

VERIFICATION REPORT

86 MW hydro project in Himachal Pradesh



KBS Certification Services Private Limited

Project Title	86 MW Hydro Project in Himachal Pradesh
Version	02
Report ID	VCS.15.VER.002

Report Title	86 MW Hydro Project in Himachal Pradesh
Client	Malana Power Company Limited
Pages	28
Date of Issue	08-05-2015
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Summary:

KBS Certification Services Pvt. Ltd. (hereafter referred as 'KBS') has performed VCS verification of the registered VCS project titled: 86 MW Hydro Project in Himachal Pradesh, VCS Project ID: 93). The purpose of the verification is to confirm the implementation of the monitoring plan of the registered VCS PD/1/ dated 27/11/2012 and the application of the monitoring methodology ACM0002 version 12.3.0/7/. A site visit was conducted to check the implementation of registered monitoring plan and verify the data submitted in the monitoring report. KBS confirms the following has been reviewed;

- (a) Monitoring report for the monitoring period under verification including VER calculations sheets/3/ and all supporting documents;
- (b) The applied monitoring methodology ACM0002 version 12.3.0/7/;
- (c) All information and references relevant to the project activity resulting in emission reductions

The VCS verification of the project activity included a desk review, resolution of outstanding issues and reporting. The assessment team has concluded that the monitoring of the project activity is in accordance with the registered VCS PD/1/ (VCS Project ID: 93). The total installed capacity was verified as 86 MW, with 2 Pelton Turbines each of 43 MW capacity installed for power generation by harnessing the water in the state of Himachal Pradesh.

Findings regarding restrictions of uncertainties related to the verification were raised and closed successfully. KBS Certification Services Pvt. Ltd. confirms that the monitoring system is in place and the emission reductions are calculated without material misstatements.

Based on the information seen and evaluated we confirm that the implementation of the project has resulted in 6,28,938 tCO₂e emission reductions during period 01/09/2012 to 28/02/2015.

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1 INTRODUCTION

1.1 Objective

KBS has been commissioned by “Malana Power Company Limited” to perform an independent VCS verification of its registered VCS project “86 MW hydro project in Himachal Pradesh”, for the reported GHG emission reductions for the given monitoring period 01/09/2012 to 28/02/2015 (both dates are inclusive). The VCS projects must undergo independent third party verification and certification of emission reductions as the basis for issuance of VCUs.

The objectives of this verification exercise are, by review of objective evidence, to establish that:

- The project activity has been implemented and operated as per the registered VCS PD/1/ and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place;
- Monitoring report/2/ and other supporting documents are complete;
- The actual monitoring systems & procedures and monitoring report conforms with the requirements of the approved monitoring plan and the approved monitoring methodology;
- The data is recorded and stored as per the monitoring methodology and approved monitoring plan.

1.2 Scope and Criteria

The scope of the verification is the independent and objective review and ex post determination of the monitored reductions in GHG emission by the project activity. The verification is based on the registered VCS PD/1/ and the monitoring report. The project is assessed against the requirements of VCS Version 3.4/4/ and related rules and guidance.

KBS has, based on the recommendations in the latest version of Verified Carbon Standard, employed a risk-based approach in the verification, focusing on the identification of significant reporting risks and the reliability of project monitoring.

1.3 Level of Assurance

☒ Reasonable level of assurance

1.4 Summary Description of the Project

The project activity involves the establishment of a large hydro power plant with a total installed capacity of 86 MW comprising of 2 Pelton turbines of capacity 43 MW each. This run of the river large hydro power project also contains a small reservoir and is located at village Jari, Kullu District, Himachal Pradesh, India.

The project displaces electricity and green house gas (GHG) emissions produced by fossil fuel based clean electricity generation facilities. The generated electricity by the project is being exported to the NEWNE grid of India.

The geographical coordinates of the project activity as mentioned in the registered VCS PD/1/ were cross checked at the project site through a GPS device during the site visit and were found to be consistent.

Based on the information seen and evaluated, the verified and certified emission reductions achieved for the current monitoring period from 01/09/2012 to 28/02/2015 are 6,28,938 tCO₂e.

