

VERIFICATION REPORT

YUNNAN MANGLI HYDROPOWER PROJECT



Document Prepared By: Bureau Veritas Certification Holding SAS

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Summary:

Bureau Veritas Certification has made the Pre-CDM verification of Yunnan Mangli Hydropower Project, owned by Datang Mangli Hydropower Development Company Limited, which is located in Mangshi River, in Luxi City of Yunnan Province of P.R. China, with UNFCCC Reference No. 4821 on the basis of Voluntary Carbon Standard (VCS) Version 3 Program, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, as well as the host country criteria.

The verification scope is defined as a periodic independent review and ex post determination by the Designated Operational Entity of the monitored reductions in GHG emissions during defined verification period, and consisted of the following three phases: i) desk review of the project design and the baseline and monitoring plan; ii) follow-up on-site 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 using Bureau Veritas Certification internal procedures.

The first output of the verification process is a list of Clarification Requests, Corrective Actions Requests, Forward Actions Requests (CLs, CARs and FARs).

In summary, Bureau Veritas Certification confirms that the Project is implemented as planned and described in the VCS-PD. Installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately. The monitoring system is in place and the Project is ready to reduce GHG emission. The GHG emission reduction is calculated without material misstatements.

Our opinion relates to the Project's GHG emissions and the resulting GHG emission reductions viz. Voluntary Carbon Units (VCUs) reported are based on the valid project baseline, monitoring plan and associated documents. Based on the evidence and information that are considered necessary to guarantee that GHG emission reductions are appropriately calculated, Bureau Veritas Certification confirms following statement:

Reporting period	Baseline emissions (tCO ₂ e)	Project emissions (tCO ₂ e)	Leakage emission (tCO ₂ e)	Emission Reductions (tCO ₂ e)
25/01/2010~31/12/2010	97,530	0	0	97,530
01/01/2011~06/10/2011	74,471	0	0	74,471
Total	172,001	0	0	172,001

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1 INTRODUCTION

1.1 Objective

Datang Mangli Hydropower Development Company Limited has commissioned Bureau Veritas Certification to verify the emission reductions of the Verified Emission Reduction (VER) of Yunnan Mangli Hydropower Project (hereafter referred to as **“the Project”**), which is located in Mangshi River, in Luxi City of Yunnan Province of P.R. China for the period from 25/01/2010 to 06/10/2011, prior to its first CDM crediting period.

Bureau Veritas Certification as the verification body of the Project has been accredited as a DOE by UNFCCC and also meets the competence requirements as set out in ISO 14065:2007.

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

Certification is the written assurance by a Certification Entity that, during a specific period in time, a project activity achieved the emission reductions as verified. According to the VVS, the Certification Entity is defined as an entity which has been accredited as a DOE by the CDM Executive Board for the particular scope into which the project falls or has been accredited as an approved Certification Entity by the VCS Steering Committee. Bureau Veritas Certification is an accredited DOE for the particular scope into which the Project falls.

The objective of verification is to verify and certify the Verified Carbon Units (VCUs) generated by the Project from 25/01/2010 to 06/10/2011.

VCS Version 3 Program and UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM rules and modalities and the subsequent decisions by the CDM Executive Board, as well as the host country criteria.

1.2 Scope and Criteria

The verification scope is defined as an independent and objective review of the VCS Project Description (VCS-PD), the Project's baseline study and Monitoring Report (MR) and other relevant documents. The information in these documents is reviewed against VCS Version 3 requirements, UNFCCC rules and associated interpretations.

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

1.3 Level of assurance

The verification report is based on the VCS-PD, the VCS Monitoring Report (MR), CDM-PDD, supporting evidences made available to the verifier and information collected through performing interviews and during the on-site assessment. The verification conclusion is assured the level of assurance of the Project is high.

