, the verification team observed that for the month of January 2012, there is significantly high energy import on 22kV line as compared to other months reported in the monitoring report. Hence, the verification team raised CL 1 on the same. The project participant, with respect to the CL 1, provided response that energy import data was wrongly taken from the another import line of the another project activity of the project participant located in the same area (which is a 1000 MW hydro-electric project: a registered CDM project activity) and also provided the invoices raised by the HPSEB for the project activity and another electricity import line of the 1000 MW project activity. The verification team checked the data with the invoices of the HPSEB and found the correction appropriate. Hence, CL 1 was closed by the verification team.

It was also observed by the verification team that energy import from the 22kV line for the current verification period (from 1st Jan. 2012 to 30th June 2012) was specified as 2539900 kWh in the monitoring report which was not matching with the HPSEB invoices submitted by the project participant. Hence, verification team raised CAR 1 on the same. The project participant, in response to CAR 1 corrected the value of the energy import from the 22kV line in the revised monitoring report which is in accordance with the HPSEB invoices. Hence, CAR 1 was closed by the validation team.

The verification team, therefore, confirms that total grid electricity import from 22kV line for the current verification period is 1501600 kWh and the project emissions reported in the monitoring

report due to the grid electricity import from 22kV line are 1208.788 tCO₂, without any material misstatement. The verification team verifies the grid electricity import as presented in monitoring report after reviewing the third party invoices of HPSEB and the same is presented as follows:

Month	Power Consumption	Project Emission (PE _{v2})
	(KWh)	(tCO ₂)
Jan 2012	287400	231.357
Feb. 2012	238200	191.751
Mar 2012	244200	196.581
Apr 2102	198000	159.390
May 2012	287800	231.679
June 2012	246000	198.030
Total	1501600	1208.788

Leakage of SF₆ Gas (PEy3):

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 is also available at the project site. The project participant measures and records the weight of the all the 5 SF₆ cylinders on periodic basis. The project participant has also provided the log sheets of records of the SF₆ gas cylinder weight measured during the current verification period. The project participant also provided the calibration certificates of the weight scale.

Based on the supporting evidences provided by the project participant, it was observed that weighing measurement for SF₆ gas cylinders during the current monitoring period was carried out on 15/03/2012, and 18/06/2012. The weighing balance was under valid calibration during the current monitoring period. However, the verification team observed that the due date of the next calibration was 31/08/2012. Hence, the verification team raised CL 4(a) regarding the same. With respect to CL 4(a), the project participant provided the latest calibration certificate of the weighing scale dated 21/08/2012 which is prior to the expiry of the previous calibration due on 31/08/2012. Hence, CL 4(a) was closed by the verification team as calibration frequency was maintained by the project participant.

The project participant also monitors the SF₆ gas pressure in the various compartments of the switchgear assembly through a Digital Pressure Indicator (DPI) once in a calendar year. The project participant has submitted the log sheet of the measurements of the SF₆ gas pressure in the various compartments of the switchgear assembly for the current monitoring period. The calibration certificates of the DPI were also submitted by the project participant. It was observed by the verification team that DPI was calibrated on 08/09/2011 and the due date for next calibration is 07/09/2012, which is after the current monitoring period. Though the due date of the calibration does not fall during the current verification period, it was already lapsed during the course of verification and hence the verification team also raised CL 4(b). The project participant with respect to, CL 4(b), provided copy of the latest calibration certificate for the DPI instrument dated 05/09/2012 which is before the due date of the last calibration. It was further observed that calibration certificate confirms that it remained within the permissible limits of accuracy of the instrument provided by the manufacturer. Hence, the verification team confirms that calibration frequency was maintained by the project participant for the DPI instrument and CL 4(b) was closed.

Therefore, it was confirmed that there had been no leakage of SF₆ gas during this verification period and hence the project emissions due to SF₆ leakage were Nil. From the monthly records of SF₆ gas pressure monitoring and the records of the SF₆ gas cylinders it was observed by the verification team that there was not any abnormal situation of SF₆ pressure drop necessitating top up filling during the current verification period.

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 current verification period. The monitoring of these parameters has been carried out as per the requirements of the monitoring specified in the methodology applied to this project and the monitoring plan. Also, the data obtained as a result of the monitoring is accurate and reliable for the purpose of correct computation of the emission reductions.

