

# VERIFICATION REPORT FOR XUNDIAN JINFENG 12.6 MW HYDROPOWER PROJECT



Document Prepared By TÜV Rheinland (China) Ltd.

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## Summary:

The *Yunnan Xudong Phosphate Chemical Group Jinfeng Power Generation Co.,Ltd* has commissioned the validation/verification body TÜV Rheinland (China) Ltd to perform a verification of VCS Project Activity “Xundian Jinfeng 12.6 MW Hydropower Project” in China (hereafter “project activity”) for the period from 29 May 2008 to 28 April 2010. The project with CDM program was validated by TÜV SÜD Industrie Service GmbH (Report No. 1174162, issued on 29 September 2009) and was registered on 29 April 2010 under UNFCCC reference number (3023). Since emission reductions occurred prior to the registration of the project as CDM project activity, these emission reductions cannot be claimed as Certified Emission Reduction (CERs). The emission reductions are thus claimed as Voluntary Carbon Units (VCU) and verified on the basis of the Voluntary Carbon Standard (VCS) version 3 for GHG emission reduction and removal projects, a gap validation with the cover page and sections 1.2, 1.3, 1.5, 1.6, 1.7, 1.9, 1.10, 1.12.1, 1.12.2, 1.12.3, 1.12.4 and 1.13 of the VCS Project Description Template was validated to comply with VCS rules.

The verification team concludes that the VCS Project Activity “Xundian Jinfeng 12.6 MW Hydropower Project” in China, as described in the registered PDD (version 2.1 dated 17 August 2009), the Project Description (version 06 dated 21 August 2012) and the monitoring report (version 07 dated 21 August 2012) meets all relevant requirements of VCS version 3.

The project activity was implemented according to selected monitoring methodology(ies) and monitoring plan. The monitoring equipment was installed, calibrated and maintained in a proper manner, while collected monitoring data allowed to verify the amount of achieved GHG emission reductions. The VVB therefore is pleased to issue a positive verification opinion expressed in the attached Certification statement.

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## **1 INTRODUCTION**

### **1.1 Objective**

Verification is the independent review and ex post determination by a verification and validation body (VVB) of the monitored reductions in GHG emissions that have occurred as a result of the implementation of an already registered CDM project activity during the period from the date when the project started to operate until the date when the project was actually registered as a CDM project activity by the CDM Executive Board and thus the start date of the CDM project activity.

Certification is the written assurance by a VVB that, during a specific period in time, a project activity achieved the emission reductions as verified.

The objective of this verification was to verify and certify emission reductions reported for the “Xundian Jinfeng 12.6 MW Hydropower Project” in country ” China ” for the period 29 May 2008 to 28 April 2010.

The purpose of verification is to review the monitoring results and verify that monitoring was implemented according to monitoring plan and monitoring data, used to confirm the voluntary emission reductions in anthropogenic emissions by sources is sufficient, definitive and presented in a concise and transparent manner.

In particular, monitoring plan, monitoring report and the project’s compliance with relevant VCS Program and host Party criteria are verified in order to confirm that the project has been implemented in accordance with previously registered design and conservative assumptions, as documented. And also if the monitoring plan is in compliance with previously registered design, the project description and conservative assumptions, as documented.

## 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;
- The baseline and monitoring methodology used for the Project is “AMS-I.D. - Grid Connected Renewable Electricity Generation” (Version 13).

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 is a run of river hydropower project developed by Yunnan Xudong Phosphate Chemical Group Jinfeng Power Generation Co.,Ltd with the total capacity 12.6 MW (2\*6.3 MW), which is located in Xundian County, Yunnan Province, P.R.China. The geographical coordinates of the project are east longitude of 103°06'35"and north latitude of 25°52'35".

The detailed technical parameters for two turbine generator sets has been verified to be as per the details provided in the registered PDD, version 2.1 dated 17 August 2009. The electricity generated is supplied to South China Power Grid (SCPG) via Yunnan Power Grid. The key technical specification was listed below Table 1:

*Table 1: Main technical specification for turbine generation unit of the proposed project*

Equipment	Type	Consistent with registered PDD?
Water Turbine	CJA475-W-116/2x11	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Electricity Generator	SFW6300-8/2150	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

The project is to utilize the renewable hydropower to displace the fossil fuel based grid power generation. The voluntary emission reduction determined with an estimated ex-ante fixed grid emission factor of 0.8433 tCO<sub>2</sub>e/MWh was verified as 62,389tCO<sub>2</sub>e.

## 2 VALIDATION PROCESS, FINDINGS AND CONCLUSION

### 2.1 Validation Process

The project was registered on 29 April 2010 under UNFCCC reference number (3023). The project design, its eligibility as CDM project activity and the correct application of the CDM approved baseline and monitoring methodology AMS-I.D., version 13 was already validated by TÜV SÜD Industrie Service GmbH. The validation opinion by TÜV SÜD Industrie Service GmbH is that the Xundian Jinfeng 12.6 MW Hydropower Project as described in the PDD version 2.1, 17 August 2009 meets all relevant UNFCCC, CDM criteria and all relevant host country criteria.

The project correctly applies methodology AMS-I.D., version 13. Based on the validation opinion of DOE TÜV SÜD Industrie Service GmbH and also based on the registration of the project as a CDM project activity by CDM EB/UNFCCC, the verification team assumes that the project design as documented is sound, reasonable and meets the relevant UNFCCC and host Party criteria.