1.4 Summary Description of the Project

The Project is owned by Datang Mangli Hydropower Development Company Limited (hereafter referred to as “**the PP**”) and is located in Mangshi River, in Luxi City of Yunnan Province of P.R. China. The Project consists of 2 sets of hydro turbines (model: HLA551c-LJ-262) and generators (Model: SF-J18-30/5050) with unit capacity of 18MW, providing a total capacity of 36 MW. The annual expected electricity supplied to China Southern Power Grid (CSPG) is 143,652 MWh and the annual estimated emission reductions are 113,189tCO₂e.

The Project has been registered on 07/10/2011 (UNFCCC ref. No. 4821) under approved CDM methodology ACM0002 Version 12.1.0 “Consolidated methodology for grid-connected electricity generation from renewable sources”. The Project Start Date is 13/01/2010, when the first turbine generator started electricity generation. The crediting period for the Project under the VCS is from 25/01/2010 to 06/10/2011.

Project title:	Yunnan Mangli Hydropower Project
UNFCCC Ref number:	4821
CDM Registration Date:	07/10/2011
VCS Monitoring Period:	25/01/2010 to 06/10/2011
Project Participants:	China (host): Datang Mangli Hydropower Development Company Limited
Methodologies used	ACM0002 Version 12.1.0
Location of the Project:	Mangshi River, in Luxi City of Yunnan Province of P.R. China
Geo coordinates:	longitude 98.3145°E and latitude of 24.3083°N
UNFCCC link:	http://cdm.unfccc.int/Projects/DB/DNV-CUK1305694841.24/view

2 VALIDATION PROCESS, FINDINGS AND CONCLUSION

2.1 Validation Process

The overall validation, from Contract Review to Validation Report & Opinion, was conducted using Bureau Veritas Certification internal procedures.

The Project Description (VCS-PD)^[8] and the Monitoring report (VCS-MR)^[10] submitted by China National Water Resources & Electric Power Materials & Equipment Co. Ltd. and additional background documents related to the project design and baseline, i.e. country Law, submitted revised CDM-PDD^[5], validation report, Approved methodology, Clarifications on Validation Requirements to be Checked by a certified validation body were reviewed.

Bureau Veritas Certification verified the information contained in the documents reviewed against the requirements set in VCS Standard Version 3.3 effective as the 04/10/2012^[3] and the Validation and Verification Standard Version 02.0^[2], issued by CDM Executive Board at its 65th meeting on 25/11/2011.

In addition, on 28/06/2012, Bureau Veritas Certification performed an on-site visit and interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of Datang Mangli Hydropower Development Company Limited were interviewed (see References). The main topics of the interviews are summarized in Table 1.

Table 1 Interview topics

Interviewed organization	Interview topics
Datang Mangli Hydropower Development Company Limited (The PP)	↳ Project background information and CDM consideration. ↳ Project technology, operation, maintenance and monitoring capability. ↳ Project monitoring and management plan. ↳ Stakeholder consultation process. ↳ Project approval status (incl. EIA approval, CDM project approval status) ↳ Hydro power project development in the area ↳ Government policies related to hydro power projects
China National Water Resources & Electric Power Materials & Equipment Co. Ltd. (The Consultant)	↳ Applicability of selected methodology. ↳ Baseline determination. ↳ Emission reductions calculation. ↳ Emission reduction monitoring plan.

During the validation process no material discrepancies were found and Bureau Veritas did not considered necessary to raise neither corrective actions, nor clarifications nor other findings.

2.2 Validation Findings

2.2.1 Gap Validation

According to the VCS standard Version 3.3 for projects validated under the CDM, the cover page and sections 1.2, 1.3, 1.5, 1.6, 1.7, 1.9, 1.10, 1.12.1, 1.12.2, 1.12.3, 1.12.4 and 1.13 of the VCS Project Description Template shall be completed and a validation/verification body shall undertake a validation of same to provide a gap validation for the project's compliance with the VCS rule.

