DATONG RIVER ZHUCHAXIA HYDROPOWER STATION

TÜV Rheinland (China) Ltd.

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Report Title	VCS Verification Report for Datong River Zhuchaxia Hydropower Station
Client	Climate Bridge Ltd.
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Prepared By	TÜV Rheinland (China) Ltd.
Contact	Unit 707, AVIC Building, No.10B, Central Road, East 3rd Ring Road, Chaoyang District, Beijing 100 022, People's Republic of China Tel.: +86 10 6566 6660 (ext.169) Fax: +86 10 6566 6667 E-mail: GHG-DOE@bj.chn.tuv.com
Approved By	Mr. Praveen Urs
Work Carried Out By	Mr. Chong YAN Mr. Jiang ZHU, Dr.Lixin Li, Mr.Jiandong Ma

Summary:

The verification team assigned by the DOE (TÜV Rheinland (China) Ltd.) has performed the verification of the project "Datong River Zhuchaxia Hydropower Station" (hereafter referred to as "the project") in China, on the basis of requirements of VCS Standard version 3.2.

The project is newly-built hydropower project with total installed capacity of 34MW. All electricity generated by the project will be supplied to the Northwest Power Grid of China in which the fossil-fuel based power plant are mainly dominated, thus the project achieves GHG emission reductions.

The project has been registered as a CDM project (UNFCCC Ref. No.2845) with the fixed crediting period starting from 18 December 2009. As reflected on the UNFCCC website, the CDM GHG programme validation of the project was completed and submitted to the CDM EB to request for registration on 3 August 2009, which is within two years of the project start date, i.e. starting power generation on 24/03/2008. Therefore, the monitoring period for this verification is selected from 24/03/2008 to 17/12/2009(incl. both days).

The verification was conducted by the following three steps:

i) Desk review of the VCS monitoring report (Version 1, dated 03/03/2012), the registered CDM PDD, the CDM validation report, emission reductions calculation spreadsheet and supporting documents made available to the verification team by the project participant;

ii) Follow-up interviews and site inspection (07/03/2012-09/03/2012); and

iii) Resolution of outstanding issues and desk review of the revised VCS monitoring report (Version 3, dated 12/04/2012).

The verification team confirms that the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner. Hence, TÜV Rheinland (China) Ltd. is able to certify that the emission reductions resulted from the project is as following:

Reporting Period: From 24/03/2008 to 17/12/2009

Emission Reductions: 180,792 tCO_2e

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1 INTRODUCTION

The Climate Bridge Ltd. has commissioned the DOE (TÜV Rheinland (China) Ltd.) to carry out the verification of the project "Datong River Zhuchaxia Hydropower Station" for the monitoring period from 24/03/2008 to 17/12/2009(incl. both days) prior to its CDM first crediting period, on the basis of requirements of VCS Standard version 3.2.

For the purpose of the verification report, the following abbreviations apply in the project,

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CL	Clarification request
CO2e	Carbon dioxide equivalent
DOE	Designated Operation Entity
EB	Executive Board
FAR	Further Action Request
GHG	Greenhouse Gases
MR	Monitoring Report
MW	Mega Watt
PD	Project Description
PDD	Project Design Document
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Verified Carbon Standard
VCUs	Verified Carbon Units

1.1 Objective

Verification is the periodic independent formal review by the accredited verification body and ex-post determination of the monitored GHG emission reductions during a defined verification period.

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

The objective of this verification is to verify and provide a verification statement of emission reductions of the project "Datong River Zhuchaxia Hydropower Station" during the monitoring period from 24/03/2008 to 17/12/2009(incl. both days).

1.2 Scope and Criteria

The scope of the verification is:

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

The criteria of the verification are:

- VCS Standard version 3.2 and other relevant requirements defined by VCSA;
- Approved consolidated baseline and monitoring methodology ACM0002 (version 07).

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 has been planned and organized to achieve a

☒ Reasonable level of assurance

☐ Limited level of assurance

1.4 Summary Description of the Project

The project "Datong River Zhuchaxia Hydropower Station" is a run-of-river hydropower project developed by GEPIC Darong Electric Power Company Ltd., in Tibetan Autonomous County of Tianzhu, Lanzhou City, Gansu Province, P. R. China, with geographical coordinates of "102°35′32″E, 36°52′19″N" for the dam and "102°38′14″E, 36°51′12″N" for the power house respectively.

The total installed capacity of the project is 34MW, consisting two same units of 13.5MW turbine (Model: HLA551C-LJ-230) and generator (Model: SF13.5-28/4870), one unit of 7MW turbine (Model: HLA551C-LJ-165) and generator (Model: SF7000-20/3250) as described in the registered PDD*/3/*. The purchase contract for the turbine generator units applied in the project was provided to the verification team/13/, and showed the key technical data of turbine generator unit in the following tables,

Table 1, Key technical data of turbine

Model	HLA551C-LJ-230	HLA551C-LJ-165
Quantity	2	1
Rated power	13.9 MW	7.3 MW
Rated water head	38 m	38 m
Rated flow	39.67 m^3/s	20.88 m^3/s
Manufacturer	Tianjin Tianfa Heavy Hydropower Equipment Co., Ltd.	

Table 2, Key technical data of generator

Model	SF13.5-28/4870	SF7000-20/3250
Quantity	2	1
Rated power	13.5 MW	7 MW
Rated voltage	10500 V	10500 V
Power current	873.3 A	452.8 A
Rated frequency	50Hz	50Hz
Manufacturer	Tianjin Tianfa Heavy Hydropower Equipment Co., Ltd.	