As the VCS recognizes the CDM as a GHG Program meets its VCU Verification Criteria, according to VCS Standard Version 3, for projects validated under the CDM, the cover page and sections 1.2, 1.3, 1.5, 1.6, 1.7, 1.9, 1.10, 1.12.1, 1.12.2, 1.12.3, 1.12.4 and 1.13 of the VCS Project Description Template shall be completed, a gap validation for the project's shall be validated to comply with the VCS rules.

The validation process regarding the additional project description produced in accordance with VCS rules includes:

#### Method and Criteria

The validation consists of the following three phases:

- I a desk review of the project design
- II on-site visit and follow-up interviews with project stakeholders
- III the resolution of outstanding issues and the issuance of the final validation report and opinion.
- IV VCS rules will be complied for validation and verification

**Document Review**

Table 2: The following table outlines the documentation reviewed during the validation and verification:

/1/	Yunnan Xudong Phosphate Chemical Group Jinfeng Power Generation Co.,Ltd: Monitoring report, version 01, 24 August 2011.
/2/	Yunnan Xudong Phosphate Chemical Group Jinfeng Power Generation Co.,Ltd: Monitoring report, version 07, 21 August 2012
/3/	Yunnan Xudong Phosphate Chemical Group Jinfeng Power Generation Co.,Ltd: Project Description, version 01, dated 9 September 2011.
/4/	Yunnan Xudong Phosphate Chemical Group Jinfeng Power Generation Co.,Ltd: Project Description, 06 dated 21 August 2012.
/5/	Registered PDD, version 2.1 dated 17 August 2009. <a href="http://cdm.unfccc.int/Projects/DB/TUEV-SUED1254989811.03/view">http://cdm.unfccc.int/Projects/DB/TUEV-SUED1254989811.03/view</a>
/6/	TÜV SÜD Industrie Service GmbH: Validation Report, Report No. 1174162, issued on 29 September 2009
/7/	Emission reduction calculation spreadsheet, “Jinfeng VER Calculation Sheet Version 01” dated 31 August 2011.
/8/	Emission reduction calculation spreadsheet, “Jinfeng VER Calculation Sheet Version 06” dated 21 August 2012.
/9/	CDM Validation and Verification Manual (Version 1.2)
/10/	VCS Standard version 3.2 issued on 1 February 2012.
/11/	VCS program Guide version 3.3 issued on 1 May 2012.
/12/	VCS Project Description Template version 3.0.
/13/	VCS Registration and Issuance Process version 3.3 issued on 1 May 2012.
/14/	Approved monitoring methodology: AMS-I.D. “Grid Connected Renewable Electricity Generation”, version 13.
/15/	CDM Executive Board: Guidelines for Assessment Compliance with the Calibration Frequency Requirements, EB52, Annex 60.
/16/	CDM Executive Board: CDM Verification and Verification Manual, Version 01.2
/17/	Xundian Grid Company: Grid Access Dispatch Agreement on 1 April 2011.
/18/	Business Licence for Yunnan Xudong Phosphate Chemical Group Jinfeng Power Generation Co.,Ltd issued on 10 April 2009, valid from 1 January 2004 to 1 January 2034.
/19/	Letter of Approval issued by National Development and Reform Commission of P.R.China on April 2008.
/20/	Final acceptance committee: Final acceptance report on 1 June 2008.
/21/	Yunnan Xudong Phosphate Chemical Group Jinfeng Power Generation Co.,Ltd: The

	electricity record from 29 May 2008 to 1 June 2008 on trial.
/22/	Xundian Power Supply Co., Ltd: sales receipt of on-grid and off-grid electricity amount from 29 May 2008 to 28 April 2010;
/23/	Yunnan Difang Electric Power Technology: Preliminary Design Report “Xundian Jinfeng 12.6 MW Small Hydropower Plant” in June 2004.
/24/	Yunnan Xundian Development and Plan Bureau: Approval of Preliminary Design Report “Xundian Jinfeng 12.6 MW Hydropower Project’ on 12 December 2004.
/25/	National Development and Reform Commission: LoA from Chinese DNA in April 2008.
/26/	Yunnan Xudong Phosphate Chemical Group Jinfeng Power Generation Co.,Ltd; The declaration letter on 9 September 2011.
/27/	ISO 14064-3:2006: Specification with guidance for the validation and verification of greenhouse gas assertions
/28/	ISO 14065:2007: Greenhouse gases-Requirements for greenhouse gas validation and verification bodies for use in accreditation or other forms of recognition
/29/	The operational acceptance board of Xundian Jinfeng 12.6 MW Hydropower Project: The operational acceptance appraisal for Xundian Jinfeng 12.6 MW Hydropower Project on 1 June 2008.
/30/	Yunnan Xudong Phosphate Chemical Group Jinfeng Power Generation Co.,Ltd: The monitoring manual issued on June 2008.
/31/	Xundian Power Supply Co., Ltd: Monthly balance sheet of on-grid and off-grid electricity amount from 29 May 2008 to 28 April 2010
/32/	Yunnan Xudong Phosphate Chemical Group Jinfeng Power Generation Co.,Ltd: Daily record on grid electricity power conducted by shift duty during the monitoring period of 29 May 2008 to 28 April 2010
/33/	Yunnan Xudong Phosphate Chemical Group Jinfeng Power Generation Co.,Ltd: The training plan in the monitoring period.
/34/	Yunnan Xudong Phosphate Chemical Group Jinfeng Power Generation Co.,Ltd: The testimonial for the electricity of 1st day and the last day on 17 July 2012
/35/	Metering Station of Xundian Power Supply Co., Ltd,: Calibration Record of Electricity Metering Equipment The main meter: serial number 005Z0024, valid from 22 January 2009 to 21 January 2010; The back-up meter: serial number D2005000981, valid from 22 January 2009 to 21 January 2010;
/36/	Calibration Institute of Yunnan Electric Power Group Co., Ltd: Authorized Certification for Metrology Assurance System for Metering Station of Xundian Power Supply Co., Ltd., issued on 16 June 2004, expired on 15 June 2009.
/37/	Yunnan Provincial Electric Power Test & Research Institute (Group) Co., Ltd. Electric Power Research Institute: The calibration report for main meters and backup meters issued on 25 November 2011, respectively.
/38/	CNAS: Quality Certification for Metrology Assurance System for Yunnan Provincial Electric Power Test & Research Institute (Group) Co., Ltd Electric Power Research Institute issued on