4.3 Quality of Evidence to Determine GHG Emission Reductions or Removals

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 leakage due to the use of SF₆ in the switchgear assembly.

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 revised monitoring report. Moreover, the 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. The following table provides the details on the reliability of the essential data used for the calculation of emission reductions:

Parameter description	Source	Reliability of the evidence
Net electricity supplied to the grid (baseline emission parameter)	Monthly JMR Reports issued by the HPSEB	The data is reliable as it is based on 100% monitored electricity from high accuracy electronic tri-vector meters and certified by a Government entity (HPSEB). The JMR also forms the basis for the invoice raised by the project participant and payments released by the HPSEB. In addition, the value has also been crosschecked from the invoices raised by the project participant for the sold electricity to HPSEB.
Quantity of electricity imported by the project participant through 22kV line (project emission parameter)	Invoices raised by the HPSEB	The data is reliable as it is based on 100% monitored electricity from the energy meter located at the HPSEB sub-station. The invoices were raised by HPSEB for the imported energy. HPSEB is a government entity and the meter is in the custody of the HPSEB and located at the sub-station of the HPSEB.
Quantity of diesel consumed during the current monitoring period in DG (a project emission parameter)	Diesel consumption log sheets	The data is reliable as it is based on the daily diesel consumption log sheets monitored and recorded by the project participant at site. The verification team has checked the diesel consumption data provided in the monitoring report with the daily log sheets. This is a minor emission source which contributes less than 1% of the baseline emissions.
Leakage of the SF ₆ gas consumed from the SF ₆ stock available at the project site (project emission parameter)	Log sheets of the SF ₆ gas cylinder weight measurement	The data is reliable as it is based on calibrated weighing machine measurements of SF ₆ gas cylinders. In addition, there is a crosschecking mechanism also for the monitoring parameter as project participant also measures the SF ₆ pressure in the switchgear assembly (GIS) once in a calendar year. Further, the PP also maintains the records of the tripping of the DCS alarms of the SF ₆ pressure drop in GIS on daily basis (consolidated monthly).

4.4 Management and Operational System

The organizational structure includes site shift-in-charges, involved in the day-to-day operations of the plant. Site supervisors are responsible for checking the reliability of data and also monthly report preparation. The Staff (Technicians and Officers) involved in day to day operation of the Power plant has adequate experience and all the equipments essential for the GHG emission reductions are operating smoothly. All the collated data are reviewed by the senior management at site and also by the top management at Head Office.

5 VERIFICATION CONCLUSION

Bureau Veritas Certification has performed seventh periodic verification of the '300 MW Hydro Power Project of JHPL' for the monitoring period covering 1st Jan 2012 to 30th June 2012 (including both days). 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.

Considering the emission reduction computation, the cumulatively achieved VERs (after rounding off monthly emission reductions to the lower value) are 3,43,852 tCO₂, from 01/01/2012 to 30/06/2012 (including both days).

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. The grid emission factor of 0.805 tCO₂/MWh, fixed ex ante, was applied correctly for the baseline emission calculations.

Appropriate procedures for maintaining the confidentiality and safe custody of the validation or verification documentation and for retaining them for a sufficient period 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.

Bureau Veritas Certification verified the contents of the revised Monitoring Report (Version 03) for the reporting period as indicated below. Bureau Veritas Certification confirms that the project is implemented as per the description contained in the validated VCS-PD. The energy meters deployed for the measurement of electricity export and import are calibrated appropriately. The monitoring system is in place and the project is generating GHG emission reductions.

Bureau Veritas Certification confirms that the GHG emission reductions are calculated without material misstatements. Our opinion relates to the project's GHG emissions and resulting GHG emissions reductions reported and related to the registered project baseline and monitoring, and its associated documents. Based on the information we have seen and evaluated, we confirm the following statement:

Reporting period: From 01/01/2012 to 30/06/2012 (including both days)

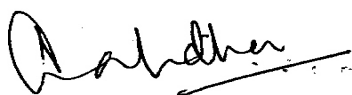
Voluntary Emission Reductions during the reporting period are as follows:

Verified GHG emission reductions or removals in the above reporting period:

GHG Emission Reductions or Removals	tCO ₂ e
Baseline Emissions	3,452,55
Project Emissions	1,400
Leakage	0
Net GHG emission reductions or removals	3,43,852*