By utilizing the hydrological resource of the Datong River, the electricity generated by the project is delivered to Gansu power grid of the Northwest China Power Grid via the 110KV Dacaigou Substation, which is in compliance with the grid-connection electricity dispatching agreement of the project/15/.

During the monitoring period from 24/03/2008 to 17/12/2009, the total net electricity supplied by the grid by the project is 212,747.716MWh, thus the VCUs generated by the project is determined as 180,792tCO2e against the registered PDD/3/ , the validation report/4/ and the approved consolidated baseline and monitoring methodology ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” (version 07)/12/, detailed assessment as seen in the following section 3.

2 VALIDATION PROCESS, FINDINGS AND CONCLUSION

2.1 Validation Process

The project is a registered CDM project activity (UNFCCC Ref. No. 2845) under the approved CDM methodology ACM0002 Version 07 “Consolidated methodology for grid-connected

electricity generation from renewable sources", as confirmed from the UNFCCC website http://cdm.unfccc.int/Projects/DB/TUEV-SUED1249311745.95/view.

The CDM Project activity Registration Form of the project "Datong River Zhuchaxia Hydropower Station" was checked, and can confirm that the CDM validation report of the project was submitted to the CDM EB to request for registration by the CDM Validation DOE of TUV SUD on 3 August 2009/5/. As reflected in the daily operation & maintenance logs of the project /14/ and its electricity trading notes/18/, the project is verified to start operation on 20 June 2008, which is also correctly reported in the VCS monitoring report/2/.

In accordance with the section 3.8 and the item 3) of section 3.12.8 of VCS standard version 3.2 /7/, the CDM validation of the project is deemed to have been completed within two years of the project start date.

2.2 Validation Findings

2.2.1 Gap Validation

In accordance with the item 3) of section 3.1.5 of the latest version 3.2 of VCS Registration and Issuance Process/8/, the cover page and sections 1.2, 1.3, 1.5, 1.6, 1.7, 1.9, 1.10, 1.12.1, 1.12.3, 1.12.4 and 1.13 of the VCS Project Description Template/10/ have been correctly completed in the VCS monitoring report/2/, and the verification team also have undertaken a validation of same to validate the project's compliance with the VCS rules as following,

1)	Cover page
Validation opinion:	The Cover page of the VCS Project Description Template is verified to be correctly added in the VCS monitoring report/2/.
2)	Section 1.2- Sectoral Scope and Project Type
Validation opinion:	Based on the registered PDD/3/, as a run-of-river hydro project, the project is confirmed to fall in the sectoral scope 1: energy industries (renewable-/non-renewable sources), which has been correctly described in the VCS monitoring report/2/. In addition, the project is checked to be a pure registered CDM project activity, thus the project can be considered not to be a grouped project.
3)	Section 1.3- Project Proponent
Validation opinion:	By means of checking its business license/25/, the project owner of the project is verified to be GEPIC Darong Electric Power Company Ltd. as same as demonstrated in the registered PDD/3/. In addition, based on the on-site interview with the management representative of the GEPIC Darong Electric Power Company Ltd./i/, the contact information described in the VCS monitoring report/2/ is correct as well.
4)	Section 1.5- Project Start Date
Validation opinion:	The project start date of 24/03/2008 can be substantiated by the daily operation & maintenance logs/14/ and the electricity trading notes issued by the Gansu electric power company/18/.

5)	Section 1.6- Project Crediting Period
Validation opinion:	Via UNFCCC website http://cdm.unfccc.int/Projects/DB/TUEV-SUED1249300679.15/view, the project was registered as CDM project activity with UNFCCC Ref. No. 2845, indicating the fixed 10 years CDM crediting period starting from 18/12/2009. As per the item 3) of section 3.1.5 of latest version 3.2 of VCS Registration and Issuance Process/8/, the project registered under CDM program is eligible to claim Voluntary Carbon Units (VCUs) generated prior to the CDM program, i.e. the crediting period from 24/03/2008 to 17/12/2009, one year and 269 days in total.
6)	Section 1.7- Project Scale and Estimated GHG Emission Reductions or Removals
Validation opinion:	By means of checking the registered PDD/3/, the annual estimated GHG emission reductions are 121,617tCO2e. In accordance with the VCS program definitions/11/, Mega project is defined as the project that generates 1,000,000 tonnes CO2e or more of GHG emissions reductions or removals per year. Thus, it is validated that the scale of the project with estimated emission reductions less than 1,000,000 tonnes CO2e is “Project”.
7)	Section 1.9- Project Location
Validation opinion:	The project is located in Tibetan Autonomous County of Tianzhu, Lanzhou City, Gansu Province of China, which is consistent with the registered PDD/3/. And also the geographical coordinates of “102°35′32″E, 36°52′19″N” for the dam and “102°38′14″E, 36°51′12″N” for the power house can be confirmed with the map tool of professional software “Google Earth”.
8)	Section 1.10- Conditions Prior to Project Initiation
Validation opinion:	The registered PDD/3/ was checked and found that the conditions prior to project initiation is that electricity will be supplied by the fossil-fuel based power plants dominated Northwest China Power Grid, and the project has not been implemented to generated GHG emissions for the purpose of their subsequent reduction, removal or destruction.
9)	Section 1.12.1- Proof of Title
Validation opinion:	The letter of approval issued by the national development & reform commission of P.R. China/6/, was checked and found that the GEPIC Darong Electric Power Company Ltd. is authorized to carry out the project activity. Further, the business license of GEPIC Darong Electric Power Company Ltd. officially issued by the Administration for Industry and Commerce of Lanzhou /25/ was checked to confirm its ownership of the project.
10)	Section 1.12.2- Emissions Trading Programs and Other Binding Limits
Validation opinion:	Via UNFCCC website http://cdm.unfccc.int/Projects/DB/TUEV-SUED1249311745.95/view, the project was registered as CDM project activity with UNFCCC Ref. No. 2845, indicating the fixed 10 years CDM crediting period starting from 18/12/2009, thus the net GHG emission reductions generated from the reporting period from 24/03/2008 to 17/12/2009 will not be used for compliance with the CDM

