

VERIFICATION REPORT FOR 'PARBATI HYDROELECTRIC PROJECT, STAGE III'



Document Prepared By Earthood Services Private Limited

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Summary:

Earthood has performed the first VCS verification of the project “Parbati Hydroelectric Project, Stage III” (VCS Id. 1425). The project is a hydro power project located in Kullu district of Himachal Pradesh state of India; exporting electricity to the regional grid.

The scope of verification includes confirming the implementation of the monitoring plan of the registered VCS PD (version 5) and the application of the monitoring ACM0002: Grid-connected electricity generation from renewable sources --- Version 16.0. The verification consisted of three phases: i) desk review of the project; ii) follow-up onsite visit and interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final verification report and opinion. The overall verification, from Contract Review to Verification Report & Opinion, was conducted following Earthood internal quality procedures.

During the verification process 04 CARs, 01 CL and 00 FARs were raised.

Earthood confirms that the monitoring system is in place and the emission reductions are calculated without material misstatements. The emission reductions from the project activity “Parbati Hydroelectric Project, Stage III” in India during the period 24/03/2014 to 29/03/2015 (including both days) amount to 630,977 tonnes of CO₂e.

Vintage wise representation of the emission reductions is as follows:

Period	Baseline Emissions (tCO ₂ e)	Project Emissions (tCO ₂ e)	Leakages (tCO ₂ e)	Emission Reductions (tCO ₂ e)
24/03/2014 to 28/12/2014	599,981	00	00	599,981
29/12/2014 to 29/03/2015	30,996	00	00	30,996
Total	630,977	00	00	630,977

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1 INTRODUCTION

1.1 Objective

EKI Energy Services Limited has commissioned Earthood Services Private Limited (Earthood) to perform a Verification of the 'Parbati Hydroelectric Project, Stage III' in India (hereafter called project). This project has already been registered as a VCS project and the crediting period starts from 24/03/2014 (VCS Id 1425). The objective of this verification is a thorough and independent assessment of registered VCS project activity against the applicable VCS requirement by the DOE. The verification process shall determine whether the proposed project activity complies with the requirements of the latest VCS guidelines, applicability conditions of the selected methodology, relevant host country regulations and guidance issued by the VCS Board.

1.2 Scope and Criteria

The scope of the validation and the verification is to assess the claims and assumptions made in the VCS project document (PD), VCS monitoring report (MR) against the VCS criteria, including but not limited to, VCS standard, CDM PS, CDM VVS, applied methodology and other relevant rules and requirements established for VCS project activities.

The verification is not meant to provide any consulting towards the project participants. However, stated requests for clarification and/or correction actions request may have provided inputs for improvement of the project design.

1.3 Level of Assurance

A draft verification report that is prepared by assessment team will be reviewed by an independent technical review team (one or more members) to confirm if the internal procedures established and implemented by Earthood were duly complied with and such opinion/conclusion is reached in an objective manner that complies with the applicable VCS requirements as appropriate. The technical review team is collectively required to possess the technical expertise of all the technical area/sectoral scope the project activity relates to. All team members of technical review team are independent of the verification team. The report approved by Quality Manager is endorsed by Managing Director, who is overall responsible to ensure quality, before final release. The further details of applicable procedures and responsibilities about Earthood Quality Management System (QMS) are available on its website (www.earthood.in).

1.4 Summary Description of the Project

The project activity is a large scale hydro power project of 520 MW located in the state of Himachal Pradesh, India/16/. The project aims to displace electricity produced by fossil fuel power plants harnessing hydel energy. The energy produced is supplied to the national grid NEWNE/01/. Therefore, the project reduces greenhouse gas emissions and thereby contributes to sustainable development. The assessment team confirms that the total emission reductions achieved under this monitoring period (24/03/2014 to 29/03/2015) are 630,977 tCO₂e).

2 VERIFICATION PROCESS

2.1 Method and Criteria

Earthood assessed and determined whether the proposed implementation and operation of the project activity, and the steps taken to report emission reductions comply with the criteria and relevant guidance provided by the VCS Board. The verification process consists of the following three phases;

- A desk review of the VCS PD and VCS MR
- Site visit and follow up interviews with project stakeholders
- The resolution of outstanding issues and issuance of final report and opinion.