2 VERIFICATION PROCESS

2.1 Method and Criteria

KBS follows a rule based verification approach, wherein a desk review of the project documentation is undertaken, which is followed by an onsite visit by the members of verification team. The verification protocol is filled by the verification team that is based on standard auditing practices and VVS Version 7/6/ to capture the applicable VCS & VCS requirements. The verification protocol provides transparent means to record the observations by the verification team members and the nonconformities, if any. The verification protocol is an internal document, and available on request.

Duration of Verification:

Verification Contract	30/03/2015
On site verification	07/04/2015
Findings raised	07/04/2015
Draft Verification Report	18/04/2015
Final Verification Report	05/05/2015

2.2 Document Review

A desk review was undertaken, involving but not limited to,

- A review of the data and information presented to verify their completeness;
- 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.

The list of document reviewed is included in the section 'References'.

2.3 Interviews

Please refer section 3.4, where complete list of interviewed personnel and key points discussed is provided.

2.4 Site Inspections

KBS conducted a sites' inspection of the project activity i.e., hydro power station located in Himachal Pradesh, India. A site visit is undertaken by a member (Team Leader/Technical Expert/Local Expert) of verification team, involving but not limited to,

- An assessment of the implementation and operation of the VCS project activity as per the registered VCS PD/1/;
- A review of information flows for generating, aggregating and reporting the monitoring parameters;
- Interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the approved monitoring plan;
- A cross-check between information provided in the monitoring report/2/ and data from other sources such as plant log books, inventories, purchase records or similar data sources;
- A check of the monitoring equipments including calibration performance and observations of monitoring practices against the requirements of the VCS PD/1/ and the selected methodology;
- 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

The site visit for this verification assessment was undertaken by Mr. Sanjay Kandari from the assessment team and details are mentioned below;

Location	Malana, District Kullu, Himachal Pradesh	
Date(s)	07/04/2015	
Key points discussed	Name of person, interviewed	Designation, Organization
Operational data	Er. H S Bishtoo	AVP, Malana Power Company Limited
Calibration	Er. M A Rafiq	Deputy Manager, Malana Power Company Limited
Data collection	Er. M A Rafiq Mr. Chandan Singh	Deputy Manager, Malana Power Company Limited Engineer Electrical, Malana

		Power Company Limited
QA/QC procedures	Er. M A Rafiq Mr. Gulshan Thakvar	Deputy Manager, Malana Power Company Limited Shift Incharge, Malana Power Company Limited
Calculation of ERs	Rohit Garg Abhishek Garg	Consultant, Emergent Ventures India Pvt. Ltd. Deputy Manager, Malana Power Company Limited
VCS requirements	Rohit Garg Abhishek Garg	Consultant, Emergent Ventures India Pvt. Ltd. Deputy Manager, Malana Power Company Limited
Others, if any	Rohit Garg Abhishek Garg	Consultant, Emergent Ventures India Pvt. Ltd. Deputy Manager, Malana Power Company Limited

2.5 Resolution of Findings

Date	Type & Number	Raised by	Reference
07/04/2015	CAR#01	Assessment team	D-30
Non conformities raised			
The emission reduction calculations are not rounded down monthly.			
Project Participant's response		Date: 08/04/2015	
The emission reduction calculations have been rounded down in the revised MR & ER sheet.			
Documentation Provided as Evidence by Project Participant			
Revised MR ver. 1.2/2/ dated 08/04/2015 Revised ER sheet ver. 1.23/ dated 08/04/2015			
Information Verified by Team Leader		Date of review: 18/04/2015	
Revised MR and ER sheet.			
Reasoning for not acceptance or close out			

The monthly ER calculations are now rounded down in the revised documents. The revised calculation found to be appropriate and conservative.

Date of acceptance or non- acceptance	Date: Closed	Status: 18/04/2015
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Date	Type & Number	Raised by	Reference
24/04/2015	CAR#02	Assessment team	D-30

Non conformities raised

The version of methodology applied is not consistent with the previous verification. (Refer CAR#06 of previous verification)

Project Participant's response	Date: 27/04/2015
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The version of methodology is made consistent with the previous verification as ACM0002, ver 12.3.0.

