

DATONG RIVER TIANWANGGOU HYDROPOWER STATION



TÜV Rheinland (China) Ltd.

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Summary:

The verification team assigned by the DOE (TÜV Rheinland (China) Ltd.) has performed the verification of the project "Datong River Tianwanggou 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 51MW. 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.2840) with the fixed crediting period starting from 25 October 2010. 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 20/06/2008. Therefore, the monitoring period for this verification is selected from 20/06/2008 to 24/10/2010 (incl. both days).

The verification was conducted by the following three steps:

- i) Desk review of the VCS monitoring report (Version 1.0, dated 02/03/2012), the registered CDM PDD, the CDM validation report, the revised monitoring plan, emission reductions calculation spreadsheet and supporting documents made available to the verification team by the project participant;
- ii) Follow-up interviews and site inspection (05/03/2012-07/03/2012); and
- iii) Resolution of outstanding issues and desk review of the revised VCS monitoring report (Version 2.0, dated 22/03/2012).

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 20/06/2008 to 24/10/2010

Emission Reductions: 467,771 tCO₂e

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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 Tianwanggou Hydropower Station” for the monitoring period from 20/06/2008 to 24/10/2010(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 Tianwanggou Hydropower Station” during the monitoring period from 20/06/2008 to 24/10/2010 (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 Tianwanggou Hydropower Station” is a run-of-river hydropower project developed by GEPIC Darong Electric Power Company Ltd., in Yongdeng County, Lanzhou City, Gansu Province, P. R. China, with geographical coordinates of “102°44’57”E, 36°42’49”N” for the dam and “102°46’20”E, 36°39’58”N” for the power house respectively.

The total installed capacity of the project is 51MW, consisting three same units of 17MW turbine (Model: HLA551-LJ-215) and generator (Model: SF-J17-22/4250) as described in the registered PDD/3/. The technical agreement for the turbine generator units applied in the project was provided to the verification team/15/, and showed the key technical data of turbine generator unit in the following tables,

Table 1, Key technical data of turbine

Model	HLA551-LJ-215
Quantity	3
Rated power	17.5 MW
Rated water head	50 m
Rated flow	38.21 m ³ /s
Manufacturer	Hangzhou Resource Power Equipment Co., Ltd.

Table 2, Key technical data of generator

Model	SF-J17-22/4250
Quantity	3
Rated power	17 MW
Rated voltage	10500 V
Power current	1100 A
Rated frequency	50Hz
Manufacturer	Hangzhou Resource Power 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 220KV Jiansheping Substation, which is in compliance with the grid-connection electricity dispatching agreement of the project/17/.

During the monitoring period from 20/06/2008 to 24/10/2010, the total net electricity supplied by the grid by the project is 550,449.754MWh, thus the VCU's generated by the project is determined as 467,771tCO₂e 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)/14/, 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. 2840) 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-SUED1249300679.15/view>.

The CDM Project activity Registration Form of the project “Datong River Tianwanggou 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 /16/ and its electricity trading notes/21/, 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 /6/, 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/10/, 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/12/ 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/28/, 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 20/06/2008 can be substantiated by the daily operation & maintenance logs/16/ and the electricity trading notes issued by the Gansu electric power company/21/.

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

- opinion: UNFCCC Ref. No. 2840, indicating the fixed 10 years CDM crediting period starting from 25/10/2010. As per the item 3) of section 3.1.5 of latest version 3.2 of VCS Registration and Issuance Process/10/, 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 20/06/2008 to 24/10/2010, 857 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 179,797tCO₂e. In accordance with the VCS program definitions/13/, 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 Yongdeng County, Lanzhou City, Gansu Province of China, which is consistent with the registered PDD/3/. And also the geographical coordinates of "102°44'57"E, 36°42'49"N" for the dam and "102°46'20"E, 36°39'58"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/8/, 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 /28/ 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-SUED1249300679.15/view>, the project was registered as CDM project activity with UNFCCC Ref. No. 2840, indicating the fixed 10 years CDM crediting period starting from 25/10/2010, thus the net GHG emission reductions generated from the reporting period from 20/06/2008 to 24/10/2010 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. 2840, indicating the fixed 10 years CDM crediting period starting from 25/10/2010, details

as shown in the UNFCCC website <http://cdm.unfccc.int/Projects/DB/TUEV-SUED1249300679.15/view>. Thus, the GHG emission reductions during the reporting period 20/06/2008 to 24/10/2010 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 20/06/2008 to 24/10/2010.