2.2 Document Review

The verification is performed primarily as a document review of the VCS PD and VCS MR and associated documents as stated in detail in appendix 1 of this document. The assessment is performed by a verification team using a protocol. The cross checks between information provided in the Monitoring report, VCS PD and information from sources other than those used, if available, the team's sectoral or local expertise and, if necessary, independent background investigations.

2.3 Interviews

The site visit for the project location, by the assessment team, was conducted on 30/03/2015 to 01/04/2015 and the following stakeholders were interviewed.

S.no	Name	Organisation
1.	N.K. Bharadwaj	NHPC
2.	Nirmal Singh	NHPC
3.	Kanwaljeet Puri	NHPC
4.	Jayakrishaan Kumar	NHPC
5.	Deepak Jain	EKI

2.4 Site Inspections

A combined site visit was undertaken by Earthood on 30/03/2015 to 01/04/2015 to carry out validation and verification. The verification includes;

- a. An assessment of the implementation and operation of the registered project activity as per the registered VCS PD and VCS MR;
- b. A review of information flows for generating, aggregating and reporting the monitoring parameters;
- c. Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the PD;
- d. A cross check between information provided in the monitoring report and data from other sources such as plant logbooks, inventories, purchase records or similar data sources;
- e. A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the PD, the applied methodology including applicable tool(s), and, where applicable, the applied standardized baseline;
- f. A review of calculations and assumptions made in determining the GHG data and emission reductions;

An identification of quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.

2.5 Resolution of Findings

The objective of this step is to identify, discuss and conclude on the issues related to the monitoring, implementation and operations of the registered project activity that could impair the capacity of the registered project activity to achieve emission reductions or influence the monitoring and reporting of emission reductions. This is done based on the desk review and onsite assessment. The verification team prepares and/or updates a verification protocol (internal document) that records the conformities and non-conformities, which may be of following types;

CAR (Corrective Action Request) is raised if one of the following occurs:

- Non-compliance with the monitoring plan, the methodology or the standardized baseline are found in monitoring and reporting and has not been sufficiently documented by the project participants, or if the evidence provided to prove conformity is insufficient;
- Modifications to the implementation, operation and monitoring of the registered project activity has not been sufficiently documented by the project participants;
- Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impact the quantity of emission reductions;
- Issues identified in a FAR during validation to be verified during verification or previous verification(s) have not been resolved by the project participants.

Clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met. All CARs and CLs raised by the Earthood during verification shall be resolved prior to submitting a request for issuance.

FAR (Forward Action Request) is raised during verification if the monitoring and reporting require attention and/or adjustment for the next verification period.

All the findings that are raised and communicated to project participant during the verification are included under Appendix 2. The appendix also includes the response, if provided, by the project participants and an assessment by the verification team if it was closed out or otherwise.

2.5.1 Forward Action Requests

The project activity is the first verification; there were no FARs raised during the validation process.

2.6 Eligibility for Validation Activities

This is a verification assignment hence, not applicable.

3 VALIDATION FINDINGS

Not applicable.

3.1 Participation under Other GHG Programs

The project is solely registered under VCS programme and was confirmed from an independent internet search conducted by the team.

3.2 Methodology Deviations

The project activity is in compliance with the applied methodology, no deviations were observed from the registered project scenario.

3.3 Project Description Deviations

PP has requested the following deviations under the current monitoring period:

- 1) The source document for electricity exported. In the registered VCS PD/01/ the export values have been mentioned Joint Meter Reading (JMR) / Monthly Special Energy Meter statement (SEM) however in actual the export values are been sourced from “Deviation Settlement Account document”/11/. Also, the source document for cross-checks has been changed from invoices to Monthly Generation Reports/12/.

The deviation proposed by the PP was accepted by the verification team as the documents mentioned in the registered PD/01/ are not available for the project activity, it being a hydro energy generation project. The exported electricity is in turn sourced from “Deviation Settlement Account document”/11/ which are publically available documents issued by the ‘Northern Regional Power Committee’, Ministry of power; Government of India/17/ entity, this entity coordinates planning and maintenance of generating machines of various generating companies of the region. The source was therefore found acceptable.