	28 April 2011, valid to 27 April 2014, CNAS L3356.
/39/	Xundian Power Supply Co., Ltd: The meters replacement record on 18 December 2010 and further clarification on replaced meters on 14 May 2012.
/40/	Technical administrative code of DL/T448 – 2000 of P.R.China

### Interviews

On 14 September 2011, the Verification Team of TÜV Rheinland has performed personal interviews with representatives of the project owner and local authorities at Xundian County, Yunnan Province, P.R.China. The main topics of the interviews were:

- Project's implementation
- Project management
- GHG program for the project

	Date	Name	Organization	Topic
/i/	14 September 2011	Mr. Zhao Dongdong Mr. Li Jiping	Yunnan Xudong Phosphate Chemical Group Jinfeng Power Generation Co.,Ltd	<ul style="list-style-type: none"> <li>- Project implementation against the description in the registered PDD;</li> <li>- Personal training for project operation and monitoring;</li> <li>- Daily monitoring recording;</li> <li>- Monthly monitoring recording;</li> <li>- Monitoring structure;</li> <li>- Reporting process;</li> <li>- Monitoring data archive;</li> <li>- Calibration of the monitoring meters</li> </ul>
/ii/	14 September 2011	Mr. Zhang Ning	Yunnan Xudong Phosphate Chemical Group Jinfeng Power Generation Co.,Ltd	<ul style="list-style-type: none"> <li>- Project's implementation</li> <li>- VER calculation</li> <li>- MR discussion</li> </ul>

### Site Inspection

The verification team performed the site visit from 13 September 2011 to 15 September 2011, the project implementation, project management and the project location was confirmed on site visit.

### Resolution of Any Material Discrepancy

The objective of this phase of the validation is to resolve any outstanding issues which need be clarified prior to TÜV Rheinland's positive conclusion on the project design.

Findings established during the validation can either be seen as a non-fulfilment of VCS criteria or where a risk to the fulfilment of project objectives is identified. Corrective action requests (CAR) are issued, where:

- i) mistakes have been made with a direct influence on project results;
- ii) VCS and/or methodology specific requirements have not been met; or
- iii) there is a risk that the project would not be accepted as a VCS project or that emission reductions will not be certified.

A request for clarification (CL) may be used where additional information is needed to fully clarify an issue.

## 2.2 Validation Findings

### 2.2.1 Gap Validation

As the project has been validated under the CDM, a further validation shall be completed for cover page, sections 1.2, 1.3, 1.5, 1.6, 1.7, 1.9, 1.10, 1.12.1, 1.12.2, 1.12.3, 1.12.4 and 1.13 of the VCS Project Description Template within the verification report based on VCS version 3 /10/.

Cover Page:

Clarification: The project owner Yunnan Xudong Phosphate Chemical Group Jinfeng Power Generation Co.,Ltd developed the VCS project, which has been identified in additional project description version 06 dated 21 August 2012. The verification team verified the registered PDD under UNFCCC version 2.1, 17 August 2009 and confirm that the information in cover page of addition project description 06 dated 21 August 2012 is consistent.

Section 1.2: Sectoral Scope and Project Type

Clarification: Based on the registered PDD version 2.1, 17 August 2009 and FSR, referenced with the sectoral scope covers Energy (renewable/non-renewable) based on the identification of VCS sectoral scope <http://www.v-c-s.org/how-it-works/policy-areas-sectors> . the sectoral scope is: Energy Industries (renewable/non-renewable sources); Project Type: Renewable energy project. The project is not a grouped project based on interview with project owner and PD.

Section 1.3: Project Proponent

Clarification: Verified the registered PDD and business licence, the verification team could confirm that the project proponent was project owner Yunnan Xudong Phosphate Chemical Group Jinfeng Power Generation Co.,Ltd, as indicated in identified in project description.

Section 1.5: Project Start Date

Clarification: According to the final acceptance report /20/ and the trial electricity record /21/, the project was operated from 29 May 2008 to 1 June 2008 on trial, and then was operated in normal after that. Therefore, the project operational date 29 May 2008 was the date on which the project began GHG emission reductions or removals and was identified as the project start date, which is

in line with VCS Standard Version 3.2. The validation with CDM program was registered on 29 April 2010, which complies with VCS process that the validation was completed within two years of the project start date.

#### Section 1.6: Project Crediting Period

Clarification: The project was registered as CDM project on 29 April 2010, and the crediting period as CDM project was a seven year twice renewable project and the the first crediting period is from 29 April 2010 to 28 April 2017. The emission reduction in the CDM crediting period is not eligible for VCU issuance. Therefore, the project crediting period for VCS was identified from the date of commissioning 29 May 2008 to 28 April 2010, which is the emission reduction prior to CER credit, and to be consistent with VCS standard /10/.