Documentation Provided as Evidence by Project Participant

Revised MR, version 1.2

Information Verified by Team Leader	Date of review: 28/04/2015
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Revised MR

Reasoning for not acceptance or close out

The version of the methodology is now made consistent with the previous verification as ACM0002, version 12.3.0. There are only minor changes in the version of methodology applied during re-validation and previous verification. Therefore the updated version of methodology is applied.

Date of acceptance or non- acceptance	Date: Closed	Status: 28/04/2015
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2.5.1 Forward Action Requests

No Forward Action Requests have been raised during the current verification.

2.6 Eligibility for Validation Activities

Not applicable as the project activity is already registered in the VCS registry, the present verification is the second periodic verification after renew of first crediting period. KBS reviewed the validation report issued by the VVB (TUV NORD) of the renewed of crediting period and verified that the current verification is within the length of second crediting period of registered VCS project activity.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

The project is not registered in any other program; the same was confirmed by interviewing the PP and checking the websites of other GHG programmes. .

3.2 Methodology Deviations

No deviation applied in the current verification, the project fully comply the applied methodology.

3.3 Project Description Deviations

. No deviation found in project description, the project fully comply the registered PD.

3.4 Grouped Project

NA as the project is not a grouped project.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The project activity involves the establishment of a large hydro power plant with a total installed capacity of 86 MW comprising of 2 Pelton turbines of capacity 43 MW each. This run of the river large hydro power project also contains a small reservoir and is located at village Jari, Kullu District, Himachal Pradesh, India.

CAR#01(a) was raised by the assessment team as the emission reduction calculations are not rounded down monthly in MR and ER sheet. In response, PP submitted the revised ER/3/ and MR/4/ sheet with rounded down values which as checked by the assessment team and found appropriate

Finding:

CAR#01 & CAR#02 were raised and resolved satisfactorily; please refer section 2.5 above for details.

Opinion:

The project activity is a run of the river large hydro power project and employs 2 Pelton turbines of 46 MW each; aggregating to a total capacity of 86 MW commissioned in the state of Himachal Pradesh. The same was verified during the site inspection and found to be correct confirming the implementation of the project activity. The total commissioned capacity of the project activity is 86 MW; the same has been checked during physical inspection of site and was found consistent.

The implementation and operation of the project activity is line with the description of the registered VCS PD and no material discrepancy was found;

The verification team verified from the VCS validation report and confirms there was no FAR raised during the validation which has also been verified.

4.2 Accuracy of GHG Emission Reduction and Removal Calculations

Monitored parameters:

Discussions:

Assessment of monitoring procedures for all monitoring parameters is discussed below:

3.2.1. Data/Parameter, Unit: Net Electricity supplied to the NEWNE grid by the project activity during the year y (**EG_y**) MWh

	<i>Discussion and verification assessment</i>
Purpose of Data	For estimation of Baseline Emissions
Monitoring equipment	Not Applicable as it is a calculated parameter
Measuring/ Reading /Recording frequency	Electricity is monitored continuously by the energy meters and recorded monthly/9/, the root parameters to derive the parameters are verified in the below section.
Data collection	Calculated using the following formula:
Verified value, Unit	733,049.16 MWh
Cross checks	The value mentioned in the ER spread sheet/3/ is cross verified by studying the onsite logbooks and invoices raised by PP to the grid.
QA/QC procedures applied	This is calculated parameter, the QA/QC related to the root parameter derived to this are verified in the below section.

3.2.2. Data/Parameter, Unit: Energy generated by Malana Hydro Power project at the Generation point ($EG_{Gen,Malana}$) MWh

	<i>Discussion and verification assessment</i>
Purpose of Data	For estimation of Baseline Emissions
Monitoring equipment	Type : Electricity Meter Accuracy Class of meters : 0.2 % For meter calibration detail, please refer the appendix 2.
Measuring/ Reading /Recording frequency	Electricity is monitored continuously by the energy meters and recorded monthly.
Data collection	The monthly generation data has been obtained from Joint Meter Reading (JMR) documents maintained by State Electricity Board (SEB)/9/. The JMR is signed by the representative of grid and PP both. All the JMRs were verified by the verification team and found the reported value of the parameter is consistent with the JMR.
Verified value, Unit	741,509.632 MWh
Cross checks	The value mentioned in the ER spread sheet/3/ is cross verified by studying the onsite logbooks and invoices raised by PP to the grid.
QA/QC procedures applied	Meters are maintained by state electricity board. These meters are calibrated once in three year and the records maintained by state electricity department. The calibration detail of each meter is provided in the below table. There was no delay in the calibrations and all the result of calibration were found to be satisfactory.