For cross-checks the invoices/13/ provided by the PP did not conform the export values. The project being a hydro project the invoices are based on scheduled energy. The actual energy exported might vary from the scheduled amount, this information gets reflected in the “Deviation Settlement Account document”/11/. Therefore, the cross-check document had to be changed. For the current monitoring period, Monthly Generation Reports/12/ have been used which tell an indicative electricity export. The approach was found applicable by the assessment team because MGRs are produced by NHPC Limited in order to assess the performance of all NHPC projects. Since NHPC Ltd is a government of India enterprise and the documents contains generation details of all its projects it is fair to assume it a credible source.

- 2) The second deviation is concerning the parameter “Quantity of Electricity imported by the project from the grid at interconnection point of the Regional Supply in year y; $EG_{Import,y}$ ”
 - a. The source of the data has been changed from Monthly electricity sales bills to import data certified by State Electricity Board. In both the cases the authority certifying the document has remained same which is ‘State Electricity Board’.

- b. The calibration for the import meters was not done during the monitoring period and the import values have been conservatively summed as per the CDM guidelines based on the latest calibration

PP could not trace the documents mentioned in the registered PD/1/; and provided data/19/ which was certified by the State Electricity Board. Since the State Electricity Board is the supplier of electricity here and has admitted the amount of electricity billed to the PP. The source of data was found acceptable by the assessment team.

The deviation in calibration of the electricity import was found acceptable by the assessment team as the import meters are under the jurisdiction of the State electricity board and PP has no control over these meters. Even though the values monitored/19/ by these meters form the basis of monetary transactions the calibration certificates for the monitoring period were not available. The calibration has been conducted on 19/04/2017 and 20/04/2017/15/ and indicated the errors to be in permissible limit. Therefore, the maximum permissible error has been applied as the correction factor to calculate electricity import. The verification team accepted the approach adopted as it is inline to para 395 of VVS version 09/18/ and the accuracy is in line to the registered PD. .

Therefore, the team concludes that there is no deviation in the project which may affect the applicability of methodology, additionality or the appropriateness of the baseline scenario and the project is in compliance with the applied methodology.

3.4 Grouped Project

The project is not a grouped project.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The project activity is a 520 MW hydro power plant located on river Sainj and Jiwa nallah a tributary of Beas River near village Bihali, Kullu district of Himachal Pradesh state of India/16/. The electricity generated is supplied to the regional electricity grid as per the signed power purchase agreement/09/.

The project is a run of the river project which makes use of discharge from the diversion of the tail race releases of Parbati Stage-II power house as well as inflows from river Sainj and Jiwa Nallah. It involves installation of 4 Francis Turbine (Vertical Axis) of the capacity 130 MW each, totalling to 520 MW. The project activity geo-coordinates are: Latitude: 32.5833N, Longitude= 77.5833E; which were verified from the NHPC website/16/ and during the physical site inspection.

The commissioning details of the project are as follows:

Unit No	Commissioning date
I	24-Mar-14
II	24-Mar-14
III	30-Mar-14
IV	6-Jun-14

The commissioning details were verified from the commissioning certificate/10/, the commissioning date of the first turbine has been considered the start date of the project crediting period and also the current monitoring period.

Assessment concludes the following:

- a. The capacity of the project activity was found to be in compliance with registered PD.
- b. DOE has conducted the on-site visit to confirm the implementation status of the project.
- c. The commissioning date of the project activity was found to be accurately and consistently recorded.
- d. The actual operation of project activity was found to be in compliance with the flow diagram provided in registered PD.
- e. There was no increase in emission reduction from estimates made in registered PD, therefore no additional explanation was sought from PP regarding the same.
- f. The project is only registered under VCS program and is not opting for any other GHG programs.

4.2 Accuracy of GHG Emission Reduction and Removal Calculations

The project monitoring has been carried in accordance with the registered VCS PD. The monitoring plan laid out is being followed at the site. The assessment team has verified the information flow (from data generation, aggregation, to recording, calculation and reporting for these parameters including the values) in the MR/04/.

The emission reductions are purely based on the net electricity generated and exported from the project.