trading program or to meet binding limits on GHG emissions other VCS.

11) Section 1.12.3- Participation under Other GHG Programs

Validation opinion: The project was registered as CDM project activity with UNFCCC Ref. No. 2845, indicating the fixed 10 years CDM crediting period starting from 18/12/2009, details as shown in the UNFCCC website http://cdm.unfccc.int/Projects/DB/TUEV-SUED1249311745.95/view. Thus, the GHG emission reductions during the reporting period 24/03/2008 to 17/12/2009 can be considered not to be claimed credit under the approved CDM program, and its VCU issuance before the end of the total project crediting period under CDM program (i.e. 24/10/2020) is eligible for the project as per the sections 3.12.5 and 3.12.6 of the version 3.2 of VVS standard.

12) Section 1.12.4- Other Forms of Environmental Credit

Validation opinion: During the on-site visit, the management representative, i.e. Mr. Bo HU/i/, was interviewed and confirmed that no other form of GHG-related environmental credit for GHG emission reductions or removals has been or will be claimed under the VCS program during the reporting period from 24/03/2008 to 17/12/2009.

13) Section 1.13- Additional Information Relevant to the Project

Validation opinion:

For Eligibility Criteria

In accordance with the registered PDD /3/and validation report /4/ of the project, the project is not a grouped project, thus this item is not applicable to the project.

For Leakage Management

In accordance with the applied methodology ACM0002 version 07/12/ and the registered PDD/3/, the leakage can be not considered, thus this item is not applicable to the project.

For Commercially Sensitive Information

As confirmed from the project owner and the VER buyers, all information stated in the VCS monitoring report/2/ is public.

For Further Information

As reported in the CDM validation report of the project /4/, the CDM validation DOE issued a positive opinion to the project for requesting registration. In addition, the verification team haven't identified any additional information that may have a bearing on the eligibility of the project, the net GHG emission reductions or removals, or the quantification of the project's net GHG emission reductions or removals.

2.2.2 Methodology Deviations

N/A

2.2.3 New Project Activity Instances

N/A

2.3 Validation Conclusion

Based on the assessment in both the above section 2.1 and section 2.2.1, the verification team can state that the project described in the VCS monitoring report /2/, conforms with the validation criteria for projects as set out in the VCS Standard version 3.2/7/ and the VCS Registration and Issuance Process version 3.2 /8/.

3 VERIFICATION PROCESS

3.1 Method and Criteria

The verification team is selected for the project as showed in the below table,

Role	Full Name	Appointed for Sectoral Scopes	Affiliation
Team Leader	Mr. Jiang ZHU	1.1, 1.2, 4.5	TÜV Rheinland (China) Ltd.
Acting Team Leader	Mr. Chong YAN	1.2, 2.1, 3.1, 4.3, 4.5, 9.1	TÜV Rheinland (Shanghai) Ltd.
Technical Reviewer	Dr. Lixin LI	1.1, 1.2, 2.1, 2.2, 3.1, 4.5	TÜV Rheinland (China) Ltd.
Technical Reviewer Trainee	Mr. Jiandong MA	1.1, 1.2, 4.5	TÜV Rheinland (Shanghai) Ltd.

The verification of the project was performed through means of the following three phases in accordance with the requirement of the registered PDD, the applied methodology, and the VCS standard version 3.2 and other relevant VCS requirements.

- A desk review of the monitoring report and all support documents;
- Follow-up interviews with project stakeholders and site inspection;
- The resolution of outstanding issues and the issuance of the verification report and statement.

The following sections outline each step in more detail.

3.2 Document Review

The following table outlines the documentation reviewed during the verification process:

Ref no.	Reference Document
/1/	VCS Monitoring Report (MR) of Datong River Zhuchaxia Hydropower Station, version 1, dated 03/03/2012