*The project participant has rounded down decimals values of the monthly emission reductions to arrive at the total emission reduction value of 3,43,852 for the current monitoring period. This is conservative and hence, accepted by the verification team. The rounded down values of monthly emission reductions have also been produced in the Table below:

GHG Emission Reductions or Removals	tCO ₂ e
January 2012	25,856
February 2012	22,299
March 2012	23,202
April 2012	33,489
May 2012	79,899
June 2012	1,59,107
Total (from January 2012 to June 2012)	3,43,852



H.B. Muralidhar
(Internal Technical Reviewer)



Anupam Badola
(Team Leader)

6 REFERENCES

1. Monitoring report version 01 dated 30/07/2012
2. Monitoring report version 03 dated 27/09/2012
3. JMR's for the Months 1st Jan 2012 to 30th June 2012
4. Monthly invoices raised by the project proponent for the sold electricity for the of period 1st Jan 2012 to 30th June 2012
5. Energy meter calibration certificate No. RTL/NR-II/CAL/201112-151/2012, dated 20.01.2012
6. Energy meter calibration certificate No. RTL/NR-II/CAL/201112-152/2012, dated 20.01.2012
7. Energy meter calibration certificate No. RTL/NR-II/CAL/201112-153/2012, dated 20.01.2012
8. Energy meter calibration certificate No. RTL/NR-II/CAL/201112-154/2012, dated 20.01.2012
9. Energy meter calibration certificate No. RTL/NR-II/CAL/201011-126/2011, dated 01.03.2011
10. Energy meter calibration certificate No. RTL/NR-II/CAL/201011-123/2011, dated 01.03.2011
11. Energy meter calibration certificate No. RTL/NR-II/CAL/201011-124/2011, dated 01.03.2011
12. Energy meter calibration certificate No. RTL/NR-II/CAL/201011-125/2011, dated 01.03.2011
13. Electronic balance calibration certificate no. 0434775 dated 01/09/2011
14. Electronic balance calibration certificate no. 0436359 dated 21/08/2012
15. Monthly HPSEB invoices for 22 kV line import for the period 1st Jan 2012 to 30th June 2012
16. DPI calibration certificate No. QLC/CAL/11/044483 dated 08/09/2011
17. DPI calibration certificate No. QLC/CAL/12/056115 dated 05/09/2012
18. Daily GIS Alram log sheets (consolidated monthly) for the current monitoring period
19. Log book weighing record of SF₆ gas cylinder and Log books of diesel consumption in the DG set for the current monitoring period from 1st Jan 2012 to 30th June 2012
20. Registered VCS-PD
21. Emission reduction spreadsheet
22. VCS Programme Guide, Version 3.3 dated 1st May 2012
23. VCS Standard, Version 3.2 dated 1st Feb. 2012
24. VCS Registration and Issuance process version 3.3 dated 1st May 2012

25. CDM Approved methodology ACM 0002 version 8 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”, EB 44

7 C.V. OF THE DOE'S VERIFICATION TEAM MEMBERS

Anupam Badola (Team Leader)

Bureau Veritas Certification, Lead Verifier – Climate Change

Mr. Anupam Badola is Post Graduate in Environmental Science with five years of work experience in climate change services. He has previously worked with a manufacturing organization and a carbon advisory firm in India on CDM project development, CDM project due diligence, stack, ambient air pollution monitoring, water pollution monitoring, etc. He has undergone intensive training on Clean Development Mechanism and presently involved in the Validation and verification of CDM/VCS projects with Bureau Veritas Certification (India) Private Limited since October 2009.

Rakesh Tripathi (Team Member)

Bureau Veritas Certification, Verifier – Climate Change

Mr. Rakesh Tripathi is graduate (B.Tech) in Electronics and communication and Post-graduate (MBA) in Power management with around 2.5 years of experience in the field of climate change services. He is working with Bureau Veritas Certification (India) Pvt. Ltd. as Verifier-Climate Change. Prior to joining Bureau Veritas, he worked on CDM/VCS projects as a consultant. He has received extensive training in CDM validation and verification processes and participated in assessment of CDM projects.