4.3 Quality of Evidence to Determine GHG Emission Reductions and Removals

The below tables describe how each parameter, which is to be measured according to the monitoring plan, has been verified to confirm that the actual monitoring complies with the monitoring plan, monitoring data has thoroughly assessed and that the requirements are met.

a) **Quantity of net electricity generation supplied by the project plant/unit to the grid in year y; $EG_{PJ, y}$; MWh**

Criteria/Requirements	Assessment/Observation
Measuring /Reading /Recording frequency	Continuously measured, hourly recorded and monthly reported.
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The measuring and reporting frequency are in line to registered VCS PD/01/ and monitoring methodology/07/.
Monitoring equipment	The parameter is a calculated and is the difference between $EG_{Export, y}$, $EG_{Import, y}$
Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	The parameter is a calculated parameter. The details of the monitoring equipment are provided under the respective parameter heads.
Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Not applicable
Calibration frequency /interval:	Once in five years
Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications?	Yes. The calibration frequency is in line with the registered PD/01/.
Is the calibration of measuring equipment carried out by an accredited person or institution?	Yes, the calibration is conducted by a certified agency/14/.
Is(are) calibration(s) valid for the whole reporting period?	Not applicable

Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Not applicable
How were the values in the monitoring report verified?	The value obtained for the parameter is 651,970 MWh. The reported electricity exported data was verified from the deviation settlement account statement/11/ published by Northern Regional Power Committee. The imported electricity data was taken from the import data. The issuing authority for DSA are government bodies. All the monthly reported values were checked and found consistent.
If applicable, has the reported data been cross-checked with other available data?	The monthly reported data was cross-checked, with the Monthly generation reports /12/ and the data was found comparable.
Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The data management system is transparent and reliable.
In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	The source document for the electricity export and import has been changed. Details of the deviations can be found in section 3.3.

b) Quantity of Electricity exported by the project to the grid at project site switch yard in year y; EG_{Export, y}; MWh

Criteria/Requirements	Assessment/Observation
Measuring /Reading /Recording frequency	Continuously measured, hourly recorded. The recording happens on a weekly basis and monthly values are obtained from there.
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	The measuring frequency is in line to registered VCS PD and reporting is more frequent than the registered plan/01/ and monitoring methodology.

Monitoring equipment	The parameter is monitored tri-vector meters (SEMs) which record both import and export are installed at a) Two transmission lines: each having a main and a check meter b) Project site switch yard: four SEMs for each generating unit. these meters act as standby meters. All the energy meters are Power Grid Corporation Limited owned/14/ and are installed and sealed in the presence of the representative from PGCL and the power producer. The details of the meters are provided under calibration head. The electricity produced by the project activity is monitored continuously by the Northern Regional Power Committee.
Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	The accuracy of the monitoring equipment is 0.2s inline to the registered monitoring plan.
Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	The accuracy is valid for entire monitoring period.
Calibration frequency /interval:	Once in five years
Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications?	Yes. The calibration frequency is in line with the registered PD/01/.
Is the calibration of measuring equipment carried out by an accredited person or institution?	The calibration/14/ is conducted by Larsen & Toubro Limited.
Is(are) calibration(s) valid for the whole reporting period?	Yes, the calibration of the meters was conducted at the time of installation and is valid for 5 years. Hence,

	entire monitoring period is covered.
Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes. The calibration is carried out appropriately.
How were the values in the monitoring report verified?	The value obtained for the parameter is 654,566 MWh. The weekly data mentioned in the emission reduction calculation sheet/05/ were verified from the source deviation Settlement account statement/11/ published by Northern Regional Power Committee/17/. All the weekly reported values were checked and found consistent.
If applicable, has the reported data been cross-checked with other available data?	The weekly reported data was used to arrive at monthly figures which were cross-checked, with the Monthly generation reports /12/ and the data was found comparable.
Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The data management system is transparent and reliable.
In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	The source document for the electricity export has been changed. Details of the deviations can be found in section 3.3.

c) Quantity of Electricity imported by the project from the grid at interconnection point of the Regional Supply in year y; $EG_{Import, y}$; MWh

Criteria/Requirements	Assessment/Observation
Measuring /Reading /Recording frequency	Continuously measured, hourly recorded and monthly reported.
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The measuring and reporting frequency are in line to registered VCS PD/01/ and monitoring methodology.