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 07/14/ 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, and no any commercially sensitive information has been excluded from the additional project description information annexed to the VCS monitoring report/2/.

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 3.2/9/ and the VCS Registration and Issuance Process version 3.2 /10/.

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 Tianwanggou Hydropower Station, version 1.0, dated 02/03/2012

/2/	VCS MR of Datong River Tianwanggou Hydropower Station, version 2.0, dated 22/03/2012
/3/	CDM Project Design Document (PDD) of Datong River Tianwanggou Hydropower Station, Registration No. 2840, Version 04 submitted to EB for request for registration due to a review, dated 01/10/2010 http://cdm.unfccc.int/Projects/DB/TUEV-SUED1249300679.15/view Version 03 initially submitted to EB for request for registration, dated 09/07/2009 http://cdm.unfccc.int/Projects/DB/TUEV-SUED1249300679.15/history
/4/	Validation report of Datong River Tianwanggou Hydropower Station, Version 7 finally submitted to EB for request for registration due to a review, dated 22/10/2010 http://cdm.unfccc.int/Projects/DB/TUEV-SUED1249300679.15/view Version 3 initially submitted to EB for request for registration, dated 09/07/2009 http://cdm.unfccc.int/Projects/DB/TUEV-SUED1249300679.15/history
/5/	CDM Project Activity Registration Form of Datong River Tianwanggou Hydropower Station submitted by the validation DOE of TUV SUD, dated 03/08/2009 http://cdm.unfccc.int/filestorage/6/J/A/6JAYUFE2XQ05MVBC9PZ8GWN1SHTOR/RegForm.pdf?t=enB8bTBxenN2fDAM90q5cFG9Rypqw19Bvfl1
/6/	The revised monitoring plan of Datong River Tianwanggou Hydropower Station approved by the CDM EB on 18 May 2011 http://cdm.unfccc.int/Projects/DB/TUEV-SUED1249300679.15/view
/7/	Validation Opinion on a Revision in Monitoring Plan issued by Bureau Veritas, version 01, dated in Jan. 2011
/8/	The letter of approval issued by the National Development & Reform Commission of P.R. China, English version No. 1195, dated in June 2008
/9/	VCS Standard, version 3.2, dated 01/02/2012
/10/	VCS Registration and Issuance Process, version 3.2, dated 01/02/2012
/11/	VCS Monitoring Report Template, version 3.1, dated 01/02/2012
/12/	VCS Project Description Template, version 3.0, dated 08/03/2011
/13/	VCS Program Definitions, version 3.2, dated 01/02/2012
/14/	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

/15/	Technical agreement for turbine generator units of Datong River Tianwanggou Hydropower Station signed between GEPIC Darong Electric Power Company Ltd. and Hangzhou Resource Power Equipment Co., Ltd., dated 12/12/2005					
/16/	Daily operation & maintenance logs in the year 2008, 2009 and 2010					
/17/	Grid-connection electricity dispatching agreement signed between the Lanzhou branch of Gansu Electric Power Company and GEPIC Darong Electric Power Company Ltd., date 15/05/2008					
/18/	Power purchase agreement (valid from 01/04/2008 to 31/12/2010) signed between Gansu Electric Power Company and GEPIC Darong Electric Power Company Ltd. , dated 15/06/2008					
/19/	Clarification on the location change of gate meter for Datong River Tianwanggou Hydropower Station, i.e. Meeting memo on the grid-connection system coordination of Tengda Northwest Iron Alloy Plant, dated 27/09/2010					
/20/	Monitoring data records during the monitoring period from 20/06/2008 to 24/10/2010					
/21/	Electricity trading notes and electricity sales invoices during the monitoring period from 20/06/2008 to 24/10/2010					
/22/	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,					
	Meters	Type	Accuracy	Serial No.	Certificate No.	Validity
	M1	SL7000	0.2S	36088340	QJJL-NAS07 No. 215	27/11/2007 to 26/11/2008
QJJL_XBJ09/22 59					26/11/2008 to 25/11/2009	
QJJL_XBJ10/22 36					25/11/2009 to 24/11/2010	
	M1'	SL7000	0.2S	36088341	QJJL-NAS07 No. 212	27/11/2007 to 26/11/2008
QJJL_XBJ09/22 59					26/11/2008 to 25/11/2009	
QJJL_XBJ10/22 37					25/11/2009 to 24/11/2010	