Bureau Veritas Certification verified the information reported in the VCS-PD version 02 dated 25/10/2012^[8] against the CDM-PDD^[5], CDM validation report^[11], Project Host country (China) LoA^[13], Project Operation Log^[15], Business License of the PP^[12], PPA^[14] and UNFCCC website^[25] and found consistent. The detailed validation process is documented in the Table below:

Table 1 Criteria of VCS-PD

CRITERIA OF VCS-PD	Ref	COMMENTS	Concl.
1 Project Details			
1.2 Sectoral Scope and Project Type	VCS-PD, CDM-PDD, CDM Validation Report	As a hydro power project, the Project falls into the sectoral scope I Energy Industries (renewable sources). The project is not a grouped project.	OK
1.3 Project Proponent	VCS-PD, CDM-PDD, CDM Validation Report, LoA, UNFCCC website, PPA	The Project owner is Datang Mangli Hydropower Development Company Limited.	OK
1.5 Project Start Date	VCS-PD, Project implementation log	The project starting date in VCS Version 3.3 is defined as the date when the Project began generating GHG emission reduction or removals. As per implementation log of the Project, on 13/01/2010 the first turbine generator started electricity generation. As a consequence the Project starting date is 13/01/2010.	OK
1.6 Project Crediting Period and	VCS-PD, Project implementation log, CDM- PDD,	The Project starting date is 13/01/2010 and the Project was registered as CDM on 07/10/2011. Since 25/01/2010, the data have been	OK

CRITERIA OF VCS-PD	Ref	COMMENTS	Concl.
	CDM Validation report, UNFCCC website	monitored and collected following the monitoring procedure in the VCS-PD. Therefore, starting date of the crediting period is 25/01/2010. The VCS crediting period is from 25/01/2010 to 06/10/2011, which does not overlap with the CDM crediting period starting from 07/10/2011.	
1.7 Project Scale and Estimated GHG Emission Reductions or Removals	VCS-PD, CDM-PDD, CDM Validation report	The Project is expected to achieve 113,189 tCO ₂ e of emission reductions per year. It is thus categorized as ' Project ' as per VCS 3.3 definition.	OK
1.9 Project Location	Site visit, VCS-PD, CDM-PDD, CDM Validation report	The project site is located in Mangshi River, in Luxi City of Yunnan Province of P.R. China. The Project coordinates of longitude 98.3145°E and latitude of 24.3083°N have been verified during the onsite visit.	OK
1.10 Conditions Prior to Project Initiation	VCS-PD, CDM-PDD, CDM Validation report	The scenario existing prior to the start of the implementation of the project activity is the China Southern Power Grid, which is dominated by fossil-fuel fired power plant, providing the same electricity service as the Project. The purpose of the proposed project is to generate hydro power and deliver it to CSPG. The implementation of the Project was not to generate GHG emissions primarily for the purpose of its subsequent removal or destruction.	OK
1.12.1 Right of use	FSR, LoAs, PPA, Business license, Approval of the project	Yunnan Mangli Hydropower Project in Yunnan Province is owned by Datang Mangli Hydropower Development Company Limited. The Letter of Approval (No.1913) issued by National Development and Reform Commission of the P.R. China ^[13] is provided to demonstrate the right of use of the Project.	OK

CRITERIA OF VCS-PD	Ref	COMMENTS	Concl.
		Information has also been verified by checking the FSR ^[30] , LoAs ^[13] , PPA ^[14] , Business license, Approval of the project Business licence ^[12] .	
1.12.2 Emission Trading Programs and Other Binding Limits	VCS-PD, CDM-PDD, CDM Validation Report, UNFCCC website	N.A. to the Project. The Project has been registered as a CDM project on 07/10/2011. Only GHG emission reductions achieved from 25/01/2010 to 06/10/2011 could be verified as VCUs under the VCS version 3.3.	OK
1.12.3 Participation under Other GHG Programs	VCS-PD, CDM-PDD, CDM Validation Report, UNFCCC website	The Project has been registered as a CDM project (UNFCCC Reference No.4821) on 07/10/2011. Only GHG emission reductions achieved from 25/01/2010 to 06/10/2011 could be verified as VCUs under the VCS Version 3.3 program.	OK
1.12.4 Other Forms of Environmental Credit	VCS-PD, CDM-PDD, CDM Validation Report, UNFCCC website	The project neither has nor intends to generate any other form of GHG-related environmental credit for GHG emission reductions or removals claimed under the VCS Program. The Project only will generate CER from 07/10/2011 on.	OK
1.13 Additional Information Relevant to the Project -Eligibility Criteria -Leakage Management -Commercially Sensitive Information -Further Information	VCS-PD, CDM-PDD, CDM Validation Report, UNFCCC website	- It is not a grouped project; - Leakage is 0; - No commercial sensitive information has been excluded to the public - There is not any additional relevant legislative, technical, economic, sectoral, social, environmental, geographic, site-specific and/or temporal information that may have a bearing on the eligibility of the project, the net GHG emission reductions or	OK

