

300MW HYDROPOWER PROJECT BY JHPL



South Asia

TÜV SÜD South Asia Private Limited
Carbon Management Service
Pune 411007 – India

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Summary:

TÜV SÜD South Asia Pvt. Ltd. has performed the periodic verification for the 1 July 2013 to 30 June 2014 of the aforementioned Verified Carbon Standard (VCS) project activity. The verification is based on the currently valid documentation of the VCS version 3.4/ VCS Association (VCSA) Rules.

The project is fully implemented according to the description presented in the project description. The verifier confirms, through the visual inspection that all physical features of the proposed VCS project activity including data collecting and storage systems have been implemented in accordance with the monitoring plan indicated in the VCS project description (VCS PD). The project activity comprises three 100MW turbine generator and it is completely operational and implemented as described in the project description. The same has been confirmed during the on-site visit.

The management of Jaiprakash Power Venture Limited (formerly known as Jaiprakash Hydro Power Limited (JHPL)) is responsible for the preparation of the GHG emissions data and the reported GHG emission reductions on the basis set out within the project's Monitoring Plan indicated in the project description document and the applied methodology. The verifier can confirm that:

- the development and maintenance of records and reporting procedures are in accordance with the registered monitoring plan;
- the project is operated as planned and described in the project design document approved by the VCSA;
- the installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately;
- the monitoring system is in place and generates GHG emission reduction data;
- the GHG emission reductions are calculated without material misstatements;
- the monitoring plan in Monitoring Report is as per the project description and monitoring plan approved by the VCSA; the monitoring plan in the approved project document is as per the applied methodology;
- There is an audit trail that contains the evidence and records that validate the stated figures.

The Methodology ACM 0002, Ver. 08: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" an approved methodology of the UNFCCC CDM program is applied.

A risk based approach has been followed to perform this verification. In the course of the verification one (1) CR was raised and successfully closed out.

Based on the information we have seen and evaluated, we confirm that the project activity achieved the verified amount of reductions in anthropogenic emissions by sources of greenhouse gases that would not have occurred in the absence of the project activity.

Verified emission reductions in this monitoring period (01/07/2013 – 30/06/2014): 1 026 171 t CO₂e

Baseline: 1 029 632 tCO₂e

Project emissions: 3 455.17 tCO₂e

Leakage: 0 tCO₂e

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1 INTRODUCTION

Jaiprakash Power Venture Limited has commissioned TÜV SÜD to carry out the verification and certification of emission reductions reported for the “300MW Hydropower project by JHPL” (the project) in the period 1 July 2013 to 30 June 2014. This report contains the findings from the verification and includes verification statement for the verified carbon unit.

1.1 Objective

Verification is the periodic independent review and ex-post determination by an accredited verification body of the monitored reductions in GHG emissions that have occurred as a result of the registered VCS project activity during a defined verification period.

A verification statement is the written assurance by a verification body that, during a specific period in time, a project activity achieved the emission reductions as verified.

The objective of this verification was to verify and provide a verification statement of emission reductions reported for the “300MW Hydropower project by JHPL” for the period 1 July 2013 to 30 June 2014.

1.2 Scope and Criteria

The scope of the verification is:

- To verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan.
- To evaluate the GHG emission reduction data and express a conclusion with a reasonable level of assurance about whether the reported GHG emissions reduction data is free from material misstatement.
- To verify that reported GHG emissions data is sufficiently supported by evidence.

The criteria of the verification are:

- VCS Program Guide version 3.4
- VCS Standard version 3.4 and other relevant requirements defined by VCSA.
- The approved methodology ACM0002 (version 08).

The verification shall ensure that reported emission reductions are complete and accurate in order to be verified.

1.3 Level of Assurance

The verification report expresses a conclusion with a reasonable level of assurance about whether the reported GHG emissions reduction data is free from material misstatement. TÜV SÜD applied a materiality threshold of 1% with respect to omission or misstatements concerning reported quantities as per VCS standard 3.4.

1.4 Summary Description of the Project

The project is a run-of-the-river hydro power plant with an installed capacity of 300MW, consisting of three numbers of 100MW pelton turbines. The diversion barrage of the project is located across river Baspa, at Kuppa in Himachal Pradesh and the power house is located at Karcham village in Kinnaur District. The project activity is an initiative of Jaiprakash Power Ventures Limited (JPVL) (formerly known as Jaiprakash Hydro Power Limited (JHPL)) a part of the Jaypee Group.

The generated power by the project is supplied to the HPSEB grid as per the power purchase agreement [IRL#17] 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 project site. The project also includes two numbers of diesel generator sets of capacity 625kVA which are used in case of emergency. In addition, grid electricity import also takes place from a separate 22 kV line to the project site and the same is monitored by the HPSEB energy meter, located at the sub-station. The project site also includes five numbers of SF₆ cylinders, with four cylinders of capacity 38.4 kg each and the cylinder of capacity 590 kg. Any leakage of SF₆ from any of these 5 cylinders are monitored as per the registered PD [IRL#23]

The electricity supplied and imported from the grid by the project is continuously monitored and recorded on monthly basis. The monitoring is performed by the set of main and check energy meters of accuracy class 0.2S at both the circuits of 400 kV lines. The net electricity supplied by the project is monthly recorded by the HPSEB representative in presence of the project proponent. The monthly joint meter reading (JMR) report [IRL#10] generated from the monthly reading is signed by HPSEB official and representative of the project proponent.