	M2	SL7000	0.2S	36088342	QJL-NAS07 No. 216 QJL_XBJ09/22 50 QJL_XBJ10/53 51	27/11/2007 to 26/11/2008 26/11/2008 to 25/11/2009 25/11/2009 to 24/11/2010
	M2'	SL7000	0.2S	36088343	QJL-NAS07 No. 211 QJL_XBJ09/22 51 QJL_XBJ10/53 52	27/11/2007 to 26/11/2008 26/11/2008 to 25/11/2009 25/11/2009 to 24/11/2010
	M3	DTSD341	0.5	323030238	QJL_XBJ09/22 53	20/06/2008 to 19/06/2011
	M4	DTSD341	0.5	323030237	QJL_XBJ09/22 52	20/06/2008 to 19/06/2011
	M5	DTSD341	0.5	323030239	QJL_XBJ09/22 54	20/06/2008 to 19/06/2011
/23/	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					
/24/	Survey Report of reservoir submerged surface area of Datong River Tianwanggou Hydropower Station issued by Northwest Hydro Consulting Engineers of China Hydropower Engineering Consulting Group Co., Ltd., dated 02/05/2008, 01/05/2009 and 30/04/2010					
/25/	Nameplate photos of turbine-generator units involved in the project, dated 07/03/2012					
/26/	Operation qualifications of staff					
/27/	Emission reductions (ER) calculation spreadsheet					
/28/	Business license of GEPIC Darong Electric Power Company Ltd. issued by the Administration for Industry and Commerce of Lanzhou, Registration No. 62010000002682(1-1), dated 03/03/2011					

/29/	Feasibility Study Report of Datong River Tianwanggou Hydropower Station by Northwest Hydro Consulting Engineers of China Hydropower Engineering Consulting Group Co., Ltd., dated in August 2005
/30/	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 5 March 2012 to 7 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) Consulting Co., Ltd. (Consultant)	- Monitoring results reporting - ER calculation

3.4 Site Inspections

From 5 March 2012 to 7 March 2012, the verification team carried out an on-site inspection at Datong River Tianwanggou 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 /16/ and the technical agreement of turbine-generator unit /15/, and then confirmed to be correct. The involved electric meters were checked against the line diagram indicated in the power purchase agreement/18/ 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/20/. In addition, the electricity trading notes and electricity sales invoices /21/ were verified to cross-check the gate meter reading records/20/. All calibration certificates of electric meters involved in the monitoring plan of the project /22/ and the accreditation of calibration entity/23/ were verified authoritative, and found to be valid for the complete reporting period from 20/06/2008 to 24/10/2010.

3.5 Resolution of Any Material Discrepancy

A Corrective Action Request (CAR) shall be raised, 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 or emission reductions;
- 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, 1 CAR and 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
CAR 1	For the determination of net electricity supplied to the grid from 29/09/2010 to 24/10/2010, the applied formula is not in compliance with the revised monitoring plan as reflected in the ER calculation spreadsheet, thus revision is required to keep consistency between ER calculation	MR/1/ ER calculation spreadsheet/27/	The formula used for ER calculation during 29/09/2010 to 24/10/2010 has been revised in both ER calculation spreadsheet and MR.	OK. Both ER calculation spreadsheet and MR are verified to be correctly revised. Therefore, CAR 1 is closed.