Monitoring equipment	The import meters are located at various points in the project premise. The electricity is imported from two 11kV Electricity Supply line from State Electricity Boards system. The meter details are provided under calibration head.
Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	The accuracy of the monitoring equipment is 0.5s inline to the registered monitoring plan.
Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	The accuracy is valid for entire monitoring period.
Calibration frequency /interval:	Once in five years as per the registered PD/01/
Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications?	There is a delay in calibration.
Is the calibration of measuring equipment carried out by an accredited person or institution?	Yes, calibration is conducted by a certified agency.
Is(are) calibration(s) valid for the whole reporting period?	The calibration is under the perview of the State Electricity Boards and calibration was not conducted during the monitoing period and has been conducted recently. PP has requested a deviation in th same regard discussed in detail in section 3.3.
Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes
How were the values in the monitoring report verified?	The value considered is 2,596.00 MWh A deviation has been taken for this parameter, details can be found in section 3.3.

	The details of the electricity import calculation can be found in the ER sheet/05/.
If applicable, has the reported data been cross-checked with other available data?	The data provided has been certified by state electricity board, therefore it was accepted..
Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The data management system is transparent and reliable.
In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	The source for the electricity import has been changed. Details of the deviations can be found in section 3.3.

Parameters fixed ex ante:

- EF_{grid, OM, y}**; tCO₂e/MWh: it is the Operating margin emission factor of NEWNE Grid fixed at the time of project registration. The mentioned value of 0.9862 tCO₂e/MWh is consistent with the VCS PD/01/.
- EF_{grid, BM, y}**; tCO₂e/MWh: it is Build margin emission factor of NEWNE grid fixed at the time of project registration. The mentioned value of 0.9495 tCO₂e/MWh is consistent with the VCS PD/01/.
- EF_{grid, CM, y}**; tCO₂e/MWh: it is the combined margin emission factor of NEWNE grid fixed at the time of project registration. The mentioned value of 0.9678 tCO₂e/MWh is consistent with the VCS PD/01/.

Calibration

During the site visit, the team visited the metering locations. It was found that no meter has been replaced during the current monitoring period; therefore, there is no change in the accuracy class of the meters. The details of the equipment monitoring electricity exported have been provided below:

Sl. No.	Meter	Meter Identification No	Meter model & Make	Accuracy Class
1.	Main meter Line 1	NP-8576-A	ER300P L&T	0.2s

Sl. No.	Meter	Meter Identification No	Meter model & Make	Accuracy Class
2.	Check meter Line 1	NP-8577-A	ER300P L&T	0.2s
3.	Main meter Line 2	NP-8592-A	ER300P L&T	0.2s
4.	Check meter Line 2	NP-8540-A	ER300P L&T	0.2s

All the meters were calibrated on 11/06/2013 at the time of installation by the L&T itself/14/. The calibration for these meter is valid for five years and therefore cover the entire monitoring period.

Details of the import meters are as follows:

Sl. No.	Meter location	Meter Identification No	Make	Accuracy Class	Calibration date
1.	BHB 1 (OLD OFFICE)	30825	SEMS Premier	0.5s	19/04/2017
2.	BHB 8 (Administrative Building)	547566	Secure	0.5s	19/04/2017
3.	SPB1 (Sapangini Township)	06645897	L& T	0.5s	20/04/2017
4.	BHB12 (Power House)	07044580	L& T	0.5s	19/04/2017
5.	SJP16 Dam Site)	06769799	L& T	0.5s	20/04/2017
6.	BHB13 (Surge Shaft)	229228	HPL Electric & power Pvt Ltd	0.5s	19/04/2017
7.	LDT 1 (TRT)	226972	HPL Electric & power Pvt Ltd	0.5s	20/04/2017

The import meters are owned by the state electricity board and are not under the control of PP and the calibration certificates of the import meters could not be traced for the current monitoring period, PP recently got the calibration conducted for all the meters. The meters were found to be in the permissible error limit. Therefore, the PP has applied an error factor as per the accuracy class of the meters. The approach is in accordance with the CDM VVS V09/18/ therefore the approach was accepted on the grounds of conservativeness.

A deviation has also been requested in the current verification, details can be found in section 3,3 of the report.