The net power exported by the project during the present monitoring period is 1 279 046.77 MWh.

2 VERIFICATION PROCESS

2.1 Method and Criteria

The verification was performed through means of the following three phases in accordance with the requirement of the registered VCS PD, the applied methodology, and the VCS Standard version 3.3 and other relevant VCS requirements. Standard auditing techniques have been adopted for the verification process. The verification team performs first a desk review, followed by an on-site visit, which results in the formation of a protocol that includes all the findings. The next step involves the evaluation of the findings through direct communication with the PPs and then finally the preparation of the verification report. This verification report and other supporting documents then undergo an internal quality control by the CB "Environment and Energy" before finalization.

The appointment of the verification team takes into account the technical area(s), sectoral scope(s) and relevant host country experience required amongst team members for verifying the ER achieved by the project activity in the relevant monitoring period for this verification. The CB TÜV SÜD operates the following qualification levels for team members that are assigned by formal appointment rules:

- Assessment Team Leader (ATL);
- Verifier (V);
- Verifier Trainee (T);

- Technical Experts (TE);
- Country expert (CE);
- Technical reviewer (TR).

It is required that the sectoral scope(s) and the technical area(s) (TA) linked to the methodology/ies and project has to be covered by the assessment team. Appointment certificates of the selected team members are attached to this report as Annex.

Assessment Team:

Name	Qualification	Coverage of scope	Coverage of technical area	Coverage of financial aspect	Host country experience	Conducted On-site visit
Sharmistha Shome	V	√	√	NA	√	√
Shivraj Sharma	ATL	√	√	NA	√	

Technical Reviewer:

Name	Qualification	Coverage of scope	Coverage of technical area	Coverage of financial aspect
Eswar Murty	√	√	√	√

2.2 Document Review

In addition to the monitoring report (version 1.1 dated 1 December 2014) [IRL#1], TUV-SUD reviewed:

- The PD for the project activity [IRL#23]
- The previous validation and verification report [IRL#19]
- Baseline and monitoring methodology ACM0002, version 08 [IRL#21]
- Emission reduction excel sheet [IRL#2].
- Joint meter reading certificates and invoices covering the monitoring period [IRL#10] [IRL#5].
- Calibration certificates of the main and check energy meters [IRL#7], calibration certificate of the electronic balance [IRL#11] used for the weighing SF₆ cylinders at project site and calibration certificate of the digital pressure indicator [IRL#12].
- Daily log book of electricity generation, diesel consumption, HPSEB invoices for the electricity import from the 22 kV line [IRL#9].
- Shutdown and maintenance log book maintained by the JPVL [IRL#14].
- Log book for the weight measurement [IRL#4] of the SF₆ gas cylinders, daily alarm log sheet [IRL#3] for the SF₆ cylinder pressure dip and pressure measurement log sheet at various compartments [IRL#15].

During the desk review, TUV-SUD has applied standard auditing techniques to assess the quality of information provided. The following activities were performed:

- A review of the data and information presented to verify their completeness [IRL#1] –[IRL#15];

- A review of the monitoring plan and monitoring methodology, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the quality assurance and quality control procedures;
- An evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions [IRL#2].
- Relevant decisions, clarifications and guidance from the VCSA;

Any other information and references relevant to the project activity's resulting emission reductions (e.g, IPCC reports, data on electricity generation in the national grid or laboratory analysis and national regulations).

2.3 Interviews

TUV-SUD has conducted the site visit on 27 November 2014. Following personnel were interviewed during the site visit:

Name	Organisation
Mr. K. Srinivasan	Jaiprakash Power Venture Limited
Mr. S. K. Jha	Jaiprakash Power Venture Limited
Mr. Ravi Kumar Gupta	Jaiprakash Power Venture Limited

2.4 Site Inspections

On 27 November 2014, TUV-SUD performed on-site assessment of the project activity. The key personnel of the project were interviewed or assisted the verification team.

During the on-site assessment, TUV-SUD has applied standard auditing techniques to assess the quality of information provided. The following aspects of the VCS project activity have been verified:

The on-site assessment involves:

- (i) Assessment of the implementation and operation of the proposed VCS project activity as per the registered VCS PD [IRL#23];
- (ii) Review of information flows for generating, aggregating and reporting the monitoring parameters [IRL#2] [IRL#15];
- (iii) Interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the monitoring plan in the VCS PD [IRL#23];
- (iv) A cross-check between information provided in the monitoring report and data from other sources such as plant log books, inventories, purchase records or similar data sources [IRL#3] [IRL#15];
- (v) A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the PD and the selected methodology [IRL#7] [IRL#11] [IRL#12];
- (vi) Review of calculations and assumptions made in determining the GHG data and emission reductions;

(vii) Identification of quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameter.

2.5 Resolution of Findings

The objective of this phase of the verification process is to resolve any outstanding issues which require clarification for TÜV SÜD's positive conclusion of the achieved GHG emission reduction. Concerns rose in the desk review, the on-site audit assessments and the follow up interviews and the responses provided for the raised concerns are documented in Annex 1 (List of Findings) to guarantee the transparency of the verification process.

A Corrective Action Request is raised where TÜV SÜD identifies:

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

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

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

2.5.1 Forward Action Requests

No FARs have been presented, neither in the validation report nor in the previous verification reports.

2.6 Eligibility for Validation Activities

This step is not required as this is a verification project activity.