	spreadsheet and MR.			
CL 1	Under the same days of 857days during the monitoring period from 20/06/2008 to 24/10/2010, the actual emission reduction is verified 10.8% higher than the estimated emission reductions against the registered PDD, pls. justify the cause of this increase.	MR/1/ PDD/3/	The actual emission reductions generated during the VCS monitoring period (20/06/2008-24/10/2010) is 10.8% higher than the estimated value in the PDD, which is mainly due to the inclusion of rainy period (July – October 2010). The emission reductions generated from the first two years, 20/06/2008 to 28/06/2010, are 0.14% lower than the annual estimated value of 179,797 tCO ₂ in the PDD adjusted by day. According to the Feasibility Study Report of the project, the water flow resources during July to October accounts for 61.96% of annual total water resources based on multi-year monitoring of local hydrological data. In 2010, the water flow resource from June to October accounted for 64.76% of the yearly amount, and its distribution is similar to the historical trend. When adjusting the water	OK. By means of checking ER calculation/27/ against the registered PDD/2/ of the project and its FSR/29/, the cause of 10.8% increase during the reporting period is verified to be the reasonable higher generation in the abundant water period from 29/06/2010 to 24/10/2010. In addition, compared to the day emission reductions during the abundant period from July to October of total average year against the registered PDD, the actual day emission reductions is even 2.44% lower than the estimated. Therefore, the actual emission reductions during the reporting period are credible, and then CL 1 is closed.

			flow impact on the emission reductions by multiplying the annual estimated emission reductions with weights of water resource distribution for the corresponding months, the actual emission reductions generated during 29/06/2010 to 24/10/2010 are even 2.44% lower than the estimated value. Therefore, the amount of emission reductions achieved during its VCS monitoring period is considered as reasonable. Detailed calculated has been submitted for review.	
CL 2	As reported in the VCS monitoring report, the monitored net electricity generated by the project during first two months, i.e. 20/06/2008 to 28/06/2008, 29/06/2008 to 29/07/2008, are even higher than the directly generated electricity by three generators during that period. Therefore, clarification is required.	MR/1/ Monitoring data records/20/	The main reason for the net electricity monitored in certain months are even higher than the total power generation monitored directly from three generators (TEG_v) is due to the difference of recording date. During the first two months of the project operation (June and July 2008), the monthly data was recorded at 24:00 on the last date of each month. During August to October	OK. As reflected in the clarification on the recording time of revenue gate meter issued by the electricity trading centre of Gansu power grid/30/, the monthly reporting period before Nov. 2008 are verified to be typos. And the VCS MR and ER calculation spreadsheet are verified to be correctly revised. Therefore, CL 2 is closed.

			2008, the monthly data was recorded at 24:00 on the second last date of every month, and since November 2008, all the monthly data was recorded at 24:00 on the third to last date of each month. The MR and ER calculation sheet have been updated accordingly.	
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4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The project was verified to be located in Yongdeng County, 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°44'57"E, 36°42'49"N for the dam and 102°46'20"E, 36°39'58"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 51MW, consisting three same units of 17MW turbine (Model: HLA551-LJ-215) and generator (Model: SF-J17-22/4250), whose name plates' information is verified to be consistent with the VCS monitoring report/2/, the registered CDM PDD/3/ and the technical agreement for involved turbine generator units/15/.

As reflected in the daily operation & maintenance logs/16/, the generator #1 started operation on 28 June 2008, the generator #2 started operation on 2 July 2008 and the generator #3 started operation on 20 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 20/06/2008 to 24/10/2010.

The verification team verified the grid-connection electricity dispatching agreement /17/ of the project and its power purchase agreement /18/ with validity covering the reporting period from 20/06/2008 to 24/10/2010, 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 220KV Jiansheping 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/. However, the monitoring plan was revised and approved by the CDM EB on 18 May 2011/6/ due to the gate meter changed from M1 to M2 at 00:00 of 29 September 2010, which can be evidenced with the meeting memo on the grid-connection system coordination of Tengda Northwest Iron Alloy Plant dated 27/09/2010 /19/. For the reporting period from 20/06/2008 to 24/10/2010 selected in the VCS monitoring report/2/, it is thus considered appropriate to operate the monitoring plan indicated in the registered PDD/3/ from 20/06/2008 to 28/09/2010, while operate the approved revised monitoring plan from 29/09/2010 to 24/10/2010.

The project has been operated by the PP in compliance with the VCS monitoring report of the project/2/, its registered PDD/3/ and the revised monitoring plan/6/. The monitoring organization has been set up, all monitoring staffs have been trained and their qualifications have been provided to the verification team/26/. The survey report of reservoir submerged surface area was provided for verification and confirmed to be conducted yearly. The calibration certificates of meters /22/ are provided to the verification team and confirmed to be conducted in compliance with the VCS monitoring report of the project/2/, its registered PDD/3/ and the revised monitoring plan/6/. Meter reading records of the meters are based on continuously measurement and monthly record by the PP/20/, 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/21/.