GHG Calculations:

The emission reduction as per the applied methodology equals the baseline emissions (project emissions and leakage emissions for such project activities is considered zero). The formula provided for the calculation of baseline emissions is:

$$BE_y = EG_y * EF_y$$

Where,

BE_y is baseline emissions in year y, tCO₂e

EG_y is the net electricity supplied

Therefore, the Baseline Emissions = 651,970 (MWh) * 0.9678 (tCO₂/MWh)
= **630,977 tCO₂** (rounded down)

4.4 Non-Permanence Risk Analysis

The data variable used for the calculation of emission reductions was overall net electricity supplied by the project activity. The parameter has been monitored through electronic meters therefore the likelihood of error is purely systematic in nature. The energy meters are state utility owned and undergo a calibration check. The monthly sheets for the energy generated issued by the state utility have been submitted to the assessment team and 100% of the data has been verified.

Therefore, assessment team is of the opinion that the emission reductions are free from any omissions, misstatement and material errors.

5 SAFEGUARDS

5.1 No Net Harm

Not applicable.

5.2 Local Stakeholder Consultation

Not applicable.

6 VERIFICATION CONCLUSION

Earthood Services Private Limited (Earthood), contracted by EKI Energy Services Limited has performed the first independent verification of the emission reductions for the VCS project activity (VCS ID 1425) "Parbati Hydroelectric Project, Stage III" in India for the monitoring period 24/03/2014 to 29/03/2015 (both days inclusive) as reported in the Monitoring Report Version 04 dated 10/05/2017. The PP is responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project activity. It is our responsibility to express an independent verification statement on the reported GHG emission reductions from the project activity

Earthood commenced the verification on the basis of the baseline and monitoring methodology ACM0002, Version 16.0, the monitoring plan contained in the PD Version 5 and VCS guidelines version 3.6, Monitoring Report Version 04 dated 10/05/2017 as per the process described under Section 2 of this report.

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

In our opinion the GHG emissions reductions reported for the project activity for the period 24/03/2014 to 29/03/2015 are fairly stated in the Monitoring Report Version 04 dated 10/05/2017. The GHG emission reductions were calculated correctly in line to the approved baseline and monitoring methodology ACM0002, Version 16.0, and the VCS standard.

Verification period: From 24-March-2014 to 29- March -2015

Verified GHG emission reductions and removals in the above verification period:

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
24/03/2014 to 28/12/2014	599,981	--	--	599,981
29/12/2014 to 29/03/2015	30,996			30,996
Total	630,977	--	--	630,977

Approved by



Dr. Kaviraj Singh

Managing Director

Earthood Services Privated Limited

Date:19/05/2017

Place: Gurgaon, Haryana

APPENDIX 1: ABBREVIATIONS

Abbreviations	Full texts
CAR	Corrective Action Request
VCS	Verified Carbon Standard
CL	Clarification Request
DOE	Designated Operational Entity
DSA	Deviation Settlement Account
Earthood(ESPL)	Earthood Services Private Limited
FAR	Forward Action Request
GHG	Greenhouse Gas(es)
JMR	Joint Meter Reading
MR	Monitoring Report
MW	Mega Watt
PD	Project Description
PGCL	Power Grid Corporation Limited
PP	Project Participants
QA/QC	Quality Assurance / Quality Control
SEM	Special Energy Meter
tCO ₂ e	tonnes of Carbon dioxide equivalent
UNFCCC	United Nations Framework Convention on Climate Change
VCR	Verification and Certification Report

APPENDIX 2: REFERENCES

S. No.	Title of Document
1.	Registered VCS PD, version 5 dated 21/10/2015
2.	VCS Validation report, dated 07/12/2015
3.	VCS Monitoring Report version 01 dated 07/12/2016
4.	VCS Monitoring Report version 04 dated 10/05/2017 (final)
5.	VCS ER spreadsheet (corresponding to the final monitoring report)
6.	VCS website for project information http://www.vcsprojectdatabase.org/#/project_details/1425
7.	ACM0002: Grid-connected electricity generation from renewable sources --- Version 16.0
8.	VCS Standard Version 3.6
9.	Power purchase agreement signed between PP and various states
10.	Commissioning certificates for the project activity
11.	Weekly Deviation Settlement Account statements for the project activity for the current monitoring period.
12.	Monthly generation report issued by NHPC Limited.
13.	Invoices raised by the project activity.
14.	Calibration certificates for the export meters used in the current monitoring period
15.	Calibration certificates for the import meters used in the current monitoring period
16.	General project information http://nhpcindia.com/NewWebsite/projectdetail.htm?CatId=1&ProjectId=38
17.	For verification of Deviation Settlement Account http://www.nrpc.gov.in/archives/ar_comm2014-2015.html
18.	CDM Validation and Verification Standard (VVS) Version 9.0
19.	Electricity Import data certified by state electricity board.