3 VERIFICATION FINDINGS

3.1 Project Implementation Status

As part of the site visit TUV-SUD was able to confirm that the project implementation is in accordance with the project description contained in registered VCS PD of 25 December 2008 [IRL#23], and that the monitoring has been carried out in accordance with the monitoring plan contained in the registered VCS PD of 25 December 2008, except for the electricity metering location. As aforementioned, the location of the sets of main and check meters were shifted from Jhakri substation to the power house of the project activity on 12 May 2011 [IRL#19] by the electricity board officials. The change in the location of the energy meters does not impact the applicability of the methodology, additionality or the project activity's

monitoring plan compliance with the applied methodology ACM0002 version 08. Hence, the change has been accepted as per Section 3.6 of the VCS Standard document, version 3.4 [IRL#20].

The monitoring and reporting frequency of all the relevant parameters are performed as per the registered VCS PD. The calibration certificates of the energy meters, electronic balance and pressure indicator has been done as per the VCS PD.

Following the monitoring parameters:

Data / Parameter:	EG _y																									
Data unit:	MWh																									
Description:	Net Electricity supplied to the grid by the project activity during the year y																									
Source of data used:	Monthly Joint meter reading reports covering the monitoring period [IRL#10]. Monitoring equipment: Energy meters of accuracy of 0.2S as per the registered monitoring plan. The accuracy of the energy meters have been verified from the calibration certificate [IRL#7]. Calibration: The electricity meters are to be calibrated annually by Power grid corporation of India Limited (A government of India enterprise) [IRL#7]. The calibration has been performed as per the registered monitoring plan. The meter numbers, date of calibrations [IRL#7], verified, are as: Line 1 [IRL#7]: <table border="1"> <thead> <tr> <th>Meter number</th><th>Calibration date</th><th>Calibration validity</th></tr> </thead> <tbody> <tr> <td>UPU 01237 (Main meter)</td><td>19/01/2013</td><td>18/01/2014</td></tr> <tr> <td>UPU 01235 (Check meter)</td><td>19/01/2013</td><td>18/01/2014</td></tr> <tr> <td>HPU 02547 (main meter)</td><td>11/01/2014</td><td>10/01/2015</td></tr> <tr> <td>HPU 02548 (check meter)</td><td>11/01/2014</td><td>10/01/2015</td></tr> </tbody> </table> The main meter UPU 01237 and check meter UPU 01235 has been replaced by HPU 02547 and HPU 02548 respectively on 11 January 2014. Line 2 [IRL#7]: <table border="1"> <thead> <tr> <th>Meter number</th><th>Calibration date</th><th>Calibration validity</th></tr> </thead> <tbody> <tr> <td>UPU 01238 (main meter)</td><td>19/01/2013</td><td>18/01/2014</td></tr> <tr> <td>UPU 01236 (check meter)</td><td>19/01/2013</td><td>18/01/2014</td></tr> </tbody> </table>		Meter number	Calibration date	Calibration validity	UPU 01237 (Main meter)	19/01/2013	18/01/2014	UPU 01235 (Check meter)	19/01/2013	18/01/2014	HPU 02547 (main meter)	11/01/2014	10/01/2015	HPU 02548 (check meter)	11/01/2014	10/01/2015	Meter number	Calibration date	Calibration validity	UPU 01238 (main meter)	19/01/2013	18/01/2014	UPU 01236 (check meter)	19/01/2013	18/01/2014
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	HPU 02549 (main meter)	11/01/2014	10/01/2015
	HPU 02550 (check meter)	11/01/2014	10/01/2015
	The main meter UPU 01238 and check meter UPU 01236 has been replaced by HPU 02549 and HPU 02550 respectively on 11 January 2014. The calibration is valid for the present monitoring period.		
Means of verification/Comments:	As per the registered PD, the net energy supplied by the project activity has been verified from monthly Joint meter reading reports covering the monitoring period [IRL#10].		
Cross-check	Monthly invoices to HPSEB by the project proponent covering the monitoring period [IRL#5].		

Data / Parameter:	Q _{SF6}						
Data unit:	tonne						
Description:	Quantity of SF ₆ loss during the year y						
Source of data used:	Plant log book of weighing records of the 5 cylinders of SF₆ [IRL#4]. The weight of the cylinders were measured and recorded on 10 June 2013, 9 September 2013, 5 December 2013, 3 March 2014, 9 June 2014 [IRL#1]. It has been observed that there is no difference in the weight of the cylinders during June 2013 to June 2014. As per the registered PD, the monitoring frequency is annually. However, the project proponent has monitored the weight of the cylinders once in every quarter, as a good practice. Monitoring equipment: Electronic balance of class III. The registered monitoring plan does not mention any accuracy of the electronic balance. The electronic balance of accuracy class III is considered to be good monitoring practice and as per the national standard. As per the registered PD, the capacity of the balance is 2000 kg and has a least count of 200 gm. Calibration: The calibration has been performed annually as per the registered monitoring plan. Metrological Department of India, Himachal Pradesh (Government of India) [IRL#11]. The calibration is valid for the monitoring period [IRL#11]. <table border="1"> <thead> <tr> <th>Date of calibration</th><th>Calibration Validity</th></tr> </thead> <tbody> <tr> <td>21/08/2012</td><td>20/08/2013</td></tr> <tr> <td>06/09/2013</td><td>05/09/2014</td></tr> </tbody> </table>	Date of calibration	Calibration Validity	21/08/2012	20/08/2013	06/09/2013	05/09/2014
Date of calibration	Calibration Validity						
21/08/2012	20/08/2013						
06/09/2013	05/09/2014						

Means of verification/Comments:	Plant log book of weighing records of the 5 cylinders of SF ₆ [IRL#4] has been verified.
Cross-check	No cross checking is applicable as per the registered monitoring plan.