3.2.3. Data/Parameter, Unit: Energy supplied by the Malana Hydro Power Project to the Malana transmission line at Malana Yard (**EG_{Malana}**) **MWh**

	<i>Discussion and verification assessment</i>
Purpose of Data	For estimation of Baseline Emissions
Monitoring equipment	Not Applicable as it is a calculated parameter
Measuring/ Reading /Recording frequency	Electricity is monitored continuously by the energy meters and recorded monthly.
Data collection	Calculated using the following formula:
Verified value, Unit	739,133.255 MWh
Cross checks	The value mentioned in the ER spread sheet/3/ is cross verified by studying the onsite logbooks and invoices raised by PP to the grid.
QA/QC procedures applied	This is calculated parameter, the QA/QC related to the root parameter derived to this are verified in the below section.

3.2.4. Data/Parameter, Unit: The units/ Energy supplied by the **Toss** Hydro Power Project to the Malana transmission line at Malana Yard (**EG_{Toss}**) **MWh**

	<i>Discussion and verification assessment</i>
Purpose of Data	For estimation of Baseline Emissions
Monitoring equipment	Type : Electricity Meter Accuracy Class of meters : 0.2 % For meter calibration detail, please refer the appendix 2.
Measuring/ Reading /Recording frequency	Electricity is monitored continuously by the energy meters and recorded monthly.
Data collection	The monthly generation data has been obtained from Joint Meter Reading (JMR) documents maintained by State Electricity Board (SEB)/9/.
Verified value, Unit	151,457.817 MWh
Cross checks	The value mentioned in the ER spread sheet/3/ is cross verified by studying the onsite logbooks and invoices raised by PP to the grid.
QA/QC procedures applied	Meters are maintained by state electricity board. These meters are annually calibrated and the records maintained by state electricity department. The details of calibration is provided in the below table separately.

3.2.5. Data/Parameter, Unit: Total Energy sent out both Malana and Toss hydro power project to the Malana transmission line at Malana yard (**EG_{M&T}**) **MWh**

	<i>Discussion and verification assessment</i>
Purpose of Data	For estimation of Baseline Emissions
Monitoring equipment	Type : Electricity Meter Accuracy Class of meters : 0.2 % For meter calibration detail, please refer the appendix 2.
Measuring/ Reading /Recording frequency	Electricity is monitored continuously by the energy meters and recorded monthly.
Data collection	The monthly generation data has been obtained from Joint Meter Reading (JMR) documents maintained by State Electricity Board (SEB)/9/.
Verified value, Unit	890,591.072 MWh
Cross checks	The value mentioned in the ER spread sheet/3/ is cross verified by studying the onsite logbooks and invoices raised by PP to the grid.
QA/QC procedures applied	Meters are maintained by state electricity board. These meters are annually calibrated and the records maintained by state electricity department. The details of calibration is provided in the below table separately.

3.2.6. Data/Parameter, Unit: Auxiliary consumption by Malana hydro power project ($EG_{Aux, Malana}$) MWh

	<i>Discussion and verification assessment</i>
Purpose of Data	For estimation of Baseline Emissions
Monitoring equipment	Not Applicable as it is a calculated parameter
Measuring/ Reading /Recording frequency	Electricity is monitored continuously by the energy meters and recorded monthly.
Data collection	Calculated using the following formula:
Verified value, Unit	2,376.377 MWh
Cross checks	The value mentioned in the ER spread sheet/3/ is cross verified by studying the onsite logbooks and invoices raised by PP to the grid.
QA/QC procedures applied	This is calculated parameter, the QA/QC related to the root parameter derived to this are verified for each parameter separately.