APPENDIX 3: FINDINGS

CL ID	01	Section no.	MR	Date : 21/12/2016
Description of CL				
PP is requested to provide the following documents:				
1. Commissioning certificate 2. Calibration certificate for 'NP-8590 A' not provided 3. Line 2 was not commissioned at the time of site visit, PP needs to provide supportive for the information included.				
Project participant response				Date : 13/02/2017
1. The commissioning certificates are provided. 2. There is typo error in serial number in VCS MR and correct serial number for Line 2 Check Meter is 'NP-8540 A'. The VCS MR is revised and the calibration certificate for same is provided to DOE. The photos of main and check meters of line 1 and line 2 are submitted to DOE. 3. The Line 2 is commissioned and letter from NHPC to Power grid substation dated 30/10/2015 for readiness of line 2 is submitted.				
Documentation provided by project participant				
Revised MR version 02 dated 13/02/2017				
DOE assessment				Date: 02/03/2017
1. The information provided in the MR is consistent to the details in the commissioning certificate. Closed. 2. The information between the documents is consistent now closed. 3. The letter provided confirms the details of the Line 2. Closed				

CAR ID	02	Section no.	D.2	Date : 21/12/2016
Description of CAR				
Following issues were identified in the gap VCS PD submitted:				
a) An obsolete version of the MR has been used, b) The cover page is incomplete, no report id has been mentioned. c) The table included in section 1.4 of the MR does not conform to the MR template. d) Section 1.10 and 2.4 was found missing in the MR submitted				
Project participant response				Date : 13/02/2017
a) The current version 3.3 of MR is still valid as per VCS update. The latest version 3.4 is mandatory to use from 19/04/2017, thus before that both previous version 3.3 of MR or template version 3.4 of MR is acceptable. Thus previous version 3.3 of MR is still applicable till 18/04/2017, and same template is continued. b) The report I.D is mentioned in revised MR c) The table in section 1.4 of MR is revised and Role in project is mentioned d) As per applicable and valid MR template version 3.3, the sections 1.10 and 2.4 are not a part of MR template. Hence no revision is required.				
Documentation provided by project participant				
Revised MR version 02 dated 13/02/2017				
DOE assessment				Date: 02/03/2017
PP has chosen to adopt version 3.3 of the MR which is valid till 18/04/2017, therefore updation is not mandatory. The information in the MR as per the requirement of version 3.3 are complete in the MR submitted. Therefore the finding is closed.				

CAR ID	03	Section no.	D.2	Date : 21/12/2016
Description of CAR				
The text included under 'Description of measurement methods and procedures to be applied' includes information indicating that the meters are located at 2 locations: switch yard and at power station. However the location of the meter details provided is not clear. Please clarify.				
Project participant response				Date : 13/02/2017
<i>The line 1 and line 2 are transmission lines at switch yard for the project activity which involves main and check meters for each line and these meters are used for net electricity supplied to grid purpose. Thus description is revised and meters located at switch yard are mentioned in revised VCS MR.</i>				
Documentation provided by project participant				
Revised MR version 02 dated 13/02/2017				
DOE assessment				Date: 02/03/2017
The information about the metering equipment in the revised documentation were found consistent to the onsite observations. However, PP has mentioned that the electricity generation data would be sourced from the JMR or SEM statement report; whereas the same have not been made available to the DOE for assessment. Please clarify. Open				
Project participant response				Date : 25/03/2017
<i>Since hydro projects involves scheduling of energy and invoice is based on scheduled energy, however the difference between scheduled energy and actual energy is reflected in Deviation Settlement Account document. There is no any JMR prepared for the project activity and no invoices are raised based on actual export values. Thus for proposed project activity, the deviation settlement account data has been considered for actual electricity supplied to grid parameter and also same data can be cross checked with Monthly Generation Report. The change is sources for the export parameter is mentioned as deviation in VCS MR.</i>				
Documentation provided by project participant				
Revised MR version 3 dated 25/03/2017				
DOE assessment				Date: 04/04/2017
The deviation proposed by the PP was accepted by the verification team as the documents mentioned in the registered PD/01/ are not available for the project activity, it being a hydro energy generation project. The exported electricity is inturn sourced from "Deviation Settlement Account document"/11/ which are publically available documents issued by the 'Northern Regional Power Committee', Ministry of power; Government of India/17/ entity, this entity coordinates planning and maintenance of generating machines of various generating companies of the region. The source was therefore found acceptable				