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 /14/and the registered PDD/3/, the baseline emissions of the project is determined as following formula,

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

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.

$EF_{\text{grid,CM,y}}$ = 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/, its registered CDM PDD/3/ and revised monitoring plan/6/, the parameter EG_y of net electricity supplied to the grid is the electricity supplied to the grid ($EG_{\text{out,y}}$) deducting the electricity purchased from the grid ($EG_{\text{in,y}}$). And both parameters $EG_{\text{out,y}}$ and $EG_{\text{in,y}}$ shall be continuously measured and recorded monthly.

As indicated in the power purchase agreement/18/, the bi-directional main meter M1 (backup meter M1') installed at the 220KV Jiansheping 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. Due to the grid-connection system coordination of Tengda Northwest Iron Alloy Plant/19/, the grid company stipulated the bi-directional meter M2 (backup meter M2') installed at the project site as the revenue gate meter since the time of 00:00 of 29 September 2010, thus the monitoring plan described in the registered PDD/3/ was accordingly revised and approved by the CDM EB on 18 May 2011 based on the conservative consideration/6//7/.

Therefore, in compliance with the registered PDD/3/ and the revised monitoring plan/6/, the net electricity supplied to the grid shall be monitored in two phases during the reporting period from 20/06/2008 to 24/10/2010, details as following,

- For the phase I monitoring period from 20/06/2008 to 28/09/2010, the net electricity supplied to the grid is determined based on the revenue gate meter M1 installed at the 220KV Jiansheping Substation as below,

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

- For the phase II monitoring period from 29/09/2010 to 24/10/2010, the net electricity supplied to the grid is conservatively determined based on the newly stipulated revenue gate meter M2 installed at the project site and the transmission loss rate (TLR) between the project site and the 220KV Jiansheping substation as below,

$$EG_y = EG_{out,y} \times (1 - TLR) - EG_{in,y} \times (1 + TLR)$$

Where, the TLR is 0.41% as reported in the approved revised monitoring plan by the CDM EB/6/.

During the reporting period from 20/06/2008 to 24/10/2010, there was no any change of monitoring meters as reflected in the daily operation & maintenance logs/16/. 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/, its registered PDD/3/ and the revised monitoring plan/6/, detailed calibration information in their calibration certificates/22/ as shown in the below table,

Meters	Type	Accuracy	Serial No.	Calibration frequency	Calibration certificate No.	Validity
M1	SL7000	0.2S	36088340	Yearly	QJL-NAS07 No. 215	27/11/2007 to 26/11/2008
					QJL_XBJ09/2 259	26/11/2008 to 25/11/2009
					QJL_XBJ10/2	25/11/2009 to

					236	24/11/2010
M1'	SL7000	0.2S	36088341	Yearly	QJL-NAS07 No. 212	27/11/2007 to 26/11/2008
					QJL_XBJ09/2 259	26/11/2008 to 25/11/2009
					QJL_XBJ10/2 237	25/11/2009 to 24/11/2010
M2	SL7000	0.2S	36088342	Yearly	QJL-NAS07 No. 216	27/11/2007 to 26/11/2008
					QJL_XBJ09/2 250	26/11/2008 to 25/11/2009
					QJL_XBJ10/5 351	25/11/2009 to 24/11/2010
M2'	SL7000	0.2S	36088343	Yearly	QJL-NAS07 No. 211	27/11/2007 to 26/11/2008
					QJL_XBJ09/2 251	26/11/2008 to 25/11/2009
					QJL_XBJ10/5 352	25/11/2009 to 24/11/2010
M3	DTSD341	0.5	323030238	Once in three years	QJL_XBJ09/2 253	20/06/2008 to 19/06/2011
M4	DTSD341	0.5	323030237	Once in three years	QJL_XBJ09/2 2532	20/06/2008 to 19/06/2011
M5	DTSD341	0.5	323030239	Once in three years	QJL_XBJ09/2 254	20/06/2008 to 19/06/2011

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 /23/ 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 20/06/2008 to 24/10/2010.