/2/	VCS MR of Datong River Zhuchaxia Hydropower Station, version 3, 12/04/2012
/3/	CDM Project Design Document (PDD) of Datong River Zhuchaxia Hydropower Station, Registration No. 2845, Version 02 submitted to EB for request for registration, dated 03/08/2009 http://cdm.unfccc.int/Projects/DB/TUEV-SUED1249311745.95/view
/4/	Validation report of Datong River Zhuchaxia Hydropower Station, Version 02 submitted to EB for request for registration, dated 03/08/2009 http://cdm.unfccc.int/Projects/DB/TUEV-SUED1249311745.95/view
/5/	CDM Project Activity Registration Form of Datong River Zhuchaxia Hydropower Station submitted by the validation DOE of TUV SUD, dated 03/08/2009 http://cdm.unfccc.int/filestorage/P/W/4/PW45HALRO762EDBJM8V3CIZSX1KFY0/RegForm.pdf?t=SXV8bTEyNms4fDC9R8IImMU7TR7luzW6a0fw
/6/	The letter of approval issued by the National Development & Reform Commission of P.R. China, English version No. 1196, dated in June 2008
/7/	VCS Standard, version 3.2, dated 01/02/2012
/8/	VCS Registration and Issuance Process, version 3.2, dated 01/02/2012
/9/	VCS Monitoring Report Template, version 3.1, dated 01/02/2012
/10/	VCS Project Description Template, version 3.0, dated 08/03/2011
/11/	VCS Program Definitions, version 3.2, dated 01/02/2012
/12/	Approved consolidated baseline and monitoring methodology ACM0002 " Consolidated baseline methodology for grid-connected electricity generation from renewable sources", version 07, EB 36, Annex 11, dated 30/11/2007
/13/	Purchase contract of turbine generator units of Datong River Zhuchaxia Hydropower Station signed between GEPIC Darong Electric Power Company Ltd. and Tianjin Tianfa Heavy Hydropower Equipment Co., Ltd., dated in June 2006
/14/	Daily operation & maintenance logs in the year 2008 and 2009
/15/	Grid-connection electricity dispatching agreement signed between the Lanzhou branch of Gansu Electric Power Company and GEPIC Darong Electric Power Company Ltd., dated 28/12/2007
/16/	Power purchase agreement (valid from 01/01/2008 to 31/12/2009) signed between Gansu

<table>
<tr><td></td><td>Electric Power Company and GEPIC Darong Electric Power Company Ltd. , dated 28/02/2008</td></tr>
<tr><td>/17/</td><td>Monitoring data records during the monitoring period from 24/03/2008 to 17/12/2009</td></tr>
<tr><td>/18/</td><td>Electricity trading notes (ETNs) and electricity sales invoices during the monitoring period from 24/03/2008 to 17/12/2009</td></tr>
<tr><td>/19/</td><td>Calibration certificates of electric meters applied in the monitoring plan of the project activity issued by Electric Energy Metrology Centre of Gansu Electric Power Company issued by Gansu Quality Supervision Bureau, details as following,
<table>
<tr><th>Meters</th><th>Type</th><th>Accuracy</th><th>Serial No.</th><th>Certificate No.</th><th>Validity</th></tr>
<tr><td>M1</td><td>SL7000</td><td>0.2S</td><td>36145166</td><td>QJJL-NAS08 No. 080

QJJL_XBJ09/2243</td><td>07/03/2008 to 06/03/2009

06/03/2009 to 05/03/2010</td></tr>
<tr><td>M1’</td><td>SL7000</td><td>0.2S</td><td>36145167</td><td>QJJL-NAS08 No. 077

QJJL_XBJ09/2244</td><td>07/03/2008 to 06/03/2009

06/03/2009 to 05/03/2010</td></tr>
<tr><td>M2</td><td>SL7000</td><td>0.2S</td><td>36145164</td><td>QJJL-NAS08 No. 078</td><td>07/03/2008 to 06/03/2011</td></tr>
<tr><td>M2’</td><td>SL7000</td><td>0.2S</td><td>36145165</td><td>QJJL-NAS08 No. 079</td><td>07/03/2008 to 06/03/2011</td></tr>
<tr><td>M3</td><td>DTSD341</td><td>0.5</td><td>701070015</td><td>QJJL_XBJ09/2248</td><td>15/03/2008 to 14/03/2011</td></tr>
<tr><td>M4</td><td>DTSD341</td><td>0.5</td><td>724040044</td><td>QJJL_XBJ09/2249</td><td>15/03/2008 to 14/03/2011</td></tr>
<tr><td>M5</td><td>DTSD341</td><td>0.5</td><td>724040070</td><td>QJJL_XBJ09/2247</td><td>15/03/2008 to 14/03/2011</td></tr>
</table></td></tr>
<tr><td>/20/</td><td>Calibration Accreditation of Electric Energy Metrology Centre of Gansu Electric Power Company issued by Gansu Quality Supervision Bureau, Accreditation Certificate No. (Gan) Fa Ji (2006) 62055, dated 05/01/2006 and valid to 04/01/2011</td></tr>
<tr><td>/21/</td><td>Survey Report of reservoir submerged surface area of Datong River Zhuchaxia Hydropower Station issued by Northwest Hydro Consulting Engineers of China Hydropower Engineering</td></tr>
</table>

	Consulting Group Co., Ltd., dated 02/05/2008 and 01/05/2009
/22/	Nameplate photos of turbine-generator units involved in the project, dated 07/03/2012
/23/	Operation qualifications of staff
/24/	Emission reductions (ER) calculation spreadsheet
/25/	Business license of GEPIC Darong Electric Power Company Ltd. issued by the Administration for Industry and Commerce, Registration No. 620100000002682(1-1), dated 03/03/2011
/26/	Clarification on the recording time of revenue gate meters issued by the electricity trading centre of Gansu power grid, dated 21/03/2012

3.3 Interviews

From 7 March 2012 to 9 March 2012, the verification team carried out an on-site visit and performed interviews with the project representatives and stakeholders. The main topics of the interviews are summarized in the table below.