Data / Parameter:	P _{BAY VT}						
Data unit:	bar						
Description:	SF ₆ gas pressure in the BAY VT						
Source of data used:	The data has been sourced from plant daily GIS alarm log sheet, consolidated on monthly basis [IRL#3]. The pressure is checked with digital pressure indicator once in a calendar year [IRL#15]. The SF₆ cylinders at bay require topping if the pressure is below 3.5 bar. Yearly pressure reading of the cylinders as monitored by the DPI-705. Monitoring equipment: Digital pressure indicator (DPI-705) of least count 0.001 bar and range 0-20 bars [IRL#12]. The registered PD does not mention any accuracy of the digital pressure indicator. The specifications of the pressure indicator are consistent with the registered monitoring plan. Calibration: The calibration has been performed annually as per the registered monitoring plan by Quick Logic Controls and Calibration [IRL#12]. The calibration is valid for the monitoring period [IRL#12]. <table border="1"> <thead> <tr> <th>Date of Calibration</th><th>Calibration Validity</th></tr> </thead> <tbody> <tr> <td>05/09/2012</td><td>04/09/2013</td></tr> <tr> <td>04/09/2013</td><td>03/09/2014</td></tr> </tbody> </table>	Date of Calibration	Calibration Validity	05/09/2012	04/09/2013	04/09/2013	03/09/2014
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Means of verification/Comments:	The data has been verified from plant daily GIS alarm log sheet, consolidated on monthly basis [IRL#3]. The pressure is checked with digital pressure indicator once in a calendar year [IRL#15]. The SF₆ cylinders at bay require topping if the pressure is below 3.5 bar. The correctness of DPI-705 is checked by measuring the pressure of SF₆ Gas Cylinder and comparing it with the pressure measured by the built-in dial gauge of the filling machine.						
Cross-check	No cross-checking is applicable as per the registered PD.						

Data / Parameter:	P_{breaker}						
Data unit:	bar						
Description:	SF ₆ gas pressure in the Breaker						
Source of data used:	The data has been sourced from plant daily GIS alarm log sheet, consolidated on monthly basis [IRL#3]. The pressure is checked with digital pressure indicator once in a calendar year [IRL#15]. The SF₆ cylinders at breaker require topping if the pressure is below 4.95 bar. Yearly pressure reading of the cylinders as monitored by the DPI-705. Monitoring equipment: Digital pressure indicator (DPI-705) of least count 0.001 bar and range 0-20 bars [IRL#12]. The registered PD does not mention any accuracy of the digital pressure indicator. The specification of the pressure indicator is consistent with the registered monitoring plan. Calibration: The calibration has been performed annually as per the registered monitoring plan by Quick Logic Controls and Calibration [IRL#12]. The calibration is valid for the monitoring period [IRL#12]. <table border="1"> <thead> <tr> <th>Date of Calibration</th><th>Calibration Validity</th></tr> </thead> <tbody> <tr> <td>05/09/2012</td><td>04/09/2013</td></tr> <tr> <td>04/09/2013</td><td>03/09/2014</td></tr> </tbody> </table>	Date of Calibration	Calibration Validity	05/09/2012	04/09/2013	04/09/2013	03/09/2014
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Means of verification/Comments:	The data has been verified from plant daily GIS alarm log sheet, consolidated on monthly basis [IRL#3]. The pressure is checked with digital pressure indicator once in a calendar year [IRL#15]. The SF₆ cylinders at bay require topping if the pressure is below 4.95 bar. The correctness of DPI-705 is checked by measuring the pressure of SF₆ Gas Cylinder and comparing it with the pressure measured by the built-in dial gauge of the filling machine.						
Cross-check	No cross-checking is applicable as per the registered PD.						

Data / Parameter:	P_{feeder}
Data unit:	bar
Description:	SF ₆ gas pressure in the Feeder
Source of data used:	The data has been sourced from plant daily GIS alarm log sheet, consolidated on monthly basis [IRL#3]. The pressure is checked with digital pressure indicator once in a calendar year [IRL#15]. The SF ₆ cylinders at

	breaker require topping if the pressure is below 4.95 bar. Yearly pressure reading of the cylinders as monitored by the DPI-705. Monitoring equipment: Digital pressure indicator (DPI-705) of least count 0.001 bar and range 0-20 bars [IRL#12]. The registered PD does not mention any accuracy of the digital pressure indicator. The specification of the pressure indicator is consistent with the registered monitoring plan. Calibration: The calibration has been performed annually as per the registered monitoring plan by Quick Logic Controls and Calibration [IRL#12]. The calibration is valid for the monitoring period [IRL#12]. <table border="1"> <thead> <tr> <th>Date of Calibration</th><th>Calibration Validity</th></tr> </thead> <tbody> <tr> <td>05/09/2012</td><td>04/09/2013</td></tr> <tr> <td>04/09/2013</td><td>03/09/2014</td></tr> </tbody> </table>	Date of Calibration	Calibration Validity	05/09/2012	04/09/2013	04/09/2013	03/09/2014
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Means of verification/Comments:	The data has been verified from plant daily GIS alarm log sheet, consolidated on monthly basis [IRL#3]. The pressure is checked with digital pressure indicator once in a calendar year [IRL#15]. The SF₆ cylinders at bay require topping if the pressure is below 4.95 bar. The correctness of DPI-705 is checked by measuring the pressure of SF₆ Gas Cylinder and comparing it with the pressure measured by the built-in dial gauge of the filling machine.						
Cross-check	No cross-checking is applicable as per the registered PD.						