A complete set of data of monitoring parameter EG_y from 20/06/2008 to 24/10/2010 are available for verification/20/. 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/27/. Specially for the monitoring period from 29/09/2010 to 24/10/2010, the gap invoiced electricity $EG_{out,y}$ used for cross-checking is determined to be the officially invoiced electricity during the period from 29/09/2010 to 29/10/2010 deducting the actual electricity generation during the period from 25/10/2010 to 29/10/2010 measured by the meter M2, while the gap invoiced electricity $EG_{in,y}$ used for cross-checking is conservatively selected the officially invoiced electricity during the period from 29/09/2010 to 29/10/2010, which are considered appropriate and conservative to determine the net electricity supplied to the grid for the gap from 29/09/2010 to 29/10/2010. Below table is the summary of monitored EG_y during the reporting period from 20/06/2008 to 24/10/2010,

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)
Phase I monitoring period (20/06/2008-29/09/2010)	A	B	C=A-B
20/06/2008-30/06/2008	4,002.532	0.000	4,002.532
01/07/2008-31/07/2008	24,212.788	0.000	24,212.788
01/08/2008-30/08/2008	31,111.136	0.000	31,111.136
31/08/2008-29/09/2008	29,150.088	0.000	29,150.088
30/09/2008-30/10/2008	23,756.172	0.000	23,756.172
31/10/2008-28/11/2008	12,607.920	0.000	12,607.920
29/11/2008-29/12/2008	8,849.808	0.000	8,849.808
Subtotal (20/06/2008-29/12/2008)	133,690.444	0	133,690.444
30/12/2008-29/01/2009	5,730.648	0.000	5,730.648
30/01/2009-26/02/2009	5,999.532	0.000	5,999.532
27/02/2009-29/03/2009	3,317.612	22.968	3,294.644
30/03/2009-28/04/2009	9,870.828	15.312	9,855.516
29/04/2009-29/05/2009	11,949.168	0.000	11,949.168
30/05/2009-28/06/2009	17,665.441	0.000	17,665.441

29/06/2009-29/07/2009	36,092.496	0.000	36,092.496
30/07/2009-29/08/2009	36,326.004	0.000	36,326.004
30/08/2009-28/09/2009	35,815.309	0.000	35,815.309
29/09/2009-29/10/2009	31,207.427	0.000	31,207.427
30/10/2009-28/11/2009	17,015.447	0.000	17,015.447
29/11/2009-29/12/2009	10,498.366	0.000	10,498.366
Subtotal (30/12/2008-29/12/2009)	221,488.278	38.280	221,449.998
30/12/2009-29/01/2010	7,029.647	0.000	7,029.647
30/01/2010-26/02/2010	6,382.992	0.000	6,382.992
27/02/2010-29/03/2010	9,181.669	1.848	9,179.821
30/03/2010-28/04/2010	10,007.528	2.508	10,005.020
29/04/2010-29/05/2010	17,762.580	0.000	17,762.580
30/05/2010-28/06/2010	22,260.216	0.000	22,260.216
29/06/2010-29/07/2010	34,002.408	0.000	34,002.408
30/07/2010-29/08/2010	35,027.509	0.000	35,027.509
30/08/2010-28/09/2010	34,117.644	0.000	34,117.644
Phase I monitoring period (29/09/2010-24/10/2010)	A	B	C=A*0.9959-B*1.0041
29/09/2010-24/10/2010	19,622.324	0.396	19,541.475
Subtotal (30/12/2009-24/10/2010)	195,394.517	4.752	195,309.312
Total (20/06/2008-24/10/2010)	550,573.239	43.032	550,449.754

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

Reporting period	EG _y (MWh)	EG _{baseline} (MWh)	EF _{grid,CM,y} (tCO ₂ e/MWh)	BE _y = (EG _y -EG _{baseline})· EF _{grid,CM,y} (tCO ₂ e)
20/06/2008-29/12/2008	133,690.444	0	0.8498	113,610
30/12/2008-29/12/2009	221,449.998	0	0.8498	188,188
30/12/2009-24/10/2010	195,309.312	0	0.8498	165,973
Total (20/06/2008-24/10/2010)	550,449.754	0	0.8498	467,771

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/m²).

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 (m²).

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 (m²). For the new reservoir, this value is zero.