3.2.7. Data/Parameter, Unit: Energy injected at Bajoura substation by both Malana and Toss hydro power project (**EG** Bajoura, M&T) **MWh**

	<i>Discussion and verification assessment</i>
Purpose of Data	For estimation of Baseline Emissions
Monitoring equipment	Type : Electricity Meter Accuracy Class of meters : 0.2 % For meter calibration detail, please refer the appendix 2
Measuring/ Reading /Recording frequency	Electricity is monitored continuously by the energy meters and recorded monthly.
Data collection	Calculated using the following formula:
Verified value, Unit	883,390.472 MWh
Cross checks	The value mentioned in the ER spread sheet/3/ is cross verified by studying the onsite logbooks and invoices raised by PP to the grid.
QA/QC procedures applied	Meters are maintained by state electricity board. These meters are annually calibrated and the records maintained by state electricity department. The details of calibration is provided in the below table separately.

3.2.8. Data/Parameter, Unit: Total transmission losses between Malana yard and Bajoura substation (**L-Transmission**) **MWh**

	<i>Discussion and verification assessment</i>
Purpose of Data	For estimation of Baseline Emissions
Monitoring equipment	Not Applicable as it is a calculated parameter
Measuring/ Reading /Recording frequency	Electricity is monitored continuously by the energy meters and recorded monthly.
Data collection	Calculated using the following formula:
Verified value, Unit	7,200.600 MWh
Cross checks	The value mentioned in the ER spread sheet/3/ is cross verified by studying the onsite logbooks and invoices raised by PP to the grid.
QA/QC procedures applied	This is calculated parameter, the QA/QC related to the root parameter derived to this are verified for each parameter separately.

3.2.9. Data/Parameter, Unit: Share of losses of Malana hydro power project (L_{Malana}) MWh

	<i>Discussion and verification assessment</i>
Purpose of Data	For estimation of Baseline Emissions
Monitoring equipment	Not Applicable as it is a calculated parameter
Measuring/ Reading /Recording frequency	Electricity is monitored continuously by the energy meters and recorded monthly.
Data collection	Calculated using the following formula:
Verified value, Unit	6,084.098 MWh
Cross checks	The value mentioned in the ER spread sheet/3/ is cross verified by studying the onsite logbooks and invoices raised by PP to the grid.
QA/QC procedures applied	This is calculated parameter, the QA/QC related to the root parameter derived to this are verified for each parameter separately.

3.2.9. Data/Parameter, Unit: Share of losses of Toss hydro power project (L_{Toss}) MWh

	<i>Discussion and verification assessment</i>
Purpose of Data	For estimation of Baseline Emissions
Monitoring equipment	Not Applicable as it is a calculated parameter
Measuring/ Reading /Recording frequency	Electricity is monitored continuously by the energy meters and recorded monthly.
Data collection	Calculated using the following formula:
Verified value, Unit	1,116.502 MWh
Cross checks	The value mentioned in the ER spread sheet/3/ is cross verified by studying the onsite logbooks and invoices raised by PP to the grid.
QA/QC procedures applied	This is calculated parameter, the QA/QC related to the root parameter derived to this are verified for each parameter separately.

3.2.10. Data/Parameter, Unit: Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (**A_{PJ}**) m²

	<i>Discussion and verification assessment</i>
Purpose of Data	For estimation of Baseline Emissions
Monitoring equipment	Not Applicable as it is a calculated parameter
Measuring/ Reading /Recording frequency	Yearly
Data collection	Calculated by making physical measurement using topographical surveys, maps, satellite pictures, etc on site.
Verified value, Unit	18,250 m ²
Cross checks	The value mentioned in the ER spread sheet/3/ is cross verified by studying maps and satellite pictures of the area.
QA/QC procedures applied	Not applicable. Moreover it is a civil structure and is same since commissioning.

3.2.11. Data/Parameter, Unit: Installed capacity of the hydro power plant after the implementation of the project activity (**Cap_{PJ}**) **Watt**

	<i>Discussion and verification assessment</i>
Purpose of Data	For estimation of Baseline Emissions
Monitoring equipment	Not Applicable
Measuring/ Reading /Recording frequency	One time based on accepted standards and techniques.
Data collection	-
Verified value, Unit	86,000,000
Cross checks	The turbine and generator specification were physically verified to confirm the actual installed capacity of the power plant.
QA/QC procedures applied	Not applicable.