CRITERIA OF VCS-PD	Ref	COMMENTS	Concl.
		removals, or the quantification of the project's net GHG emission reductions or removals	

2.2.2 Methodology Deviations

No methodology deviation has been applied to the Project

2.2.3 Project Description Deviations

The model of generator in the registered PDD contains a typographical error. The revised PDD has been submitted and the change would not affect the monitoring of the project.

2.2.4 New Project Activity Instances

Not applicable since Yunnan Mangli Hydropower Project is not a grouped project.

2.3 Validation Conclusion

In Bureau Veritas Certification's opinion the Project conforms to the relevant criteria of VCS Standard Version 3.3.

3 VERIFICATION PROCESS

3.1 Method and Criteria

The overall verification, from Contract Review to Verification Report & Opinion, was conducted using Bureau Veritas Certification internal procedures.

The Project was verified against the requirements set in VCS Standard Version 3.3 effective as the 04/10/2012^[3] and the Clean Development Mechanism Validation and Verification Standard^[2], issued by CDM Executive Board at its 65th meeting on 25/11/2011.

3.2 Document Review

The verification of the project documentation provided by the project participant is based upon both quantitative and qualitative information on emission reductions. Quantitative information comprises the reported numbers in the monitoring report (MR) version 02 dated 25/10/2012 and VCS-PD version 02 dated 25/10/2012 submitted to the Bureau Veritas Certification. Qualitative information comprises information on internal management controls, calculation procedures, procedures for transfer of data, frequency of emissions reports, and review and internal audit of calculations.

In addition to the monitoring documentation provided by the project participants, Bureau Veritas Certification reviews:

- a) The PD of the Project, the submitted revised CDM-PDD, including the monitoring plan and the corresponding validation report^[5]^[11];
- b) The applied monitoring methodology^[1];
- c) The CDM-MR and Verification for the 1st monitoring period of CDM^[6]
- d) Other information and references relevant to the project activity's resulting emission reductions (e.g. national regulations)^[20]^[21].

3.3 Interviews

On 28/06/2012, Bureau Veritas Certification performed an on-site visit and interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review.

Representatives of China National Water Resources & Electric Power Materials & Equipment Co. Ltd. and Datang Mangli Hydropower Development Company Limited were interviewed (see References).

Interviewed organization	Interview topics
Datang Mangli Hydropower Development Company Limited (the Project Owner)	↗ Project Design and implementation ↗ Technical equipment, calibration and operation ↗ Monitoring Plan and management procedures ↗ Monitoring data ↗ Data uncertainty and residual risks (QA/QC) ↗ GHG Calculation

China National Water Resources & Electric Power Materials & Equipment Co. Ltd. (the Consultant)	↗	Environmental Impacts
	↗	Compliance with National Laws and Regulations
	↗	Monitoring Plan
	↗	Monitored data and Monitoring Report
	↗	GHG Calculations

3.4 Site Inspections

Please refer to section 3.3 above.

3.5 Resolution of Any Material Discrepancy

The objective of this phase of the verification is to raise the requests for corrective actions and clarification and any other outstanding issues that needed to be clarified for Bureau Veritas Certification positive conclusion on the GHG emission reduction calculation.