	Date	Name	Organization	Topic
/i/	2012-03-07	Mr. Bo HU Mr. Jian XU Mr. Pan HE	GEPIC Darong Electric Power Company Ltd. (Project Owner)	- Project Implementation - Project operation - Monitoring devices' calibration - Management and Operational procedures - Data collection procedure - Data QA/QC procedures - Environmental impacts and mitigation measures
/ii/	2012-03-07	Ms. Ling LI Ms. Shanfeng HUANG	Climate Bridge Ltd. (VCUs Buyer)	- Monitoring results reporting - ER calculation
/iii/	2012-03-07	Mr. Mengde LIU Ms. Tingting YANG	S.D.F . (Beijing) Consuling Co., Ltd. (Consultant)	- Monitoring results reporting - ER calculation

3.4 Site Inspections

From 7 March 2012 to 9 March 2012, the verification team carried out an on-site inspection at Datong River Zhuchaxia Hydropower Station. During the visit, the verification team verified the actual implementation of the project as described in the VCS monitoring report/2/ and the registered CDM PDD/3/. The project start date and the applied turbine-generator details were checked against the daily operation & maintenance logs /14/ and the purchase contract of turbine-generator unit /13/, and then confirmed to be correct. The involved electric meters were checked against the line diagram indicated in the power purchase agreement/16/ and found in order. The evidences of the reported net electricity generation were also verified, i.e. the monthly electricity generation gate meter reading records/17/. In addition, the electricity trading notes and electricity sales invoices /18/ were verified to cross-check the gate meter reading records/17/. All calibration certificates of electric meters involved in the monitoring plan of the project /19/ and the accreditation of calibration entity/20/ were verified authoritative, and found to be valid for the complete reporting period from 24/03/2008 to 17/12/2009.

3.5 Resolution of Any Material Discrepancy

A Corrective Action Request (CAR) shall be raised, where:

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

b) Mistakes have been made in applying assumptions, data or calculations of emission reductions which will impair the estimate or emission reductions;

c) Issues identified in a FAR during validation to be verified verification have not been resolved by the project participants.

A Clarification Request (CL) shall be raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

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

During the VCS verification of the project, 2 CLs are raised by the verification team and successfully closed, details as following,

CAR/CL	Observation	Reference	Summary of project owner response	Verification team conclusion
CL 1	As reflected in the electricity trading notes, the electricity exported to the grid is 0 in Mar. 2009, while the electricity imported from the	MR/1/ Monitoring data records/17/ ETNs/18/	In March 2009, no electricity was generated by the project due to the small flow of the river caused by frozen weather, therefore	OK. The verification team checked the daily water flow monitoring records of three generators/17/, and

	grid is 1.43MWh in the same month, which is obviously less than ones in the other normal operation months. Thus, it is required to clarify the reasonability of the electricity imported from the grid in Mar. 2009.		the electricity exported to the grid is 0; and in this month, no overhaul of the equipments occurred except for minor examination, so the electricity imported from the grid in this month is mainly for domestic consumption, and the amount of 1.43MWh is reasonable. The related daily records have been provided.	confirmed that the water flow is indeed too small to drive the turbine-generator for power generation due to the frozen weather. In addition, after checking the daily operation & maintenance logs of the project/14/, the verification team did not found any overhaul event in March 2009. Thus, it is considered appropriate that the 1.43MW of electricity imported from the grid is the living electricity consumption of plant operation staff, and CL 1 is closed.
CL 2	As reported in the VCS monitoring report, the monitored net electricity generated by the project during first two months, i.e. 24/03/2008 to 28/04/2008, 29/04/2008 to 29/05/2008, are even higher than the directly generated electricity by three generators during that period. Therefore, clarification is	MR/1/ Monitoring data records/17/	For the first three months, the monitoring time for electricity delivered to the grid is the 24:00 on the last day of each month, but the monitoring date for the gross electricity generated by the three generators is the 24:00 on the third last day of each month, that's why the net electricity delivered to the grid in the first two	OK. As reflected in the clarification on the recording time of revenue gate meter issued by the electricity trading centre of Gansu power grid*/26/*, the monthly reporting period before July 2008 are verified to be typos. And the VCS MR and ER calculation spreadsheet are verified to be correctly revised.

	required.		months higher than the gross electricity generated by the generators. For consistency, the monthly gross electricity has been re-accumulated based on the daily records by using the same monitoring period with the net electricity delivered for each month, which is proved to be reasonable. The related daily log has been provided.	Therefore, CL 2 is closed.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The project was verified to be located in Tibetan Autonomous County of Tianzhu, Lanzhou City, Gansu Province, P.R. China. As described in the VCS monitoring report/2/ and the registered PDD/3/, the geographical coordinates of the project are 102°35′32″E, 36°52′19″N for the dam and 102°38′14″E, 36°51′12″N for the power house respectively, which can be substantiated by means of using the map tool of Google Earth.

The project is a run-of-river hydropower project with the total installed capacity of 34MW, consisting two same units of 13.5MW turbine (Model: HLA551C-LJ-230) and generator (Model: SF13.5-28/4870), one unit of 7MW turbine (Model: HLA551C-LJ-165) and generator (Model: SF7000-20/3250), whose name plates' information is verified to be consistent with the VCS monitoring report/2/, the registered CDM PDD/3/ and the purchase contract for involved turbine generator units/13/.