#### Section 1.7: Project Scale and Estimated GHG Emission Reductions or Removals

Clarification: The verification team checked the registered PDD /5/ and CER spreadsheet /8/; the net electricity generated, with a total estimated annual volume of 48,334 MWh, will be supplied to the South China Power grid, the emission factor is 0.8433tCO<sub>2</sub>e/MWh. The total estimated emission reduction in the monitoring period (700days) is 78,170tCO<sub>2</sub>e, the annual ER is 40,760tCO<sub>2</sub>e. The verification team has verified the estimated ER calculation /8/, and confirmed it is consistent with the calculation in the registered PDD. Based on the estimated ER, the annual GHG emission reduction is less than 1,000,000 tCO<sub>2</sub>e per year, hence, the project is categorized as projects.

#### Section 1.9: Project Location

The project location identified in additional project description was in line with the registered PDD, also the verification team was confirmed with on-site inspection.

#### Section 1.10: Conditions Prior to Project Initiation

According to the registered PDD /5/ and validation opinion by TÜV SÜD Industrie Service GmbH /6/, the conditions prior to project initiation is the same as baseline scenario, which is South China Power Grid (SCPG) providing the same electricity services as the Project. Therefore, the verification team confirms that the project has not been implemented to generate GHG emissions for the purpose of their subsequent reduction.

#### Section 1.12.1: Proof of Title

The letter of approval issued by the national development & reform commission of P.R. China/19/ was checked and found that the Yunnan Xudong Phosphate Chemical Group Jinfeng Power Generation Co.,Ltd is authorized to carry out the project activity. Further, the business license of Yunnan Xudong Phosphate Chemical Group Jinfeng Power Generation Co.,Ltd officially issued by the Administration for Industry and Commerce of Yunnan /18/ was checked to confirm its ownership of the project.

#### Section 1.12.2: Emissions Trading Programs and Other Binding Limits

Clarification: Via UNFCCC website, the project was registered as CDM project activity with UNFCCC Ref. No. 3023, indicating the renewable crediting period of 3x7 years starting from 29 April 2010, thus the net GHG emission reductions generated from the reporting period from 29

May 2008 to 28 April 2010 will not be used for compliance with the CDM trading program or to meet binding limits on GHG emissions other VCS. The proposed project is not included in an emission trading program, and does not take place in a jurisdiction or sector in which binding limits are established on GHG emissions. The declaration letter from the project owner has been confirmed /26/.

#### Section 1.12.3: Participation under Other GHG Programs

The project was registered as a CDM project on 29 April 2010, however, the emission reduction claimed as VCU is from 29 May 2008 to 28 April 2010, which is prior to the registration date under UNFCCC, therefore, the GHG emission reductions during the monitoring period can be considered not to be claimed credit under the approved CDM program. The declaration letter from the project owner has been obtained /26/. It has been confirmed that the project owner will not apply for other VERs. CDM validation was completed within two years of the project start date (see section 1.5), the gap validation was undertaken within the proposed report

#### Section 1.12.4: Other forms of Environmental Credits

The declaration letter from the project owner has been obtained /26/. It has been confirmed that the project owner neither has nor intends to generate any other form of GHG-related environmental credit.

#### Section 1.13: Additional Information Relevant to the Project Eligibility Criteria

The proposed project is not a grouped project, the eligibility criteria is not applicable.

#### Leakage Management

According to the methodology AMS-I.D.version 13 and the registered PDD, there is no leakage involved in the project.

#### Commercially Sensitive Information

The verification team has not found any commercially sensitive information excluded from the public version of the project description on site visit.

#### Further Information

The verification team has not found other information exclude the information mentioned in the registered validation report /6/ as CDM project and this report.

### 2.2.2 Methodology Deviations

Not applicable

### 2.2.3 New Project Activity Instances

Not applicable.

### 2.3 Validation Conclusion

In summary, the project was registered on 29 April 2010 under UNFCCC reference number (3023). The project design, its eligibility as CDM project activity and the correct application of the CDM approved baseline and monitoring methodology AMS-I.D., version 13 was already validated by TÜV SÜD Industrie Service GmbH. The validation opinion by TÜV SÜD Industrie Service GmbH is that the Xundian Jinfeng 12.6 MW Hydropower Project as described in the PDD of version 2.1, 17 August 2009 meets all relevant UNFCCC, CDM criteria and all relevant host country criteria.

The project correctly applies methodology AMS-I.D.version 13. Based on the validation opinion of DOE TÜV SÜD Industrie Service GmbH and also based on the registration of the project as a CDM project activity by CDM EB/UNFCCC, the verification team assumes that the project design as documented is sound, reasonable and meets the relevant UNFCCC and host Party criteria.

Furthermore, it is Verification team's opinion that the Xundian Jinfeng 12.6 MW Hydropower Project in Yunnan Province as described in the PD version 06, 21 August 2012, meets additional requirement under VCS version 3 rules.

### 3 VERIFICATION PROCESS

#### 3.1 Method and Criteria

The verification team has focused on the identification of significant reporting risks and verifying the mitigation measures for these based on the recommendations in the VCS version 3 program documents /10/, and/or ISO 14064-3:2006 /27/ and ISO 14065:2007 /28/.

#### 3.2 Document Review

The verification consists of the following three phases:

1. Desk review of the monitoring plan, monitoring report, project design document and other relevant documents;
2. On-site visit (including follow-up interviews with project stakeholders, when deemed necessary);
3. Resolution of outstanding issues and the issuance of the final Verification report and Certification statement.

The following sections outline each step in more detail.

##### **Desk Review:**

The Table 2 outlines the documentation reviewed during the verification.