CAR ID	04	Section no.	D.2	Date : 21/12/2016
Description of CAR				
The details of the equipment monitoring energy imported could not be found in the monitoring report.				
Project participant response				Date : 13/02/2017
<i>The PP is importing electricity through regional supply lines. These meters will be calibrated and maintained by state electricity board and PP do not have any control on it. PP is getting just import electricity data/electricity bills to pay to state electricity board. Also PP has delayed calibration certificate, thus error factor is applied for import value for complete monitoring period</i>				
Documentation provided by project participant				
Revised MR version 02 dated 13/02/2017				
DOE assessment				Date: 02/03/2017
The information about the import meters installed at various sites regarding the calibration not being in purview of the PP stands correct. And, it is not the duty of the PP to calibrate these meters, however the electricity board who is the seller of the electricity (imported by Parbati III). The meters are sealed and inspected by the authorized personnel only. And the monetary transactions are based on the readings obtained from these meters. Also the latest calibration certificates were made available indicating the errors to be in permissible limits. The PP has applied maximum permissible error for the electricity imported fo the entire monitoring period in accordance with the paragraph 395 of VVS V09. <i>The approach was found acceptable. Closed</i>				

CAR ID	05	Section no.	D.2	Date : 21/12/2016
Description of CAR				
The following discrepancies were found in ER sheet:				
a) The value for electricity supplied by the project activity, which is the monitored parameter could not be found in the supportive provided				
Project participant response				Date : 13/02/2017
<i>The weekly data of deviation settlement account mentioned the actual energy exported by project activity and the same data has been considered for emission reduction calculations. Also import data from regional supply lines are measured and considered for emission reduction calculations.</i> <i>Due to weekly statements of actual energy export which has last week as 23/03/2015 to 29/03/2015, the end date of monitoring period is considered as 29/03/2015 instead of 31/03/2015. The MR and ER sheet is revised accordingly. The import data is considered till March end which is conservative.</i>				
Documentation provided by project participant				
Revised MR version 02 dated 13/02/2017				
Revised ER sheet				
DOE assessment				Date: 02/03/2017
Refer CAR 03				

APPENDIX 4: COMPETENCE STATEMENTS OF THE TEAM

Competence Statement			
Name	Shreya Garg		
Country	India		
Education	M.Sc. (Climate Science & Policy), TERI University		
Experience	4 Years +		
Field	Climate Change		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS-I.D., AMS-II.D., ACM0002		
Local expert	YES (India)		
Financial Expert	NO		
Technical Reviewer	YES		
TA Expert (1.2)	YES		
Reviewed by	Abhishek Mahawar	Date	08/09/2016
Approved by	Ashok Gautam	Date	08/09/2016

Competence Statement			
Name	Nayan Jyoti Deka		
Country	India		
Education	M.Tech. (Energy Technology), Tezpur University		
Experience	8 Years +		
Field	Climate Change & Energy Management		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS-I.D., AMS-III.H., AMS-I.C., ACM0006, ACM0002, ACM0014, AMS-IIG, AMS-IE.		
Local expert	YES (India)		
Financial Expert	NO		
Technical Reviewer	YES		
TA Expert (1.1, 1.2, 3.1, 13.1)	YES		
Reviewed by	Abhishek Mahawar	Date	01/02/2017
Approved by	Ashok Kumar Gautam	Date	01/02/2017