H B Muralidhar (Internal Technical Reviewer)

Bureau Veritas Certification, - Operations Manager

Lead auditor with Bureau Veritas Certification for Environment Management System, Quality Management System and Occupational Health and Safety Management System. Graduate in Electrical Engineering with 25 year work experience related to power generation and distribution as well as management system auditing. He is the Lead auditor for Environmental Management System, Quality Management system and Occupational Health and Safety Management System. He is the technical expert & conducted Validation / Verification for more than 50 CDM/VCS Projects.

8 VERIFICATION PROTOCOL

Table 1 Verification requirements based on the Voluntary Carbon Standard 3.0

CHECKLIST QUESTION	COMMENTS	Draft Concl	Final Concl
1 Project implementation in accordance with the registered project document			
a Are all physical features of the proposed VCS project proposed in the registered PD in place?	The project activity is run-of-river hydro-electric power plant of capacity 300 MW, located across river Baspa, at Kuppa in Himachal Pradesh. The project activity consist of following: 1. Three pelton turbines of 100 MW each. 2. Two D.G sets of capacity of 625 KVA. Which is same as mentioned in the registered PD.	OK	OK
b Have the project participants operated the proposed VCS project as per the registered PD?	The project activity is run-of-river hydro-electric power plant of capacity 300 MW, located across river Baspa, at Kuppa in Himachal Pradesh. The project activity is operated as per the registered PD..	OK	OK
c Was an on-site visit conducted?	No. The onsite visit was not conducted.	OK	OK
d If not, justify the rationale of the decision.	This is seventh periodic verification of the project activity. The periodic verification takes place two times in a year and the physical site visit for the immediate earlier verification period carried out by the same verification team involved in the sixth verification. The physical site visit for the sixth verification team took place from 22/03/2012 to 23/03/2012 and the period when site visit conducted, falls under the current verification period. The verification team reviewed all the records of the sold electricity and the JMR reports (issued by the state electricity utility which is a government entity) for the current verification period (seventh periodic verification) that there is no change in the project design. Hence, the verification team did not	OK	OK

CHECKLIST QUESTION	COMMENTS	Draft Concl	Final Concl
	carry out separate physical site visit for the current verification period.		
e Does the implementation or operation of VCS project conform with the description contained in the registered PD?	It was observed by the verification team that the project is implemented and operated as per the description presented in the registered PD.	OK	OK
f If not, which are the potential impacts due to these changes?	It was observed by the verification team that the project is implemented and operated as per the description presented in the registered PD.	OK	OK
2 Compliance of the monitoring plan with the monitoring methodology			
a Is the validated monitoring plan in accordance with the approved methodology applied by the proposed VCS project?	The validated monitoring plan of the project activity is based on previously approved CDM methodology ACM0002/Version 8, <i>"Consolidated baseline methodology for grid-connected electricity generation from renewable sources"</i> .	OK	OK
b Are there any monitoring aspects of the project that are not specified in the methodology (e.g. additional monitoring parameters, monitoring frequency and calibration frequency)?	There are some additional parameters besides the requirement of the methodology ACM0002 and have been already identified in the validated monitoring plan. As per requirements of the validated monitoring plan (based on large scale CDM methodology ACM0002/Version 8), following additional parameters needs to be monitored: 1) Q_{SF6} – Quantity of SF6 loss during the year 2) $P_{BAY\ VT}$, $P_{BREAKER}$ & P_{feeder} Pressure of SF6 gas in the breaker, bay and feeder. 3) Q_{diesel} – Quantity of diesel consumed in the DG sets 4) $E_{22\ kV}$ – Electricity consumed during year Y. 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	OK	OK

CHECKLIST QUESTION	COMMENTS	Draft Concl	Final Concl
	the project activity.		
3 Compliance of monitoring with the 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 ACM0002 have been properly implemented and followed by the project participants.	OK	OK
b Have all parameters stated in the monitoring plan, the applied methodology been sufficiently monitored and updated as applicable, including:			
i Project emission parameters?	The project emission parameters stated in the monitoring plan are: 1) Q_{SF6} – Quantity of SF6 loss during the year. 2) $P_{BAY\ VT}$, $P_{BREAKER}$ & P_{feeder} Pressure of SF6 gas in the breaker, bay and feeder. 3) Q_{diesel} –Quantity of diesel consumed in the running of D.G. sets. 4) $E_{22\ kV}$ – Electricity imports from the 22kV line. The above parameters are appropriately monitored and updated as per the validated monitoring plan stated in the registered VCS PD. However, The grid import from the 22kV line forms part of the project emissions from the electricity consumption. It was observed by the verification team that quantity of the electricity imported from 22kV line for the month of Jan 2012 is very high as compared to other month. Please clarify.	CL 1	OK
ii Baseline emission parameters?	The baseline emission 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