#### 3.3 Interviews

From 14 September 2011 to 16 September 2011, the Verification Team of TÜV Rheinland has performed personal interviews with representatives of the project owner and local authorities at Julongge Villa, Luoman Hotspring Hotel, Dianchi Street, Kunming City, Yunnan Province. The main topics of the interviews were:

	Date	Name	Organization	Topic
/i/.	14 September 2011	- Mr.Li Jiping/ General Manager	Xundian Jinfeng 12.6 MW Hydropower Project	- Project implementation against the description in the registered PDD; - Personal training for project operation and monitoring
/ii/.	14 September 2011	- Mr. Zhao Dongdong/Station Master	Xundian Jinfeng 12.6 MW Hydropower Project	- Daily monitoring recording - Monthly monitoring recording - Monitoring structure - Reporting process - Monitoring data archive - Calibration of the monitoring meter - Position of the monitoring meter
/iii/.	14 September 2011	- Mr. Zhang Ning	Beijing Reachble Management Consulting Co.,Ltd	- Discussion in monitoring report

### 3.4 Site Inspections

From 14 September 2011 to 16 September 2011, the Verification Team of TÜV Rheinland has performed site inspections to the project location. On site visit, the following inspection was performed:

- Project's implementation
- Project monitoring structure
- Project monitoring implementation
- Monitoring equipments installation and calibration
- Monitoring data archive

### 3.5 Resolution of Any Material Discrepancy

List of Requests for Corrective Action (CAR) and Clarification (CL)		
Observation	Summary of project owner response	Verification team conclusion
<p>CAR1</p> <p>Refer to the calibration of monitoring meters, the following issues need to be further justified:</p> <ol style="list-style-type: none"> <li>1. The serial number of the main meter (93021500) addressed in MR is inconsistent with the calibration report, please justify the main meter used during the monitoring period from 29 May 2008 to 28 April 2010.</li> <li>2. The accuracy for the back up meter with serial number D2005000981 in MR is inconsistent with the calibration report, please further justify it;</li> <li>3. The calibration date for the back up meter with serial number 20100050006 in MR is inconsistent with the calibration report, please further justify it.</li> <li>4. The calibration valid period for the main and backup meter should be covered in the total monitoring period.</li> </ol>	<ol style="list-style-type: none"> <li>1. That's a typo, the actual serial number of the main meter is "005Z0024" not "93021500".</li> <li>2. The actual accuracy for the backup meter with serial number D2005000981 is "0.5" not "0.5s", it doesn't exceed +0.5%.</li> <li>3. The Backup meter with serial number 20100050006 is used to replace the meter with D2005000981 at 18/12/2010. That is out of the monitoring period of this project.</li> <li>4. Because the qualification certificate of calibration entity was invalid after 15/06/2009, and they could not provide us the certification of calibration after that, the PO asked a new entity to calibrate the meters later. The calibration has been delayed.</li> </ol>	<p>OK.</p> <p>The verification team has verified the updated monitoring report 07 dated 21 August 2012, the replaced record and the calibration report, and then confirmed that:</p> <ol style="list-style-type: none"> <li>1.The actual serial number of the main meter is "005Z0024", which is addressed in updated monitoring report;</li> <li>2.According to the calibration report, the accuracy for the backup meter with serial number 2005000981 is 0.5, which is consistent with registered PDD;</li> <li>3. According to the replaced record, the back up meter with serial number 20100050006 was is used to replace the meter with D2005000981 on 18 December 2010, hence, the verification team could confirm that the electricity meter with serial number 20100050006 was not involved in the monitoring period.</li> <li>4. The verification team has verified the delayed calibration report, and confirm that the ER calculation was calculated based on Guidelines for Assessment Compliance with the Calibration Frequency</li> </ol>

		<p>Requirements, which is more conservative.</p> <p>Therefore, the CAR was closed.</p>
<p>CAR2</p> <p>According to ER spreadsheet, the meter recording time set at 8:00 AM dated 20 of each month, please clarify how to assess the electricity imported and exported before 8:00AM of first day and after 8:00AM of the last day.</p>	<p>According to the statement from Xundian Power Supply, the meter records at 0:00 AM of 29/05/2008 and 29/04/2010 were confirmed.</p>	<p>OK.</p> <p>The verification team verified the testimonial for the electricity of the 1st day and the last day issued by Xundian Power Supply Co., Ltd /34/, and confirm that the reading for the electricity meter at 0:00 on 29 May 2008 and the reading for the electricity meter at 24:00 on 28 April 2010. The verification team confirms that the calculation is credible and reasonable.</p> <p>Therefore, the CAR was closed.</p>
<p>CL1</p> <p>The qualification certificate of calibration entity should be provided to justify the calibration entity authority.</p>	<p>Because the certification of the calibration Xundian Power Supply could not provide us the certification after 15/06/2009, the PO asked a new entity to calibrate the meters later. The calibration has been delayed. That's not compliance with the requirements of the calibration frequency. However, according to the section B.4 of the "guidelines for accessing compliance with the calibration frequency requirements" (EB52, Annex60). If it doesn't</p>	<p>OK.</p> <ul style="list-style-type: none"> <li>- The verification team verified the calibration report issued by Metering Station of Xundian Power Supply Co., Ltd /35/, however, there is no authorized calibration certificate for Metering Station of Xundian Power Supply Co., Ltd, the calibration conducted by Metering Station of Xundian Power Supply Co., Ltd cannot be justified as credible;</li> <li>- Therefore, an authorised entity Yunnan Provincial Electric Power Test &amp; Research Institute (Group) Co., Ltd Electric Power Research Institute</li> </ul>