Data / Parameter:	Q _{diesel}
Data unit:	Litre
Description:	Quantity of diesel consumed during the year y
Source of data used:	The data has been sourced from diesel consumption log book [IRL#6]. The diesel consumption is daily monitored and monthly recorded. Monitoring equipment: The D.G. sets (2 x 625 KVA) have static graduated level gauge provided on the fuel injection tank of each DG set. No accuracy is mentioned in the registered PD. Static graduated level gauges on the fuel injection tanks are used for the diesel consumption monitoring by the DG sets. Calibration: Static graduated level gauges on the fuel injection tanks are used for the diesel consumption monitoring by the DG sets. No calibration is

	applicable for the same.
Means of verification/Comments:	The diesel consumption data has been verified from diesel consumption log book [IRL#6].
Cross-check	The diesel consumption has been cross-checked from diesel receipts [IRL#6].

Data / Parameter:	E _{22 kV}
Data unit:	kWh
Description:	Electricity consumed during the year y (Electricity imported by the project activity from HPSEB grid).
Source of data used:	The data has been sourced from monthly HPSEB invoice for the 22 kV line [IRL#9]. Monitoring equipment: Energy meter of accuracy class 0.5S. Accuracy of the energy meter is not mentioned in the registered PD. The energy meter is under the per-view of HPSEB and is maintained by HPSEB. Calibration: The energy meter is under the per-view of HPSEB and is maintained by HPSEB. It has been verified from the letter from HPSEB that the calibration is performed by HPSEB periodically [IRL#13].
Means of verification/Comments:	The data has been verified from monthly HPSEB invoice for the 22 kV line [IRL#9].
Cross-check	No cross-checking is applicable as per the registered PD.

3.2 Accuracy of GHG Emission Reduction and Removal Calculations

TUV-SUD confirms that appropriate methods and formulae for calculating baseline emissions, project emissions and leakage have been followed, and the assumptions, emission factors and default values that are applied in the calculation have been justified.

4.2.1: Baseline emission:

Baseline emissions (BE_y in tCO_2) are the product of the baseline emission factor (EF_y in tCO_2/MWh) times the net electricity supplied by the project activity to the grid (EG_y in MWh). As verified from the registered PD, EF_y is emission factor of the NEWNE grid of India, was calculated ex-ante and will not be updated during the crediting period. EF_y of the proposed project in the VCS PD is $0.805 tCO_2/MWh$, which has been verified to be correct based on the availability of grid data.

The net electricity supplied to the grid is determined in the joint meter reading certificate [IRL#10] as the electricity supplied to the grid minus the imported electricity from the grid and line losses @ 0.65% of the

total power exported to the grid as per the PPA [IRL#17] due to change in the main meter and check meter location. TUV-SUD has verified the net electricity supplied to the grid from the joint meter reading of main meter [IRL#10] in the period 1 July 2013 to 30 June 2014 and cross-checked from the energy invoices [IRL#5]. The data verified from the joint meter reading certificate [IRL#3] for the monitoring period is as followed:

Power Exported to grid (MWh)	Less Transmission Losses between Baspa II power house and Jhakri substation as per PPA @ 0.65% (MWh)	Power Export to grid after deducting transmission loss (MWh)	Power Import from grid (MWh)	Net power exported to grid (MWh)
1 287 420.00	8 368.23	1 279 051.77	5.00	1 279 046.77

The baseline emission for the present monitoring period is 1 029 632 tCO₂.

4.2.2 Project emission

Emission from diesel consumption in the DG sets at the site (PE_{y1})

As aforementioned, the project activity has 2 numbers of DG sets of capacity 625 kVA each. These DG sets are operated in the event of emergency. In line with the registered PD, the diesel consumption by the DG sets are monitored and are accounted for as project emission. The diesel consumption by the DG sets are monitored by the level gauge of the DG tank and recorded in the log book. The total diesel consumption by the DG sets during the monitoring period is 14 846 litres as verified from the diesel log book [IRL#6]. The consumption has been further verified from the diesel receipts [IRL#6].

$$PE_{y1} = Q_{diesel} \times \rho_{diesel} \times EF_{diesel} / 1000$$

Where

Q_{diesel} = Quantity of diesel consumed in litre. The diesel consumed during the monitoring period is 14 846 litres.

ρ_{diesel} = Density of diesel of 0.860 kg/ litre; sourced from the registered PD and also verified from the IOCL website [IRL#16].

EF_{diesel} = Emission factor of diesel of 3.186 tCO₂e/ tonne sourced from the registered PD and verified from the IPCC default value [IRL#22].

Thus, the project emission from the diesel consumption in the DG sets is 40.68 tCO₂.

Emissions from 22 KV Transmission line (PE_{y2}):

The project activity is connected to 22 kVA line of HPSEB. The electricity is imported from this 22 kVA line by the project activity for meeting its daily electricity requirements. The amount of electricity import by the project activity from 22 kVA line during the monitoring period is 42 416 MWh and the same has been verified from the monthly invoices from HPSEB [IRL#9].

$$PE_{y2} = E_{22\text{ kV}} \times EF_{grid} / 1000$$

Where

$E_{22\text{ kV}}$ = Electricity consumed at the site in kWh (4 241 600 kWh)

EF_{grid} = Combined margin grid emission factor for NEWNE Grid of 0.805 tCO₂/Mwh as fixed ex ante in the registered PD.