CHECKLIST QUESTION	COMMENTS	Draft Concl	Final Concl
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 Are equipment controlled and calibrated in accordance with the monitoring plan?	Equipment used for measuring monitored values are controlled and calibrated in accordance with the monitoring Plan	OK	OK
d Are monitoring results consistently recorded as per approved frequency?	Yes, the monitoring results have been recorded consistently as per the approved frequency.	OK	OK
e Have quality assurance and quality control procedures been applied in accordance with the monitoring plan?	Quality assurance and quality control procedures been applied in accordance with the monitoring plan stated in the registered PD. a) The project participant to provide the calibration certificate for the weighing machine as the last calibration was due on 31/08/2012 as per the calibration certificate b) The due date of the calibration for DPI instrument is 07/09/2012 as per the annual calibration frequency. Project participant requested to submit the calibration certificate if the same has been undertaken in year 2012.	CL 4	OK
4 Assessment of data and calculation of greenhouse gas emission reductions			
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 validator shall make the most conservative assumption theoretically possible in finalizing the verification report).	The project participant has provided the complete data set for the current monitoring period from 1 st January 2012 to 30 th June 2012 for the purpose of the verification of emission reductions achieved by the project activity. The set of data includes:- 1. JMRs for the current monitoring period 2. Electricity Bills of 22 kV line for the current monitoring period		OK

CHECKLIST QUESTION	COMMENTS	Draft Concl	Final Concl
	3. Diesel Consumption for the monitoring period 4. Log sheet for SF6 cylinder's periodic weight measurements. However, a) The project participant has submitted the electricity bills for 22kV line to substantiate the project emissions computed from the 22kV line import. However, it has been observed that bills pertaining to three accounts of the PP namely, Jal 1B, Jal 2B and Jal 1. The input data has not been considered consistently. Besides, it is not clear which account relates to the project activity. Please clarify the same with the supporting evidences. b) The project participant has provided the scanned copy of the log sheet of the SF6 cylinder's periodic weight measurements. The project participant to provide the latest copy of the log sheet to ascertain if there is any change/no change in the SF6 cylinder's weight during the entire monitoring period.	CL 2 CL 3	
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 Quantity of SF6 loss, which is zero for the monitoring period from 1st January 2012 to 30th June 2012. The same has been verified during site visit by cross-checking the physical stock of SF6 quantity in the cylinders. c. SF6 loss was further crosschecked with the daily alarm log sheet. There is an alarm system for monitoring of the pressure drop in bay, breaker and bus coupler compartments filled with SF6 gas.	CAR 1	OK

CHECKLIST QUESTION	COMMENTS	Draft Concl	Final Concl
	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 January 2012 to 30th June 2012, there was no incident of tripping of the alarm. However, the monitoring report specifies that 69849 litres of diesel was consumed and 2539900 kWh units were imported from the 22kV line during the current monitoring period. However, the values specified above are not supported by the documents submitted.		
c Have calculations of baseline emissions, proposed project 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 emissions and 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?	The project participant has used grid electricity emission factor of 0.805 tCO ₂ /MWh which has been fixed ex ante at the time of validation (It has been computed in accordance with the Tool to calculate emission factor for an electricity system and CEA official data).	OK	OK
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 0.805 tCO 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 The grid import from the 22kV line forms part of the project emissions from the electricity consumption. It was observed by the verification team that quantity of the electricity imported from 22kV line for the month of Jan 2012 is very high as compared to other month. Please clarify.	Table 1 3.b.i	The grid import from the 22 kv line for the month of January, 2012 is 287400 kWh, which can be cross checked with the electricity bill raised by HPSEB for the same month against the electricity drawn from grid. It was a typographical error in the VER worksheet, which had been submitted to DOE and has been corrected in the revised VER worksheet and revised MR.	The project participant has provided the HPSEB (Himachal Pradesh State Electricity Board) electricity bills for the 22kV line import. The verification team confirms that the correction made in the revised monitoring report and the emission reduction sheet matches with the electricity consumption value for the month of January 2012. Hence, CL 1 was closed by the validation team.
CL 2 The project participant has submitted the electricity bills for 22kV line to substantiate the project emissions computed from the 22kV line import. However, it has been observed that bills pertaining to three accounts of the PP namely, Jal 1B, Jal 2B and Jal 1 com. The input data has not been considered consistently. Besides, it is not clear which account relates to the project activity. Please clarify the same with the supporting evidences.	Table 1 4.a	The bills pertaining to the account Jal 1 com/Jal 1 B is relates to the project activity. The correct bills have been used for project emission calculation in the revised VER worksheet and in revised Monitoring Report. The correct bills are submitted to DOE. DOE can crosscheck the consistency of the bills by checking the meter readings presented in the electricity bills of the following months.	The project participant has provided revised emission reduction spreadsheet and the revised monitoring report. The input data considered for the 22kV import line in the revised monitoring report is based on the Jal 1B and Jal 1 Com accounts. The validation team has crosschecked the meter readings (old and new) provided by the HPSEB (a government entity) in the electricity bills for JAL 1B account matches with the following month of the Jal 1 com. Hence, CL 2 was closed by the validation team.
CL 3 The project participant has provided the scanned copy of the log sheet of the SF ₆	Table 1	The periodical weight measurement of SF ₆ cylinders are carried out quarterly. The last	The project participant has also provided the quarterly measurement records of the SF ₆ cylinder weights after the current