	<p>show any errors in the measuring equipment (It shows the meters are qualified in the calibration report), the maximum permissible error of the meters can be applied to the measured values for conservative. The accuracies of the main meter and the backup meter are 0.2s and 0.5s separately. We consider the accuracy 0.5s of backup meter as the maximum permissible error. It is more conservative with less baseline emissions and do not need to consider the project emissions or leakages of the project since there are no project emissions or leakages. In the new version of the MR and the CER Calculation Sheet, the measured values supply to the gird(EGy) have been deducted with 0.5% and the measured values imported from the gird(EGg) have been added with 0.5%.</p>	<p>was conducted the calibration again on 25 November 2011, respectively, the verification team has verified the calibration report /37/ and authorized calibration certificate of Yunnan Provincial Electric Power Test &amp; Research Institute (Group) Co., Ltd Electric Power Research Institute /38/, and confirm that it is credible;</p> <p>- Furthermore, due to the results of the delayed calibration, in accordance with Guidelines for Assessment Compliance with the Calibration Frequency Requirements /15/, a conservative approach was adopted in the calculation of emission reduction (addressed in section 4.3 of the report ), the verification team verified the guideline and the CER spreadsheet, and confirms that it is reasonable and conservative.</p> <p>Therefore, the CL was closed.</p>
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## 4 VERIFICATION FINDINGS

### 4.1 Project Implementation Status

The project implementation was verified by means of on-site physical inspection, stakeholder’s interview and document review, including Monitoring Report /2/ , registered PDD /5/, project Validation Report /6/, Grid Access Dispatch Agreement between project owner and Xundian Grid Company /17/ as well as the

project final acceptance report /20/. The Verification Team of TUV Rheinland was able to confirm that the project implementation is in accordance with the project description contained in the registered PDD (version 2.1, 17 August 2009).

The project constitutes only one site and is located in Xundian County, Yunnan Province, People's Republic of China, which has been confirmed by the Verification Team during on site physical inspection. The construction site is in Fengyi Village and Jinyuan Village. The geographical coordinate of the powerhouse are east longitude of 103°06'35" and north latitude of 25°52'35". Thus the Verification Team confirms the geographic coordinate of the proposed project.

According to the operational acceptance report for the proposed project, the project was implemented and commissioned on 29 May 2008 /29/, the Verification Team was able to confirm that the commercial operational date for the proposed project was identified as 29 May 2008. The monitoring period 29 May 2008 to 28 April 2010 was identified from the date of commissioning to the project registration date from UNFCCC, which doesn't involve the GHG emission reductions in the applicable project crediting period under UNFCCC. By physical inspection on site and document review, the Verification Team is able to confirm that no overhaul or equipment exchange was happened and no events or situation occurred during this monitoring period.

.All facilities and equipment as described in the PDD have been installed /2/; these included 2 sets of turbines and associated generators with the capacity of 6.3 MW respectively. This has been verified by verification team to be in compliance with registered PDD during on-site visit.

Electricity was generated and supplied to the South China Power Grid (SCG). The generated electricity of 73,982.315MWh was supplied to the grid during the monitored period 29 May 2008 to 28 April 2010. The average plant load factor during this monitoring period is 35.0% (73,982.315 MWh / (12.6 MW \* 700 days \* 24 h/day)), which is lower than the expected average plant load factor of 43.8% (48,334 MWh / (12.6MW \* 365 days \* 24 h/day)) indicated in the registered PDD/5/.

The training plan for operating and maintaining the equipment was provided by project owner /33/. During on-site visit, the verification team was able to confirm that these trainings and procedure implementation were appropriate.

Malfunctioning of equipment has been monitored and the relevant replaced record for monitoring meters was provided for cross check.

The project boundary is as defined in the registered PDD /5/.

Hence, it was confirmed by verification team that the project has been implemented in accordance with the design mentioned in the registered PDD /5/

**The actual operation of the project activity**

The on-site inspection enables the Verification Team to confirm that the project actual physical implementation is fully consistent with that described in the registered PDD during this monitoring period. The project is a run of river type hydropower plant, with two water turbine generation units. The capacity of each generation unit is 6.3 MW; consequently the project total installation is 12.6 MW. The nameplates information is summarized in below Table:

Equipment	Type	Consistent with registered PDD?
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Water Turbine	CJA475-W-116/2x11	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Electricity Generator	SFW6300-8/2150	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No

By physical on-site inspection, the Verification Team has confirmed that the technical parameters of water turbine and generators are consistent with the registered PDD.

The power generated will be supplied to SCG through the 35kV transformer substation of the Grid Company according to Grid Access Dispatching Agreement between Xundian power Supply Co., Ltd and Yunnan Xudong Phosphate Chemical Group Jinfeng Power Generation Co.,Ltd.

In conclusion, to the Verification Team’s opinion, the project has been implemented according to the registered PDD.

**Compliance of the monitoring plan with the monitoring methodology**

As per paragraph 203 of VVM version 01.2, the Verification Team of TUV Rheinland was able to confirm that the monitoring plan contained in the registered PDD (version 2.1, 17 August 2009) is in accordance with the approved methodology applied by the project activity, i.e. AMS-I.D.version 13.

**Compliance of the monitoring with PDD and monitoring plan**

Through the documentation review and on site visit, the Verification Team of TUV Rheinland was able to confirm that the monitoring, including the actual monitoring system, data management, QA&QC has been carried out in accordance with the monitoring plan contained in the registered PDD (version 2.1, 17 August 2009).

**4.2 Accuracy of GHG Emission Reduction or Removal Calculations**

An information/process flow was included in CDM monitoring manual /30/ and registered PDD, where data is transferred between or within systems/spreadsheets; the method of transfer (manual) is reviewed by another staff member where possible.