Findings established during the verification can either be seen as a non-fulfilment of criteria ensuring the proper implementation of a project or where a risk to deliver high quality emission reductions is identified.

Corrective Action Requests (CARs) are issued, where:

- Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient;
- Mistakes have been made in applying assumptions, data or calculations of emission reductions which will impair the estimate of emission reductions;
- Issues identified in a FAR during validation or previous verification to be verified during verification have not been resolved by the project participants.

Forward Action Requests (FARs) are issued, for actions if the monitoring and reporting require attention and/or adjustment for the next verification period.

The verification team may also use the term Clarification Requests (CLs), if information is insufficient or not clear enough to determine whether the applicable VCS requirements have been met.

To guarantee the transparency of the verification process, the issues raised are documented in more details below.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

Bureau Veritas Certification has performed an on-site visit and found that the Project has been put into operation and the electricity generated is supplied to CSPG according to the signed Power Purchase Agreement (PPA) ^[14]. 2 sets of hydro turbine (model: HLA551c-LJ-262) generator (Model: SF-J18-30/5050) ^[17] with unit capacity of 18MW, providing a total capacity of 36 MW as described in the submitted revised PDD have been in operation.

According to the implementation log of the Project ^[15], the first turbine has been commissioning since 13/01/2010. However, since 25/01/2010, the data have been monitored and collected following the monitoring procedure of the VCS-PD. Therefore, starting date of the crediting period is 25/01/2010.

The model of generator in the registered PDD contains a typographical error. The revised PDD has been submitted and the change would not affect the monitoring of the project.

Information provided in the monitoring report is in accordance with that stated in the VCS-PD and CDM-PDD. Further analysis of monitored parameters as reported in the monitoring report compared to those estimated in the CDM-PDD is developed in section 4.2 of this report.

[Power System]

As is shown in the diagram of the power connection system ^[16], the Project supplies electricity to China Southern Power Grid via a 110kV transmission line and imports electricity via the same 110kV line and a backup line.

[Metering System]

There are three meters installed for the Project.

One electricity meter (M1) is installed at the Grid substation to monitor electricity supplied by the Project and imported to the Project; one electricity meter (M2) is installed at the Project site only for backup purpose, another electricity meter (M_{backup}) is installed on the backup line to monitor electricity imported through backup line.

4.2 Accuracy of GHG Emission Reduction or Removal Calculations

Monitoring has been carried out in accordance with the monitoring plan contained in the VCS-PD^[8] and the submitted revised CDM-PDD^[5].

[Parameters and information flow]

The parameters required by the monitoring plan and the way Bureau Veritas Certification has verified the information flow (from data generation, aggregation, to recording, calculation and reporting for these parameters including the values) in the monitoring reports are described below:

Parameters monitored:

$EG_{\text{export},y}$ is electricity supplied by the project activity to the grid in year y

$EG_{\text{import},y}$ is electricity imported by the project activity from the grid in year y

$EG_{\text{backup},y}$ is electricity imported through backup line from the grid in year y

Therefore, quantity of net electricity generation supplied by the project ($EG_{\text{facility},y}$) can be calculated as:

$$EG_{\text{facility},y} = EG_{\text{export},y} - EG_{\text{import},y} - EG_{\text{backup},y}$$

As described above, the meters have been installed in accordance with the submitted revised PDD. Bureau Veritas Certification has on-site checked the location of the meters against the diagram of power system connection of the Project and found that they are consistent.

The readings of the meters are continuously monitored and monthly recorded by the PP and the grid company. The cut-off time to calculate the monthly net electricity supplied to the grid by the Project is on 24:00 of 25th of each month in 2010 and on 24:00 of 10th of each month in 2011 except in a few months a different date could be selected which were decided by the grid company. The grid company provided the PP with the Electricity Transaction Notes (ETNs) monthly, which contain the electricity exported to and imported from the grid by the Project.

The Bureau Veritas Certification has verified the values provided in the VCS-MR version 02 dated 25/10/2012 against the relevant documented evidences i.e. the MRRs and the ETNs and found it consistent with the evidences.