Thus, the project emission from the import of electricity from 22 kV line is 3 414.49 tCO₂.

Emissions from SF₆ (PE_{y3})

As aforementioned, the project activity has five numbers of SF₆ cylinders, with four cylinders of capacity 38.4 kg each and the cylinder of capacity 590 kg. The cylinders need topping of SF₆ if there is any change in the cylinder weight or pressure. As per the monitoring plan, the cylinders are weight every quarter [IRL#4] and the pressure of the cylinders are measured by-digital pressure indicator (DPI-705) once a year [IRL#15]. The pressure of the cylinders were measured by digital pressure indicator (DPI-705) on 15 December 2012 valid till 14 December 2013 and on 20 December 2013 valid till 19 December 2014 [IRL#15]. It has been verified from the plant log book that there has been no change in the cylinder weight [IRL#4] or pressure [IRL#15] during the monitoring period. The project activity also has GIS alarm system, connected to SCADA system, for daily monitoring of the SF₆ cylinder pressure [IRL#3]. The daily report of the GIS alarm has been verified and it is confirmed that there has been no incident of decrease in pressure of SF₆ cylinders. The weights of the cylinders as measure every quarter, covering the monitoring period, are as follows:

Date	Cylinder 1- Gross weight in kg	Cylinder 2- Gross weight in kg	Cylinder 3- Gross weight in kg	Cylinder 4- Gross weight in kg	Cylinder 5- Gross weight in kg
10 June 2013	1046.2	68.6	67.6	73.6	73.4
09 September 2013	1046.2	68.6	67.6	73.6	73.4
05 December 2013	1046.2	68.6	67.6	73.6	73.4
03 March 2014	1046.2	68.6	67.6	73.6	73.4
09 June 2014	1046.2	68.6	67.6	73.6	73.4

Based on the pressure and weight of the cylinders, it is confirmed that there has been no SF₆ leakage. Thus, the project emission from SF₆ is 0.

Hence, the emission reduction during the monitoring period is 408 467 tCO₂. As outlined above, the input data for calculating the emission reductions [IRL#2], the calculating process and the result are complete and transparent. Therefore, TUV-SUD is able to confirm the accuracy of the emission reductions.

3.3 Quality of Evidence to Determine GHG Emission Reductions and Removals

TUV-SUD confirms that a complete set of data for this monitoring period was available to be verified and was in accordance with the approved monitoring plan [IRL#1].

All necessary documentation were collected, referenced and aggregated and were easily accessible in hard-copy and electronic format. Measurements are performed by calibrated equipment, and the key data were cross-checked via other sources (invoices). Weight and pressure of the SF₆ cylinders are regularly monitored as per the monitoring plan. No assumptions are used that have any material influence on reported emission reductions.

3.4 Non-Permanence Risk Analysis

This step is not required as no non-permanence risk rating has been determined by the project proponent in the project activity.

4 VERIFICATION CONCLUSION

TÜV SÜD South Asia Pvt. Ltd (TUV-SUD) has performed the verification of the emission reductions that have been reported for the VCS project “300MW Hydropower project by JHPL” (VCS Registration No. 92) for the period 1 July 2013 to 30 June 2014.

The project participants are responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project.

It is TUV-SUD's responsibility to express an independent verification statement on the reported GHG emission reductions from the project. TUV-SUD does not express any opinion on the selected baseline scenario or on the validated and registered VCS PD [IRL#23].

TUV-SUD conducted the verification on the basis of the approved methodology ACM0002 (version 08) [IRL#21], the monitoring plan contained in the registered VCS PD of 25 December 2008 and the monitoring report (version 1.1) dated 1 December 2014. The verification included i) checking whether the provisions of the monitoring methodology and the monitoring plan were consistently and appropriately applied and ii) the collection of evidence supporting the reported data.

TUV-SUD's verification approach draws on an understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. TUV-SUD planned and performed the verification by obtaining evidence and other information and explanations that TUV-SUD considers necessary to give reasonable assurance that reported GHG emission reductions are fairly stated.

In our opinion the GHG emissions reductions of the “300MW Hydropower project by JHPL” (VCS Project ID No. 92) for the period 1 July 2013 to 30 June 2014 are fairly stated in the monitoring report (version 1.1) dated 1 December 2014.

The GHG emission reductions were calculated correctly on the basis of the approved methodology ACM0002 (version 08) and the monitoring plan contained in the registered VCS PD of 25 December 2008.

TUV-SUD is able to certify that the emission reductions from the “300MW Hydropower project by JHPL” during the period 1 July 2013 to 30 June 2014 amount to 1 026 171 tonnes of CO₂ equivalent, detailed as below.

Reporting period: 1 July 2013 to 30 June 2014

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

GHG Emission Reductions or Removals	tCO ₂ e
Baseline Emissions	1 029 632.65
Project Emissions	3 455.17
Leakage	0
Net GHG emission reductions or removals	1 026 171

TUV-SUD does not assume any responsibility towards the issuance and utilization of the VCU's hereby verified and certified. Request for issuance of VCU's shall be made by the project proponent to an approved VCS Program Registry based on the requirements set out under the most recent version of the VCS Program Guidelines clause on VCS Registration.