As stated above, the electricity data was recorded at 08:00 of 20th of each month during this monitoring period. CAR 2 was raised for clarifying how to assess the electricity imported and exported before 8:00AM of first day and after 8:00AM of the last day. The verification team verified the testimonial for the electricity of the 1st day and the last day issued by Xundian Power Supply Co., Ltd /34/, and confirm that the reading for the electricity meter at 0:00 on 29 May 2008 and the reading for the electricity meter at 24:00 on 28 April 2010. The verification team confirms that the calculation is credible and reasonable.

The emission reductions E<sub>Ry</sub> by the project activity during the crediting period is the difference between baseline emissions (BE<sub>y</sub>), project emissions (PE<sub>y</sub>) and emissions due to leakage (L<sub>y</sub>). The formula is: E<sub>Ry</sub> = BE<sub>y</sub> - PE<sub>y</sub> - L<sub>y</sub> = BE<sub>y</sub>.

1) Baseline emissions (BE<sub>y</sub> in tCO<sub>2</sub>e) are the product of the baseline emissions factor (EF<sub>y</sub> in tCO<sub>2</sub>e /MWh) multiply the net electricity supplied by the project activity to the grid (EG<sub>y</sub>-EG<sub>g</sub> in MWh).

The baseline emissions factor (EF<sub>y</sub> in tCO<sub>2</sub>e/MWh) was ex-ante determined from combination by OM and BM. The weights ω<sub>OM</sub> and ω<sub>BM</sub> were selected as 0.5 and 0.5 respectively.

The combined margin of 0.8433 tCO<sub>2</sub>e/MWh was fixed ex-ante for the first crediting period which is in line with registered PDD

The net power supplied to grid was determined by the electricity supplied to the grid minus the imported electricity from the grid on a monthly basis by monitoring the electricity exported and imported. The monthly monitored data were cross checked with the figures in the monthly balance sheet issued by Xundian Power Supply Co., Ltd /31/. The magnification 28,000 for electricity meters were confirmed by verification team by on-site inspection and verified the daily record on grid electricity /32/, the monthly balance sheet /31/.

In addition, due to the calibration certificate for calibration entity, Metering Station of Xundian Power Supply Co., Ltd. Was expired on 15 June 2009, and has not been authorized by calibration institute, the calibration report issued by Metering Station of Xundian Power Supply Co., Ltd. can not be considered credible, the delayed calibration for main meter and back up meter (listed in Table 1, section 4.3 of the report) was issued by Yunnan Provincial Electric Power Test & Research Institute (Group) Co., Ltd Electric Power Research Institute on 25 November 2011, respectively /37/, in accordance with Guidelines for Assessment Compliance with the Calibration Frequency Requirements /15/, a conservative approach was adopted in the calculation of emission reduction after May 2009. According to the calibration report issued by Yunnan Provincial Electric Power Test & Research Institute (Group) Co., Ltd Electric Power Research Institute (authorized the calibration certificate by CNAS /38/)/37/, the calibrated meters were qualified, the error in the delayed calibration report is within the maximum permissible error specified by the manufacturers, which is addressed in Table 1, section 4.3 of the report. The verification team inspected on-site, and confirm that the maximum permissible error is credible. Against Table 1, the main meter with accuracy 0.2s was replaced with the main meter with accuracy 0.5s in the monitoring period; hence, to be conservative, in the monitoring period, the maximum permissible error as 0.5% was applied for measuring the electricity export for baseline emissions and electricity import in the monitoring period. Since there is no project emissions and leakages for the proposed project, in the calculation of emission reduction, to be conservative, EGy with electricity supply to the grid was deducted with 0.5%, EGg with electricity import to the grid was added with 0.5%. The formula is:

$$EGy, \text{ corrected} = EGy \times (1-0.5\%)$$

$$EGg, \text{ corrected} = EGg \times (1+0.5\%)$$

Based on the above assessment, the emission reductions resulted from the monitoring period from 29 May 2008 to 28 April 2010 is verified as 62,389tCO<sub>2</sub>e. Compared with the estimated emission reductions under the same days of 700 from 29 May 2008 to 28 April 2010 against the registered PDD, the actual emission is verified to be 20.2% lower than the estimated emission reductions, i.e.  $(78,170 - 62,389 \times 700 / 365) \times 100\% / (78,170 \times 700 / 365) = 20.2\%$ . As confirmed above, the input data for calculation /8/ as well as the calculation process and result is complete and transparent, which is consistent with the formulae and methods described in the registered PDD and applied methodology and the verification team is able to confirm the accuracy.

### 4.3 Quality of Evidence to Determine GHG Emission Reductions or Removals

VVB shall assess the monitoring techniques and feasibility of the values and provide a short summary on the verification of every parameter listed in the monitoring plan and used for calculation of:

- Baseline emissions;
- Project emissions
- Leakage emissions

Table 1: The provided description shall refer to the detailed monitoring parameter.