A_{PJ} Area of the reservoir measured in the surface of the water, after the implementation of the Project, when the reservoir is full.

A_{PJ} should be measured annually. A_{PJ} is measured by Dehong Jiada Road Survey and Design Co. Ltd on 15/04/2010 and 12/04/2011^[28]^[29]. The respective value is 2,735,390 m² and 2,732,305 m².

CAP_{PJ} Installed capacity of the hydro power plant after the implementation of the project activity.

As per the nameplates of the on-site turbines and generators, the installed capacity of the hydropower plant after the implementation of the project activity is 36MW.

Parameters determined ex-ante:

(1) $EF_{grid,CM,y}$, emission factor of the grid

The emission factor of the 1st crediting period of the Project has been determined ex-ante in the submitted revised PDD. The emission factor used in the monitoring report has been verified against the PDD and found them to be consistent.

Cap_{BL} , installed capacity of the hydro power plant before the implementation of the Project.

The Project is a newly constructed hydro power plant and this value is zero.

A_{BL} , Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full.

For new reservoirs, in accordance with the methodology ACM0002 Version 12.1.0, this value is zero.

[Calibration]

During this monitoring period, the installed metering equipments have been operating well and were duly calibrated. The calibration records are shown in Table 2 below.

Table 2 The calibration records of the meters

Meter ID	Serial number	Accuracy	Calibration date	Calibration validity	Calibration entity
M_{backup}	060001004134	1.0	12/10/2009 12/06/2010 23/05/2011	Yes	Dehong Jincheng Power Metering Equipment Inspection Technology Co. Ltd. ^[19]
M1	02299816	0.2S	22/07/2009 10/05/2010 30/01/2011	Yes	
M2	20081167020135	0.2S	30/12/2009 22/12/2010	Yes	

Calibration Entity: Dehong Jincheng Power Metering Equipment Inspection Technology Co. Ltd. with the code of (Dian) Fa Ji (2008) 1.

The monitoring plan required that "Metering equipment will be calibrated by an accredited calibration agency annually according to the sectoral requirement.", "M1 and M2 with accuracy of 0.5% or higher." and " M_{backup} with accuracy of 2% or higher."

The verification team has verified the calibration records and the accreditation certificate of the calibration entity. All the meters meet the rated accuracy level as described in the monitoring plan and are in compliance with the industry standard Technical Administrative Code of Electric Energy Metering (DL/T 448-2000)^[20]. The calibration frequency fulfills the requirement as described in the monitoring plan and is in compliance with the national standard Verification Regulation of Electrical Energy Meter with Electronics (JJG 596-1999)^[21].

4.3 Quality of Evidence to Determine GHG Emission Reductions or Removals

A complete set of data for the specified monitoring period is available.

The critical parameter used for the determination of the Emission Reductions is the net electricity supplied to the grid by the Project. The data pertaining to the above parameter are maintained in the identified records. All the data are in compliance with that stated in the Monitoring Report version 02.

As per the methodology ACM0002 Version 12.1.0^[1] and the VCS-PD^[8], the emission reductions for the Project are calculated as the baseline emissions minus the project emissions and leakage. Hence the emission reduction is determined by the following formula:

$$ER_y = BE_y - PE_y - LE_y$$

Where,

ER_y: Emission reductions

BE_y: Baseline emissions

PE_y: Project emissions

LE_y: Leakage emissions

[Baseline emissions]

The baseline emissions are the baseline emission reductions factor times the net electricity supplied to the grid. Therefore,

$$BE_y = EF_{\text{grid, CM, y}} \times EG_{\text{facility, y}}$$

EF_{grid, CM, y}: GHG emission factor of the CSPG, calculated ex ante in the registered CDM-PDD and VCS-PD as 0.7879 tCO₂e/MWh

EG_{facility, y}: Quantity of net electricity generation supplied by the project

EG_{facility, y} is calculated as:

$$EG_{\text{facility}} = EG_{\text{export, y}} - EG_{\text{import, y}} - EG_{\text{backup, y}}$$

The verification team has cross-checked the values from the MRRs^[22] with the ETNs^[23] for the period from 25/01/2010 to 06/10/2011 and found them fully consistent. The verified values are shown in the following Table 3.