As reflected in the daily operation & maintenance logs/14/, the generator #1 started operation on 24 March 2008, the generator #2 started operation on 28 April 2008 and the generator #3 started operation on 2 June 2008, which is confirmed to be accurately described in the VCS monitoring report/2/. Besides, there was no any occurred event or situation which may impact the applicability of the methodology ACM0002 version 07 during the reporting period 24/03/2008 to 17/12/2009.

The verification team verified the grid-connection electricity dispatching agreement /15/ of the project and its power purchase agreement /16/ with validity covering the reporting period from 24/03/2008 to 17/12/2009, and then confirmed that after being raised to 110KV by the project site step-up substation, the electricity generated by the project is delivered to 110KV Dacaigou Substation via 110KV transmission line, and finally delivered to Gansu power grid of the Northwest China Power Grid.

The metering meters were installed in accordance with the registered PDD/3/. The project has been operated by the PP in compliance with the VCS monitoring report of the project/2/ and its registered PDD/3/.The monitoring organization has been set up, all monitoring staffs have been trained and their qualifications have been provided to the verification team/23/. The survey report of reservoir submerged surface area was provided for verification and confirmed to be conducted yearly. The calibration certificates of meters /19/ are provided to the verification team and confirmed to be conducted in compliance with the VCS monitoring report of the project/2/ and its registered PDD/3/. Meter reading records of the meters are based on continuously measurement and monthly record by the PP/17/, and also the electricity trading notes and sales invoices are used to cross-check the electricity supplied to the grid and the electricity imported from the grid for quality assurance/18/.

After checking the CDM validation report of the project/4/, the verification team can confirm that there were no any remaining issues in the previous CDM validation.

4.2 Accuracy of GHG Emission Reduction or Removal Calculations

Baseline Emissions:

According to the applied methodology ACM0002 version 07 /12/and the registered PDD/3/, the baseline emissions of the project is determined as following formula,

$BE_y = (EG_y - EG_{baseline}) \cdot EF_{grid,CM,y}$

Where:

BE_y = Baseline emissions in year y (tCO2/yr).

EG_y= Electricity supplied by the project activity to the grid (MWh).

$EG_{baseline}$ =Baseline electricity supplied to the grid in the case of modified or retrofit facilities (MWh). For the new hydro power plant, this value is taken as zero.

$EF_{grid,CM,y}$ = Combined margin CO2 emission factor for grid connected power generation in year y calculated using the "Tool to calculate the emission factor for an electricity system". As reported in the registered PDD/3/, the value has ex-ante determined as 0.8498tCO2e/MWh and is not necessary to be monitored.

According to the VCS monitoring report of the project /2/ and its registered CDM PDD/3/, the parameter EG_y of net electricity supplied to the grid is the electricity supplied to the grid ($EG_{out,y}$) deducting the electricity purchased from the grid ($EG_{in,y}$). And both parameters $EG_{out,y}$ and $EG_{in,y}$ shall be continuously measured and recorded monthly.

As indicated in the power purchase agreement/16/, the bi-directional main meter M1 (backup meter M1') installed at the 110KV Dacaigou Substation was stipulated as the revenue gate meter for measuring the electricity supplied to and purchased from the grid. Designated personnel of the project owner and Grid Company jointly read and record the main meter reading at 24:00 on the third to last day of each month.

Therefore, in compliance with the registered PDD/3/, the net electricity supplied to the grid shall be monitored as following,

$EG_y = EG_{out,y} - EG_{in,y}$

During the reporting period from 24/03/2008 to 17/12/2009, there was no any change of monitoring meters as reflected in the daily operation & maintenance logs/14/. All monitoring meters for the measurement of net electricity supplied to the grid have been strictly calibrated in accordance with the VCS monitoring report of the project/2/ and its registered PDD/3/, detailed calibration information in their calibration certificates/19/ as shown in the below table,

Meters	Type	Accuracy	Serial No.	Calibration frequency	Calibration certificate No.	Validity
M1	SL7000	0.2S	36145166	Yearly	QJJL-NAS08	07/03/2008 to

					No. 080 QJJL_XBJ09/2243	06/03/2009 06/03/2009 to 05/03/2010
M1'	SL7000	0.2S	36145167	Yearly	QJJL-NAS08 No. 077 QJJL_XBJ09/2244	07/03/2008 to 06/03/2009 06/03/2009 to 05/03/2010
M2	SL7000	0.2S	36145164	Once in three years	QJJL-NAS08 No. 078	07/03/2008 to 06/03/2011
M2'	SL7000	0.2S	36145165	Once in three years	QJJL-NAS08 No. 079	07/03/2008 to 06/03/2011
M3	DTSD341	0.5	701070015	Once in three years	QJJL_XBJ09/2248	15/03/2008 to 14/03/2011
M4	DTSD341	0.5	724040044	Once in three years	QJJL_XBJ09/2249	15/03/2008 to 14/03/2011
M5	DTSD341	0.5	724040070	Once in three years	QJJL_XBJ09/2247	15/03/2008 to 14/03/2011

The calibration of meters was carried out by the Electric Energy Metrology Centre of Gansu Electric Power Company, whose accreditation (Certificated No. (Gan) Fa Ji (2006) 62055) was provided to the verification team /20/ and could confirm that its accreditation validity is from 05/01/2006 to 04/01/2011. Thus, the calibration certificates of meters are considered credible, and accordingly the accuracy and validity of meters can ensure the accurate measurement of net electricity supplied to the grid during the reporting period from 24/03/2008 to 17/12/2009.