The verification team checked both the technical agreement for turbine generator units of the project /15/ and the on-site name plate information of three turbine generator units/25/, then verified that the installed capacity of the hydro power plant after the implementation of the project is still 51MW 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)/24/, in accordance with the registered PDD/3/, the revised monitoring plan/6/ and the applied methodology ACM0002 version 07 /14/, 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	237,400 m ²
01/05/2009		237,400 m ²
30/04/2010		237,400 m ²

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

$$PD = (51MW-0) / (237,400m^2-0) = 51,000,000W / 237,400m^2=214W/m^2.$$

In accordance with the applied methodology ACM0002 version 07/14/, the power density of the project is greater than 10W/m², thus the project emissions is 0, i.e. $PE_y=0$.

Leakage:

According to the applied methodology ACM0002 version 07 /14/, 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 (tCO ₂ e)	PE_y (tCO ₂ e)	LE_y (tCO ₂ e)	$ER_y = BE_y - PE_y - LE_y$ (tCO ₂ e)
20/06/2008-29/12/2008	113,610	0	0	113,610
30/12/2008- 29/12/2009	188,188	0	0	188,188
30/12/2009- 24/10/2010	165,973	0	0	165,973
Total (20/06/2008- 24/10/2010)	467,771	0	0	467,771

Based on the above assessment, the emission reductions resulted from the monitoring period from 20/06/2008 to 24/10/2010 is verified as 467,771tCO₂e. Compared with the estimated emission reductions under the same days of 857 from 20/06/2008 to 24/10/2010 against the registered PDD/2/, the actual emission is verified to be 10.8% higher than the estimated emission reductions, i.e. $(467,771 - 179,797 * 857 / 365) * 100\% / (179,797 * 857 / 365) = 10.8\%$. As reflected in the response to CL 2 by PP, the emission reductions in the first much complete years from 20/06/2008 to 28/06/2010, is verified to be 0.14% lower than the estimated emission reductions under the same days of 739. It is thus considered reasonable that the cause of 10.8% increase is the higher generation from 29/06/2010 to 24/10/2010 in the average year. The verification team checked the FSR of the project/29/, and confirmed that the water resource from July to October in the multi-years history average year accounts for 61.96% of total average year, thus correspondingly results in 61.96% of total annual emission reductions based on the relationship between the power generation and water resource. Compared to the estimated day emission reductions during the period from July to October of total average year against the registered PDD/2/, the actual day emission reductions during the period from 29/06/2010 to 24/10/2010 is verified to be 2.44% lower than the estimated. Therefore, the verification team can consider that the actual emission reductions of 467,771tCO₂e during the reporting period from 20/06/2008 to 24/10/2010, 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/11/ and the latest version version 3.0 of VCS Project Description Template/12/;
- The daily operation & maintenance logs /16/ were verified and found that no any event or situation which may impact the applicability of the methodology ACM0002 version 07/14/ occurred to the project activity during the reporting period;
- All involved meters in the monitoring plan of the registered PDD/3/ and the revised monitoring plan/6/ are appropriately calibrated, and their calibration certificates were verified valid by checking the accreditation of calibration entity/22//23/. 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/26/;
- A complete monitoring data records/20/ and survey reports of the project reservoir submerged surface area/24/ 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/27/.

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/ and the revised monitoring plan /6/. The monitoring personnel are well trained and have got relevant national operation qualifications/26/, 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/16/.

5 VERIFICATION CONCLUSION

The verification team assigned by the DOE (TÜV Rheinland (China) Ltd.) has performed the verification of the project “Datong River Tianwanggou 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:

- Desk review of the VCS monitoring report (Version 1.0, dated 02/03/2012), the registered CDM PDD, the CDM validation report, the revised monitoring plan, emission reductions calculation spreadsheet and supporting documents made available to the verification team by the project participant;
- Follow-up interviews and site inspection (05/03/2012-07/03/2012); and
- Resolution of outstanding issues and desk review of the revised VCS monitoring report (Version 2.0, dated 22/03/2012).

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 Tianwanggou Hydropower Station" during the monitoring period from 20/06/2008 to 24/10/2010 amount to 467,771 tonnes of CO₂ equivalent, detailed as below,

Reporting period: From 20/06/2008 to 24/10/2010

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

GHG Emission Reductions or Removals	tCO ₂ e
Baseline Emissions	467,771
Project Emissions	0
Leakage	0
Net GHG emission reductions or removals	467,771