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
cylinder's periodic weight measurements. The project participant to provide the latest copy of the log sheet to ascertain if there is any change/no change in the SF ₆ cylinder's weight during the entire monitoring period.	4.a	measurement had carried out on 20/09/2012, which is done after the present monitoring period. The result shows that there no change in the SF ₆ cylinder's weight during the entire monitoring period. The weighing machine has been calibrated on 21/08/2012 and result has been found within the permissible error. Hence, it is evident that the weighing machine was working properly during the last SF ₆ cylinder's weight measurement dated 18/06/2012.	verification period is over. The verification team, after reviewing the records of the measurement confirms that there was no refilling of the SF ₆ gas in the switchgear assembly and hence the project emissions from the SF ₆ leakage considered as nil by the project participant are appropriate. Hence, CL 3 has been closed.
CL 4 a) The project participant to provide the calibration certificate for the weighing machine as the last calibration was due on 31/08/2012 as per the calibration certificate b) The due date of the calibration for DPI instrument is 07/09/2012 as per the annual calibration frequency. Project participant requested to submit the calibration certificate if the same has been undertaken in year 2012.	Table 1 3.e	(a) The calibration due of the weighing machine was 31/08/2012, which has been calibrated on 21/08/2012. The calibration report is submitted to DOE. (b) The calibration of DPI instrument was due on 07/09/2012. PP has undertaken the calibration of the DPI instrument dated 05/09/2012. The calibration certificate of DPI	a) The project participant has submitted the independent third party weighing machine calibration certificate dated 21/08/2012. The verification team confirms that frequency of the calibration has been met. b) The project participant has submitted the independent third party DPI instrument calibration certificate dated 05/09/2012. The verification team confirms that frequency of the calibration has been met.

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
		instrument is submitted to DOE.	Since results of the calibration for both the instruments certify the equipment's functioning within permissible limits of accuracy, the CL 4 has been closed.
CAR 1 The monitoring report specifies that 69849 litres of diesel was consumed and 2539900 kWh units were imported from the 22kV line during the current monitoring period. However, the values specified above are not supported by the documents submitted.	Table 1 4.b	The log sheet of the DG consumption has already been submitted to DOE, from where DOE can cross check the total diesel consumption of amount 69849 liters for the present monitoring period. There were typographical errors in the monthly unit consumption through 22 kv import lines, which have been corrected in the revised VER worksheet as well a revised monitoring report. The corrected kWh consumption through 22kv import line for the present monitoring period is 1501600 kWh, which can be cross checked with the electricity bills for the months of January, 2012 – June, 2012. The electricity bills are submitted to DOE.	The verification team has reviewed the revised monitoring report and the supporting documents submitted. It was observed that necessary corrections have been applied by the project participant in the emission reduction calculation sheet and the revised monitoring report. The corrections applied are in accordance with the supporting documents submitted. Hence, CAR 1 has been closed.