Table 3 The Quantity of net electricity generation supplied by the project (MWh)

Period	EG _{export, y} MRRs	EG _{import, y} MRRs	EG _{backup, y} MRRs	Verified EG _{facility}
	A	B	C	D = A-B-C
25/01/2010~25/02/2010	1,299.848	20.592	0.000	--
26/02/2010~25/03/2010	1,979.472	20.856	0.000	
26/03/2010~25/04/2010	3,884.320	21.032	0.000	

26/04/2010~25/05/2010	3,550.272	16.544	0.000	
26/05/2010~25/06/2010	8,441.312	12.760	0.000	
26/06/2010~25/07/2010	14,846.656	2.992	0.000	
26/07/2010~25/08/2010	25,676.992	0.000	0.000	
26/08/2010~25/09/2010	20,524.240	2.552	0.000	
26/09/2010~25/10/2010	21,196.736	0.088	0.000	
26/10/2010~25/11/2010	12,482.448	11.088	0.000	
26/11/2010~31/12/2010	10,026.544	15.488	0.000	
Subtotal in 2010	123,908.840	123.992	0.000	123,784.848
01/01/2011~10/01/2011	3,241.040	0.088	0.000	--
11/01/2011~30/01/2011	2,351.008	23.936	0.000	
31/01/2011~10/02/2011	1,791.680	6.160	0.000	
11/02/2011~10/03/2011	3,529.680	16.720	0.000	
11/03/2011~10/04/2011	3,849.120	18.480	0.000	
11/04/2011~10/05/2011	3,446.080	22.880	0.000	
11/05/2011~10/06/2011	6,225.120	14.080	0.000	
11/06/2011~10/07/2011	12,992.320	7.040	0.000	
11/07/2011~10/08/2011	19,306.320	1.760	0.000	
11/08/2011~10/09/2011	21,506.320	2.640	0.000	
11/09/2011~06/10/2011	16,394.400	0.880	0.000	
Subtotal in 2011	94,633.088	114.664	0.000	94,518.424
Total	218,541.928	238.656	0.000	218,303.272

Note:* For period 26/11/2010~31/12/2010, 01/01/2011~10/01/2011, 11/01/2011~30/01/2011, 11/09/2011~06/10/2011, separate ETNs are issued by the grid company.

Table 4 The baseline emissions of the Project

Period	EG _y (MWh)	Emission Factor (tCO ₂ e/MWh)	Baseline Emission (tCO ₂ e)
	E	F	G=E*F
2010	123,784.848	0.7879	97,530
2011	94,518.424		74,471
TOTAL	218,303.272	-	172,001

[Project emissions]

On 15/04/2010, A_{PJ} of the project is 2,735,390 m², Installed capacity of the project is 36,000,000W, the power density of the project = $(Cap_{PJ}-Cap_{BL})/(A_{PJ}-A_{BL}) = 13.161 \text{ W/m}^2$, greater than 10W/m². ^[28]

On 12/04/2011, A_{PJ} of the project is 2,732,305m², Installed capacity of the project is 36,000,000W, the power density of the project = $(Cap_{PJ}-Cap_{BL})/(A_{PJ}-A_{BL}) = 13.176 \text{ W/m}^2$, greater than 10W/m². ^[29]

As per the methodology ACM0002 Version 12.1.0, the project emission is zero.

[Leakage emissions]

No leakage needs to be considered according to ACM0002 Version 12.1.0.