A complete set of data of monitoring parameter EG_y from 24/03/2008 to 17/12/2009 are available for verification/17/. In order to ensure the accuracy of measurement, the net electricity supplied to the grid (EG_y) has been cross-checked with the electricity trading notes and sales invoices covering the reporting period. If the measured electricity is different from invoiced electricity, the most conservative value is applied, in which the smaller value is taken as the electricity supplied to the grid, while the bigger value is taken as the electricity purchased from the grid, as presented in the emission reduction calculation spreadsheet/24/. Specially for the monitoring period from 29/11/2009 to 17/12/2009, the gap monitored $EG_{out,y}$ is conservatively determined to be the monthly conservative electricity supplied to the grid during the period from 29/11/2009 to 29/12/2009 deducting the actual electricity generation during the period from 18/12/2009 to 29/12/2009 measured by the meter M2 installed at the project site, while the gap invoiced electricity $EG_{in,y}$ used for cross-checking is conservatively selected the officially invoiced electricity during the period from 29/11/2009 to 29/12/2009, which are considered appropriate and conservative to determine the net electricity supplied to the grid for the gap from 29/11/2010 to 17/12/2009. Below table is the summary of monitored EG_y during the reporting period from 24/03/2008 to 17/12/2009,

Period	Electricity supplied to the grid, $EG_{out,y}$ (MWh)	Electricity purchased from the grid, $EG_{in,y}$ (MWh)	Net electricity supplied to the grid, EG_y (MWh)
	A	B	C=A-B
24/03/2008-30/04/2008	3,034.582	23.438	3,011.144
01/05/2008-31/05/2008	10,836.614	5.460	10,831.154
01/06/2008-30/06/2008	8,449.122	3.300	8,445.822
01/07/2008-29/07/2008	12,976.124	7.100	12,969.024
30/07/2008-29/08/2008	17,934.840	0.000	17,934.840
30/08/2008-28/09/2008	15,671.964	0.000	15,671.964
29/09/2008-29/10/2008	10,110.936	0.000	10,110.936
30/10/2008-28/11/2008	3,584.988	0.000	3,584.988
29/11/2008-29/12/2008	4,730.936	4.300	4,726.636
Subtotal (24/03/2008-29/12/2008)	**87,330.106**	**43.598**	**87,286.508**
30/12/2008-29/01/2009	4,054.644	1.320	4,053.324
30/01/2009-26/02/2009	381.678	1.990	379.688
27/02/2009-29/03/2009	0.000	1.426	-1.426
30/03/2009-28/04/2009	6,328.410	9.500	6,318.910
29/04/2009-29/05/2009	6,907.560	2.400	6,905.160

30/05/2009-28/06/2009	10,394.340	0.000	10,394.340
29/06/2009-29/07/2009	22,173.690	0.000	22,173.690
30/07/2009-29/08/2009	22,627.242	0.000	22,627.242
30/08/2009-28/09/2009	23,058.420	0.000	23,058.420
29/09/2009-29/10/2009	19,599.756	0.000	19,599.756
30/10/2009-28/11/2009	7,205.814	0.000	7,205.814
29/11/2009-17/12/2009	2,746.290	0.000	2,746.290
Subtotal (30/12/2009-29/12/2008)	**125,477.844**	**16.636**	**125,461.208**
Total (24/03/2008-17/12/2009)	**212,807.950**	**60.234**	**212,747.716**

Therefore, the baseline emissions (BEy) are conservatively calculated as showed in the following table,

Reporting period	EG_y (MWh)	$EG_{baseline}$ (MWh)	$EF_{grid,CM,y}$ (tCO2e/MWh)	$BE_y = (EG_y-EG_{baseline})\cdot EF_{grid,CM,y}$ (tCO2e)
24/03/2008-29/12/2008	87,286.508	43.598	0.8498	74,176
30/12/2008-17/12/2009	125,461.208	16.636	0.8498	106,616
Total (20/06/2008-24/10/2010)	212,747.716	60.234	0.8498	180,792

Project Emissions:

The power density of the project activity is calculated as follows:

$$PD = \frac{Cap_{PJ} - Cap_{BL}}{A_{PJ} - A_{BL}}$$

Where:

PD = Power density of the project activity (W/m^2).

Cap_{PJ} = Installed capacity of the hydro power plant after the implementation of the project activity (W).

Cap_{BL} = Installed capacity of the hydro power plant before the implementation of the project activity (W). For the new hydro power plant, this value is zero.

A_{PJ} = Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (m^2).

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 (m^2). For the new reservoir, this value is zero.

The verification team checked both the purchase contract for turbine generator units of the project /13/ and the on-site name plate information of three turbine generator units/22/, then verified that the installed capacity of the hydro power plant after the implementation of the project is still 34MW as same as reported in the registered PDD/3/.

The area of the reservoir measured in the surface of the water after the implementation of the project at full level (A_{PJ}) is yearly measured by the qualified third party of Northwest Hydro Consulting Engineers of China Hydropower Engineering Consulting Group Co., Ltd. (National level of Class I)/21/, in accordance with the registered PDD/3/ and the applied methodology ACM0002 version 07 /12/, with details as below table,

Measurement Date	Measurement	The measured result of A_{PJ}
02/05/2008	Instrument: Leica TC402 of total station Measurement method: Measured from topographical survey	60,900 m^2
01/05/2009		60,900 m^2

Therefore, the power density of the project activity is calculated as

PD = (34MW-0) / (60,900m^2-0) = 34,000,000W / 60,900m^2 = 558W/m^2.