Findings:

No findings have been raised.

Parameters not monitored/ex ante:

Following is the list of parameters that are not monitored/fixed ex ante:

3.2.12. Operating margin CO₂ emission factor for NEWNE grid in the year y/15/. (EF_{grid,OM,y})

Description of parameter	This is the operating margin for the NEWNE grid of India
Verified value	0.994 tCO ₂ /MWh

Source of value	Registered PD/1/
Justification	Consistent with the registered PD/1/ and VCS validation report/1.2/

3.2.13. Build margin CO₂ emission factor for NEWNE grid in the year y/15/. ($EF_{grid,BM,y}$)

Description of parameter	This is the build margin for the NEWNE grid of India
Verified value	0.812 tCO ₂ /MWh
Source of value	Registered PD/1/
Justification	Consistent with the registered PD/1/ and VCS validation report/1.2/

3.2.14. Combined margin CO₂ emission factor for NEWNE grid in the year y (EF_{CM})

Description of parameter	Combined Margin emission factor of the NEWNE grid
Verified value	0.858 tCO ₂ /MWh
Source of value	Registered PD/1/
Justification	Consistent with the registered PD/1/ and VCS validation report/1.2/

Discussion:

Emission factor was calculated using the “Tool to calculate the emission factor for an electricity system”/14/.

The emission factor was computed applying the formula:

$$E_f = W_{OM} * EF_{OM,y} + W_{BM} * EF_{BM,y}$$

The value is calculated as the weighted average of the operating margin and build margin and kept fixed at the time of registration. The value is consistent in the VCS MR/2/ and the registered PD/1/.

Finding:

No findings have been raised..

Opinion:

In the opinion of assessment team, the assumptions, emission factors and default values that were applied in the calculations have been justified.

Calibration Details of Energy Meters:

Calibration Details of Trivector Meters installed at Malana Generation End:

Main/Check	Location of Energy Meters	Meter Sr. No.	Installation Date	Calibration Valid from	Calibration Validity
Main Meter	Gen.-1	KRB00 281	02/03/2012	17/01/2012	16/01/2013
		AB0013A	24/12/2012	27/11/2012	26/11/2013
				23/08/2013	22/08/2014
		KRB00 282	23/06/2014	24/08/2013	23/08/2014
				19/08/2014	18/08/2015
	Gen.-2	KRB00 282	02/03/2012	18/01/2012	17/01/2013
		AB0014A	24/12/2012	27/11/2012	26/11/2013
				23/08/2013	22/08/2014
				19/08/2014	18/08/2015
Check Meter	Gen.-1	AB0013A	31/12/2011	14/11/2011	13/11/2012
		KRB00280	09/11/2012	01/10/2012	01/10/2013
		KRB00281	16/01/2013	03/01/2013	03/01/2014
				23/08/2013	22/08/2014
	Gen.-2	AB0014A	31/12/2011	18/11/2011	17/11/2012
		KRB00279	09/11/2012	03/09/2012	03/09/2013
				23/08/2013	22/08/2014
				19/08/2014	18/08/2015

Calibration Details of Tri vector Meters installed at Malana Transmission End:

Main/Check	Location of Energy Meters	Meter Sr. No.	Installation Date	Calibration Valid from	Calibration Valid upto
Main Meter	Line-1	AB000 1A	31/12/2011	17/11/2011	16/11/2012
		AB000 6A	09/11/2012	03/10/2012	03/10/2013
				23/08/2013	22/08/2014
				19/08/2014	18/08/2015
	Line-2	AB000 3A	31/12/2011	17/11/2011	16/11/2012
		AB000 11A	09/11/2012	05/10/2012	05/10/2013
				23/08/2013	22/08/2014
				19/08/2014	18/08/2015
Check Meter	Line-1	AB000 2A	31/12/2011	16/11/2011	15/11/2012
		AB000 10A	09/11/2012	04/10/2012	04/10/2013
				23/08/2013	22/08/2014
				19/08/2014	18/08/2015
	Line-2	AB000 5A	02/03/2012	17/01/2012	16/01/2013
		AB000 4A	24/12/2012	29/11/2012	28/11/2013
				23/08/2013	22/08/2014
		AB000 5A	23/06/2014	24/08/2013	23/08/2014

				19/08/2014	18/08/2015
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Calibration Details of Tri vector Meters installed at Malana Receiving End (Bajaura Substation).