[Emission reductions]

Therefore, the emission reductions during the monitoring period from 25/01/2010 to 06/10/2011 are calculated as:

Monitoring Period	Vintage	BE _y (tCO ₂ e)	PE _y (tCO ₂ e)	LE _y (tCO ₂ e)	Emission reductions (tCO ₂ e)
25/01/2010 to 06/10/2011	2010	97,530	0	0	97,530
	2011	74,471	0	0	74,471
Total		172,001	0	0	172,001

As per ex-ante calculation of the registered CDM-PDD, the average of annual emission reductions is 113,189 tCO₂e. The estimated ERs during this period are 192,266 tCO₂e (=113,189*620/365), whereas the actual emission reduction accomplished by the project during this verification period is 172,001 tCO₂e. Comparing with the estimated ERs, the actual ERs were lower than estimation.

4.4 Management and Operational System

The data reporting procedure between the Project and the grid company has been identified and assessed during the on-site visit. In order to ensure the completeness of the records of the meters, the PP had taken the effective actions including the installation, adjustment, calibration and continual monitoring for the meters.

The PP has operated the Project as per VCS-PD and the submitted revised CDM-PDD. The monitoring organization has been set up, all monitoring staffs have been trained and quality control procedures are in place ^{[26][27]}. Reading records of all meters are based on continuous measurement and are monthly recorded by the PP and the grid company. The grid company issues monthly ETNs to confirm the net electricity supplied to the grid.

5 VERIFICATION CONCLUSION

Bureau Veritas Certification has performed the verification of Yunnan Mangli Hydropower Project, CDM Registration Reference Number 4821, owned by Datang Mangli Hydropower Development Company Limited, which is located in Mangshi River, in Luxi City of Yunnan Province of P.R. China, and applying the methodology ACM0002 Version 12.1.0. The verification was performed based on the requirements set by VCS Standard Version 3.3 effective as the 04/10/2012, UNFCCC criteria for the CDM and relevant guidance provided by CMP and the CDM Executive Board.

The verification consisted of the following three phases: i) desk review of the project design and the baseline and monitoring plan; ii) follow-up interviews with project stakeholders and onsite visit; iii) resolution of outstanding issues and the issuance of the final verification report and opinion.

The management of Datang Mangli Hydropower Development Company Limited is responsible for the preparation of the GHG emissions data and the reported GHG emission reductions of the project on the basis set out within the project Monitoring Plan in the submitted revised PDD. The development and maintenance of records and reporting procedures in accordance with that plan, including the calculation and determination of GHG emission reductions from the Project, is the responsibility of the management of the Project.

Bureau Veritas Certification has verified the project Monitoring Report version 02 dated 25/10/2012 for the reporting period as indicated below. Bureau Veritas Certification confirms that the Project is implemented as described in validated and submitted revised project design documents. Installed equipments being essential for generating emission reductions run reliably and are calibrated appropriately. The monitoring system is in place and the Project is generating GHG emission reductions. The Project also conforms with the verification criteria for projects and their GHG emission reductions or removals set out in the VCS rules.

Bureau Veritas Certification can confirm that the GHG emission reductions are calculated without material misstatements. Our opinion relates to the project's GHG emission and resulting GHG emission reductions reported and related to the validated and submitted revised project baseline, monitoring plan and its associated documents. Based on the evidence and information that are considered necessary to guarantee that GHG emission reductions are appropriately calculated, Bureau Veritas Certification confirms the following statement:

Reporting period : 25/01/2010 to 06/10/2011

GHG Emission Reductions or Removals (tCO ₂ e)	2010	2011	Total
Baseline Emissions	97,530	74,471	172,001
Project Emissions	0	0	0
Leakage	0	0	0
Net GHG emission reductions or removals	97,530	74,471	172,001

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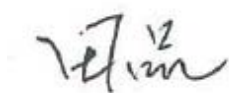
[30]. FSR of the Project

Persons interviewed:

- | | | |
|-----|----------------------------------|--|
| /1/ | Li Ying,
Project Manager | Datang Mangli Hydropower Development Company Limited |
| /2/ | Luo Shunyuan,
Project Manager | Datang Mangli Hydropower Development Company Limited |
| /3/ | Luo Xianjun,
Director | Datang Mangli Hydropower Development Company Limited |

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