The verification of reported emission reductions is based on the information made available to TUV-SUD and the engagement conditions detailed in this report. TUV-SUD cannot be held liable by any party for decisions made or not made based on this report.

List of Findings - Compilation and Resolutions

Project Title: 300MW Hydropower project by JHPL.

Page 1 of 1



Compilation and Resolutions of CARs, CRs and FARs

Clarification Requests by the assessment team		
	Comments and Results	Conclusion and IRL
Issue	<u>The date of change of energy meters are not mentioned in the monitoring report</u>	☒ Finding Closed [IRL #1]
Requirement	Metering details to be mention in the monitoring report as per paragraph 3.16.5 of VCS standard, version 3.4	
Clarification Request	It has been verified from the meter changing certificate that the energy meters of Line 1 and Line 2 has been changed on 11 January 2014. This information is not included in the monitoring plan.	
Response	Energy meters (Main & Check Meter) of line 1 & line 2 has been changed on 11 January 2014. This information has been included in section 3.2 of the revised MR version 1.1.	
Assessment Means of verification	The monitoring report has been adequately updated to include the date of change of meters (main and check) in Line 1 and Line 2. This information has been verified from the meter changing certificate by HPSEB, dated 11 January 2014.	
Adjustment on project design OR Changes in the monitoring report or supporting annexes	Not Applicable.	

INFORMATION REFERENCE LIST

1 REF. NO.	Author/Editor/ Issuer	Title/Type of Document. Publication place			Issuance and/or submission date (dd/mm/yyyy)	Additional Information (Relevance in CDM Context)
1.	Jaiprakesh Power Venture Limited	Monitoring report of “300MW Hydropower project by JHPL”, version 1, dated 11 November 2014 and version 1.1, dated 1 December 2014			version 1, dated 11 November 2014 and version 1.1, dated 1 December 2014	
2.	Jaiprakesh Power Venture Limited	Emission reduction excel sheet, version 1			11 November 2014	
3.	Jaiprakesh Power Venture Limited	Daily GIS alarm monitoring report of SF ₆ gas pressure covering the monitoring period 1 July 2013 to 30 June 2014				
4.	Jaiprakesh Power Venture Limited	Plant log book of weighing of SF ₆ cylinders every quarter covering the monitoring period 1 July 2013 to 30 June 2014.				
5.	Jaiprakesh Power Venture Limited	Monthly electricity invoice to HPSEB covering the monitoring period 1 July 2013 to 30 June 2014.				
6.	Jaiprakesh Power Venture Limited	Monthly diesel consumption report and the diesel receipts covering the monitoring period 1 July 2013 to 30 June 2014.				
7.	Power Grid Corporation of India Limited	Calibration certificates of the energy meters: Line 1:				
		Meter number	Calibration date	Calibration validity		
		UPU 01237 (Main meter)	19/01/2013	18/01/2014		
		UPU 01235 (Check meter)	19/01/2013	18/01/2014		
		HPU 02547 (main meter)	11/01/2014	10/01/2015		
		HPU 02548 (check meter)	11/01/2014	10/01/2015		

1 REF. NO.	Author/Editor/ Issuer	Title/Type of Document. Publication place			Issuance and/or submission date (dd/mm/yyyy)	Additional Information (Relevance in CDM Context)															
		Line 2: <table><tr><td>Meter number</td><td>Calibration date</td><td>Calibration validity</td></tr><tr><td>UPU 01238 (main meter)</td><td>19/01/2013</td><td>18/01/2014</td></tr><tr><td>UPU 01236 (check meter)</td><td>19/01/2013</td><td>18/01/2014</td></tr><tr><td>HPU 02549 (main meter)</td><td>11/01/2014</td><td>10/01/2015</td></tr><tr><td>HPU 02550 (check meter)</td><td>11/01/2014</td><td>10/01/2015</td></tr></table>			Meter number	Calibration date	Calibration validity	UPU 01238 (main meter)	19/01/2013	18/01/2014	UPU 01236 (check meter)	19/01/2013	18/01/2014	HPU 02549 (main meter)	11/01/2014	10/01/2015	HPU 02550 (check meter)	11/01/2014	10/01/2015		
Meter number	Calibration date	Calibration validity																			
UPU 01238 (main meter)	19/01/2013	18/01/2014																			
UPU 01236 (check meter)	19/01/2013	18/01/2014																			
HPU 02549 (main meter)	11/01/2014	10/01/2015																			
HPU 02550 (check meter)	11/01/2014	10/01/2015																			
8.	HPSEB (Himachal Pradesh State Electricity Board)	Certificate of change of energy main and check meters.			11 January 2014																
9.	HPSEB	Electricity bills for the 22 kV line covering the monitoring period 1 July 2013 to 30 June 2014.																			
10.	HPSEB	Joint meter reading for the project activity covering the monitoring period 1 July 2013 to 30 June 2014.																			
11.	Metrological Department of	Calibration certificate of the electronic balance: <table><tr><td>Date of calibration</td><td>Calibration Validity</td></tr></table>			Date of calibration	Calibration Validity															
Date of calibration	Calibration Validity																				