Main/Check	Location of Energy Meters	Meter Sr. No.	Installation Date	Calibration Valid from	Calibration Valid upto
Main Meter	Line-1	AB000 4A	31/12/2011	15/11/2011	14/11/2012
		KRB09865	09/11/2012	03/10/2012	03/10/2013
				23/08/2013	22/08/2014
				19/08/2014	18/08/2015
	Line-2	AB000 8A	02/03/2012	17/01/2012	16/01/2013
		AB000 12A	24/09/2012	18/01/2012	17/01/2013
		AB000 2A	24/12/2012	29/11/2012	28/11/2013
				23/08/2013	22/08/2014
				19/08/2014	18/08/2015
Check Meter	Line-1	AB000 7A	02/03/2012	16/01/2012	15/01/2013
		AB000 1A	24/12/2012	27/11/2012	26/11/2013
				23/08/2013	22/08/2014
				19/08/2014	18/08/2015
	Line-2	AB000 9A	02/03/2012	16/01/2012	15/01/2013
		AB000 3A	24/12/2012	29/11/2012	28/11/2013
				23/08/2013	22/08/2014
				19/08/2014	18/08/2015

4.3 Quality of Evidence to Determine GHG Emission Reductions and Removals

The reported values, notation, units and sources in the monitoring report for all the monitoring parameters have been cross checked with the emission reduction sheet/5/ and with revised monitoring report/2/. During verification, the data is cross verified with the reading mentioned in the Monitoring report/2/, the procedure for data transfer and compilation was also verified and found in compliance with the requirement.

Furthermore, the cross checks have been performed during site inspection/8/ on the continuous operation of the monitoring equipment and procedures. The quality of evidence to determine emission reductions was found satisfactory therefore it has been accepted by the assessment team.

The emission reductions were calculated using the following formula:

$$ER_y = BE_y - PE_y - L_y$$

where,

BE_y = Baseline Emissions = $EF_y * EG_y$

PE_y = Project emissions = 0

$L_y = \text{Leakages} = 0$

So, emission reductions will be

$$ER_y = BE_y = EF_y * EG_y$$

$$ER_y = 62,89,38 \text{ tCO}_2\text{e}$$

4.4 Non-Permanence Risk Analysis

Not applicable to the project activity.

5 VERIFICATION CONCLUSION

KBS Certification Services Pvt. Ltd. Has been contracted by Malana Power Company Limited to undertake independent verification and certification for the greenhouse gas (GHG) emission reductions reported from the “86 MW Hydro Project in Himachal Pradesh” VCS ID. No. 93 for the monitoring period ranging from 1st September 2012 to 28th February 2015.

The verification is based on the validated and registered VCS PD/1/ and the monitoring report/2/ for this project. Our verification approach was based on the requirements as defined under the by the VCS Association and the VCS Standard Version 3.4/4/.

The management of the Malana Power Company Limited is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project Final Monitoring Report Version 1.2/2/ and dated 27/04/2015. The calculation and determination of GHG emission reductions from the project is the responsibility of the management of the Malana Power Company Limited. The development and maintenance of records and reporting procedures are in accordance with the Monitoring Report/2/ Version 1.2 and dated 27/04/2015.

It is our responsibility to express an independent GHG verification opinion on the GHG emissions and on the calculation of GHG emission reductions from the project for the period 01/09/2012 to 28/02/2015 based on the reported emission reductions in the Final Monitoring Report Version 1.2/2/ dated 27/04/2015 for the same period.

Based on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these, KBS planned and performed our work to obtain the information and explanations that we considered necessary to provide sufficient evidence for us to give reasonable assurance that this reported amount of GHG emission reductions for the period is fairly stated.