In accordance with the applied methodology ACM0002 version 07/12/, the power density of the project is greater than 10W/m^2, thus the project emissions is 0, i.e. PE_y=0.

Leakage:

According to the applied methodology ACM0002 version 07 /12/, the leakage can be not considered, i.e. LE_y=0.

Emission reductions:

The emission reductions of the project are calculated as follows,

Reporting period	ER_y (tCO2e)	PE_y (tCO2e)	LE_y (tCO2e)	ERy =BEy – PEy - LEy (tCO2e)
24/03/2008-29/12/2008	74,176	0	0	74,176
30/12/2008-17/12/2009	106,616	0	0	106,616
Total (24/03/2008-17/11/2009)	180,792	0	0	180,792

Based on the above assessment, the emission reductions resulted from the monitoring period from 24/03/2008 to 17/12/2009 is verified as 180,792tCO2e. Further, compared against the registered PDD/3/, the actual emission reductions of 180,792tCO2e is lower than the estimated 211,247tCO2e under the same days of 634 during the reporting period from 24/03/2008 to 17/12/2009 (i.e. (121,617tCO2e*634days)/365days=211,247tCO2e).Therefore, the verification team can consider that the actual emission reductions of 180,792tCO2e during the reporting period from 24/03/2008 to 17/12/2009, is accurate and credible.

4.3 Quality of Evidence to Determine GHG Emission Reductions or Removals

As discussed in the above sections 4.1 and 4.2, the accuracy of GHG emission reductions for the reporting period is deemed credible via following quality assessments of evidences,

- The VCS monitoring report/2/ is prepared in line with the latest version 3.1 of VCS monitoring report template/9/ and the latest version version 3.0 of VCS Project Description Template/10/;

- The daily operation & maintenance logs /14/ were verified and found that no any event or situation which may impact the applicability of the methodology ACM0002 version 07/12/ occurred to the project activity during the reporting period;

- All involved meters in the monitoring plan of the registered PDD/3/ are appropriately calibrated, and their calibration certificates were verified valid by checking the accreditation of calibration entity/19//20/. Further, the validity of calibration certificates are confirmed to cover the reporting period;

- All monitoring personal of the project were well trained and got the relevant national operation qualifications/23/;

- A complete monitoring data records/17/ and survey reports of the project reservoir submerged surface area/21/ were provided for verification during the site inspection, and the electricity trading notes and sales invoice are used to cross check both the electricity supplied to the grid and the electricity purchased from the grid, where conservative values are taken to determine the net electricity supplied to the grid for ensuring the quality of baseline emissions;

- The emission reductions during the reporting period can be transparently reproducible against the emission reductions calculation spreadsheet/24/.

4.4 Management and Operational System

During the on-site visit, the verification team interviewed with the management representative and on-site operators/i/, and confirmed that the structure of monitoring management team and the responsibilities of team have been defined and followed well in accordance with the registered PDD/3/. The monitoring personnel are well trained and have got relevant national operation qualifications/23/, which demonstrates that they have sufficient competence to carry out the relevant monitoring tasks.

An internal data are subjected to QA/QC measures. All monitored data will be archived in electronic form and be kept for at least 2 years after the end of the last crediting period or till the last issuance of VERs for the project activity whichever occurs later.

The QA/QC measures were further verified reliable by checking the daily operation & maintenance logs/14/.

5 VERIFICATION CONCLUSION

The verification team assigned by the DOE (TÜV Rheinland (China) Ltd.) has performed the verification of the project “Datong River Zhuchaxia Hydropower Station” (hereafter referred to as “the project”) in China, on the basis of requirements of VCS Standard version 3.2.

All electricity generated by the project will be supplied to the Northwest Power Grid of China in which the fossil-fuel based power plant are mainly dominated, thus the project achieves GHG emission reductions.

The verification was conducted by the following three steps:

i) Desk review of the VCS monitoring report (Version 1, dated 03/03/2012), the registered CDM PDD, the CDM validation report, emission reductions calculation spreadsheet and supporting documents made available to the verification team by the project participant;
ii) Follow-up interviews and site inspection (07/03/2012-09/03/2012); and
iii) Resolution of outstanding issues and desk review of the revised VCS monitoring report (Version 3, dated 12/04/2012).

Based on the above, the verification team can conclude as follows in detail,

- All operations of the project are implemented and installed as planned and described in the registered PDD;
- The monitoring plan is in compliance with the applied approved methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" (version 07);
- The electric meters applied to monitor parameters required for calculating emission reductions are calibrated appropriately;
- The monitoring system and QA/QC procedures have been in place, and all operation staff has got qualifications to operate and monitor the project activity.

Therefore, the verification team confirms that the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner. TÜV Rheinland (China) Ltd. hereby is able to certify that the emission reductions resulted from the project "Datong River Zhuchaxia Hydropower Station" during the monitoring period from 24/03/2008 to 17/12/2009 amount to 180,792 tonnes of CO2 equivalent, detailed as below,

Reporting period: From 24/03/2008 to 17/12/2009

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

GHG Emission Reductions or Removals	tCO_2e
Baseline Emissions	180,792
Project Emissions	0
Leakage	0
Net GHG emission reductions or removals	180,792