1 REF. NO.	Author/Editor/ Issuer	Title/Type of Document. Publication place		Issuance and/or submission date (dd/mm/yyyy)	Additional Information (Relevance in CDM Context)
	India, Himachal Pradesh (Government of India).	21/08/2012	20/08/2013		
		06/09/2013	05/09/2014		
12.	Quick Logic Controls and Calibration	Calibration certificate of the digital pressure indicator (DPI-705):			
		Date of Calibration	Calibration Validity		
		05/09/2012	04/09/2013		
		04/09/2013	03/09/2014		
13.	HPSEB	Letter to Jaiprakesh Power Venture Limited confirming on the periodic calibration of the energy meter of the 22 kV line import meter by HPSEB, dated 4 May 2010.		4 May 2010	
14.	Jaiprakesh Power Venture Limited	Plant outage report covering the monitoring period 1 July 2013 to 30 June 2014.			
15.	Jaiprakesh Power Venture Limited	Log book of the pressure of the SF ₆ cylinder recorded once a year. On 15 December 2012 and 20 December 2013.			
16.	IOCL	Density of diesel- http://www.iocl.com/Products/DieselSpecifications.pdf			
17.	HPSEB	Power purchase agreement with HPSEB, dated 28 February 2003.		28 February 2003	
18.	VCS	VCS: Programme guide, version 3.4			
19.	BVQI	Validation report and previous verification reports https://vcsprojectdatabase2.apx.com/myModule/Interactive.asp?Tab=Projects&a=2&i=92&lat=31%2E833333&lon=78%2E283333&bp=1			

1 REF. NO.	Author/Editor/ Issuer	Title/Type of Document. Publication place	Issuance and/or submission date (dd/mm/yyyy)	Additional Information (Relevance in CDM Context)
20.	VCS	VCS Standard,version 3.4		
21.	CDM Executive Board	Baseline and monitoring methodology ACM0002, version 08		
22.	IPCC default value	2006 IPCC guidelines for National GHG Inventories - Table 1.2 for NCV value of diesel, and Table 1.4 for carbon oxidation factor and default carbon content for diesel		
23.	Jaiprakesh Power Venture Limited	VCS registered PD, dated 25 December 2008	25 December 2008	



South Asia

CERTIFICATE OF APPOINTMENT

Mr. Sharma, Shivraj fulfills the requirements of the Certification Body 'Environment and Energy' of TÜV SÜD South Asia Pvt Ltd to participate in audits.

Qualification applicable to					
Standard	CDM	GS	VCS	ISO-14064-1: 2006	Other
	☒	☒	☒	☒	☐

Qualification as						
Status	Validator	Verifier	ATL	Technical Reviewer	Financial Expert	Technical Expert
	☒	☒	☒	☒	☒	☒
TA (s)	1.2, 3.1, 13.1					

Country Expertise						
Region	1	2	3	4	5	Other
	☒	☐	☐	☐	☐	
Further countries						

Technical Area
1.2_Renewables
3.1_Energy demand
13.1_Solid waste and wastewater

This appointment is valid until 31.01.2016 and is bound by internal requirements of the Certification Body 'Environment and Energy' of TÜV SÜD South Asia Pvt Ltd.

In case of loss of validity of this certificate as per result of an assessment according to internal procedures or due to any other reason, it will be properly communicated to you.

Your Certificate has the internal reference no. CB-IND-CCP-0060/006.

Date	Signature
01/01/2015	



South Asia

CERTIFICATE OF APPOINTMENT

Mrs. Shome, Sharmistha fulfills the requirements of the Certification Body 'Environment and Energy' of TÜV SÜD South Asia Pvt Ltd to participate in audits.

Qualification applicable to					
Standard	CDM	GS	VCS	ISO-14064-1: 2006	Other
	☒	☒	☒	☐	☐

Qualification as						
Status	Validator	Verifier	ATL	Technical Reviewer	Financial Expert	Technical Expert
	☒	☒	☐	☐	☐	☒
TA (s)	1.2					

Country Expertise						
Region	1	2	3	4	5	Other
	☒	☐	☐	☐	☐	
Further countries						

Technical Area
1.2_Renewables

This appointment is valid until 31.01.2016 and is bound by internal requirements of the Certification Body 'Environment and Energy' of TÜV SÜD South Asia Pvt Ltd.

In case of loss of validity of this certificate as per result of an assessment according to internal procedures or due to any other reason, it will be properly communicated to you.

Your Certificate has the internal reference no. CB-IND-CCP-0095/002.

Date	Signature
01/01/2015	



South Asia

CERTIFICATE OF APPOINTMENT

Mr. Murty, Eswar fulfills the requirements of the Certification Body 'Environment and Energy' of TÜV SÜD South Asia Pvt Ltd to participate in audits.

Qualification applicable to					
Standard	CDM	GS	VCS	ISO-14064-1: 2006	Other
	☒	☒	☒	☒	☐

Qualification as						
Status	Validator	Verifier	ATL	Technical Reviewer	Financial Expert	Technical Expert
	☒	☒	☒	☒	☒	☒
TA (s)	1.2, 3.1, 6.1, 13.1					

Country Expertise						
Region	1	2	3	4	5	Other
	☒	☐	☐	☐	☐	
Further countries						

Technical Area
1.2_Renewables
3.1_Energy demand
6.1_Construction
13.1_Solid waste and wastewater

This appointment is valid until 31.01.2016 and is bound by internal requirements of the Certification Body 'Environment and Energy' of TÜV SÜD South Asia Pvt Ltd.

In case of loss of validity of this certificate as per result of an assessment according to internal procedures or due to any other reason, it will be properly communicated to you.

Your Certificate has the internal reference no. CB-IND-CCP-0031/006.

Date	Signature
01/01/2015	

IS-CMS-CB-POG-01/05, version 03

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