KBS confirms the following;

Verification period: From 01/09/2012 to 28/02/2015 (First and last day inclusive)

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

Month	Baseline emissions (BEy) (tCO ₂ e)	Project emissions (PEy) (tCO ₂ e)	Lekages (Ly) (tCO ₂ e)	Emission reductions (ERy) tCO ₂ e
Sep-12	41654	0	0	41654
Oct-12	14598	0	0	14598
Nov-12	8054	0	0	8054
Dec-12	6173	0	0	6173
Jan-13	4840	0	0	4840
Feb-13	4725	0	0	4725
Mar-13	6139	0	0	6139
Apr-13	11848	0	0	11848
May-13	25734	0	0	25734
Jun-13	47482	0	0	47482
Jul-13	62695	0	0	62695
Aug-13	43053	0	0	43053
Sep-13	31331	0	0	31331
Oct-13	17902	0	0	17902

Nov-13	8001	0	0	8001
Dec-13	6132	0	0	6132
Jan-14	5169	0	0	5169
Feb-14	4483	0	0	4483
Mar-14	6748	0	0	6748
Apr-14	12026	0	0	12026
May-14	25000	0	0	25000
Jun-14	46320	0	0	46320
Jul-14	63802	0	0	63802
Aug-14	55136	0	0	55136
Sep-14	32284	0	0	32284
Oct-14	15043	0	0	15043
Nov-14	7358	0	0	7358
Dec-14	4342	0	0	4342
Jan-15	5474	0	0	5474
Feb-15	5392	0	0	5392
Total	628938	0	0	628938

Location: Faridabad, Haryana, India

Date: 08/05/2015



Kaushal Goyal

Managing Director

KBS Certification Services Pvt. Ltd.

6 REFERENCES:

S. No	Name of Document
/1/	/1.1/ VCS – PD Version 01, dated 11/07/2013 /1.2/ Re-validation Report dated 23/04/2012 /1.3/ Previous verification report issued by VVB dated 30/11/2012
/2/	/2.1/ Monitoring Report version 1.0 dated 30/03/2015 /2.2/ Monitoring Report version 1.1 dated 08/04/2015 /2.3/ Monitoring Report version 1.2 dated 27/04/2015
/3/	/3.1/ Emission Reduction Spread Sheet Version 01 /3.3/ Emission Reduction Spread Sheet Corresponding to final versions of MR
/4/	VCS Standard, Version 3.4
/5/	VCS Program Guide Version 3.4 dated 4/10/2012
/6/	VCS Validation and Verification Standard – Version 07.0
/7/	Consolidated baseline methodology for grid-connected electricity generation from renewable source”, ACM0002
/8/	Audit Plan of site visit carried out.
/9/	/9.1/ Monthly Joint Meter Reading (JMR) certificates of Malana HEP indicating main and check meter numbers and the energy generated at the site and that injected at Sarabai Sub-station at Bajaura by HPSEB covering entire reported monitoring period, including the auxiliary consumption and transmission losses. /9.2/ Weekly Joint Meter Reading (JMR) certificates of Malana HEP indicating main and check meter numbers and the energy generated at the site and that injected at Sarabai Sub-station at Bajaura by HPSEB covering entire reported monitoring period (, including the auxiliary consumption and transmission losses. /9.3/ Meter readings of Toss HEP covering entire reported monitoring period issued by HPSEB.
/10/	Technical Specification of turbines and generators verified from the nameplates.
/11/	1. Calibration records for the generation, transmission and sub-station energy meters for the entire monitoring period. 2. Calibration records for the meters at the Toss injection point at Malana yard for the entire monitoring period. 3. Details of changes in the tri-vector meters at generation end.
/12/	Copies of invoice raised to the electricity board for the sale of electricity as a cross check of .net electricity supplied to grid.
/13/	Documents pertaining to the implementation of project activity. /13.1/ Erection and Commissioning of 2x43 MW Hydro generating units of Malana Hydroelectric Project issued by Bharat Heavy Electricals Limited: • Commissioning of Unit I: 09/07/2001 • Commissioning of Unit II: 05/07/2001 /13.2/ Copy of 40 years implementation agreement dated 12 March 1997
/14/	EB 70, Annex 22: Tool to calculate the emission factor for an electricity system
/15/	Central Electricity Authority (CEA) : CO2 Baseline Database for the Indian Power Sector, version 6.0 http://www.cea.nic.in/reports/planning/VCS_co2/VCS_co2.htm