Assessing the Monitoring Plan																				
Monitored Parameters	EGy: Electricity delivered to grid in year y  EGg: Electricity supplied by grid in year y																			
Monitoring method	- The first meter (backup meter) at the exit of the project station is employed to measure output electricity, and the second meter (main meter) measures the power supplied to the grid at the input of the substation of the Grid Company (interconnection facility connecting the facility to the grid). Both meters (which of them belong to the project owner) have the capability to be read remotely through a communication line.																			
Frequency of measurements	Continuous monitoring																			
Measure Devices	- The verification team verified the registered PDD and national standard DL/T 448-2000 /40/, and confirm that the Main Meter (SN: 005Z0024with accuracy class 0.2S) and the Backup Meter(SN:D2005000981 with accuracy class 0.5) was used in the monitoring period, and the accuracy of electricity meters is reasonable;  - The maintainence and operational record for the project was verified by verification team, there is no any other events occurred in the monitoring period to affect the monitoring.																			
Calibration frequency/interval	<table border="1"> <thead> <tr> <th>Serial number</th> <th>accuracy</th> <th>Calibration date</th> <th>Valid date</th> <th>Calibration entity</th> </tr> </thead> <tbody> <tr> <td rowspan="2">005Z0024 (main meter)</td> <td>0.2s</td> <td>25 November 2011</td> <td>24 November 2012</td> <td>Yunnan Provincial Electric Power Test &amp; Research Institute (Group) Co., Ltd Electric Power Research Institute</td> </tr> <tr> <td>0.2s</td> <td>22 January 2009</td> <td>21 January 2010</td> <td>Xundian Power Supply Co., Ltd</td> </tr> <tr> <td>D2005000981</td> <td>0.5</td> <td>25 November 2011</td> <td>24 November 2012</td> <td>Yunnan Provincial Electric Power Test &amp; Research Institute (Group) Co., Ltd</td> </tr> </tbody> </table>	Serial number	accuracy	Calibration date	Valid date	Calibration entity	005Z0024 (main meter)	0.2s	25 November 2011	24 November 2012	Yunnan Provincial Electric Power Test & Research Institute (Group) Co., Ltd Electric Power Research Institute	0.2s	22 January 2009	21 January 2010	Xundian Power Supply Co., Ltd	D2005000981	0.5	25 November 2011	24 November 2012	Yunnan Provincial Electric Power Test & Research Institute (Group) Co., Ltd
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D2005000981	0.5	25 November 2011	24 November 2012	Yunnan Provincial Electric Power Test & Research Institute (Group) Co., Ltd																

				Electric Power Research Institute
	0.5	22 January 2009	21 January 2010	Metering Station of Xundian Power Supply Co., Ltd
QA/QC Procedures Applied	On site visit, the monitoring manual was provided /30/. The roles and responsibilities for the monitoring are clearly defined and implemented according to CDM monitoring manual and registered PDD.			
Data Report	<ul style="list-style-type: none"> <li>- Based on on-site interview by verification team, it could confirm that the electricity was recorded by project owner at 08:00AM every day, and automatic sent to the remote control center in Grid Company.</li> <li>- Based on the daily record by project owner and the electricity remote control center in grid company, the sales receipt issued at 8:00 of 20 per month by Xundian Power Supply Co., Ltd /32/;</li> <li>- Moreover, the verification team cross checked daily manual record on grid electricity power conducted at 8:00 AM every day by project owner during the monitoring period of from 29 May 2008 to 28 April 2010 /32/ and confirm that it is consistent between the sales receipt and daily manual record;</li> </ul>			

- The verification team verified the calibration report for the main meter serial number 005Z0024 and back up meter serial number D2005000981, valid from 22 January 2009 to 21 January 2010 issued by Metering Station of Xundian Power Supply Co., Ltd /35/, and also verified the authorized certification for Metering Station of Xundian Power Supply Co., Ltd. issued on 16 June 2004, expired on 15 June 2009 /36/, and then confirm the calibration report is credible calibrated by Metering Station of Xundian Power Supply Co., Ltd., in the period of calibration.
- however, after 15 June 2009, the authorized calibration certificate for Metering Station of Xundian Power Supply Co., Ltd was expired, the calibration conducted by Metering Station of Xundian Power Supply Co., Ltd since 15 June 2009 cannot be justified as credible;
- Therefore, an authorised entity Yunnan Provincial Electric Power Test & Research Institute (Group) Co., Ltd Electric Power Research Institute was conducted the calibration again on 25 November 2011 and 29 November 2011, respectively, the verification team has verified the calibration report /37/and authorized calibration certificate of Yunnan Provincial Electric Power Test & Research Institute (Group) Co., Ltd Electric Power Research Institute /38/, and confirm that it is credible.
- Furthermore, due to the results of the delayed calibration, in accordance with Guidelines for Assessment Compliance with the Calibration Frequency Requirements /15/, a conservative approach was adopted in the calculation of emission reduction (addressed in section 4.3 of the report ), the verification team verified the guideline and the ER spreadsheet, and confirms that it is reasonable and conservative.

#### 4.4 Management and Operational System

Data was collected according to well defined data collection procedures:

- Data of electricity exported and imported is recorded on a daily basis /33/;
- The sales receipt was issued by Xundian Power Supply Co., Ltd for cross check /22/;
- Quality of the meter reading is assured through calibration of electricity meters and through cross checking of readings between the meters and the receipts.

The monitoring and reporting of electricity data is in accordance with well established operational procedures.

The site visit confirmed that the management system for the project is in place, such as the monitoring manual /30/ and the competence criteria of personnel involved in the project..

## 5 VERIFICATION CONCLUSION

The verification team assigned by the VVB (TÜV Rheinland (China) Ltd.) has performed the verification of the project “*Xundian Jinfeng 12.6 MW Hydropower Project*” (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 South China Power grid in which the fossil-fuel based power plant are mainly dominated, thus the project achieves GHG emission reductions.

The verification is was conducted by the following three steps: i) desk review of the VCS monitoring report, 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; and iii) resolution of outstanding issues.

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 AMS-I.D. “Grid Connected Renewable Electricity Generation”, version 13;
- 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 “*Xundian Jinfeng 12.6 MW Hydropower Project*” during the monitoring period from *29 May 2008 to 28 April 2010* amount to *62,389tCO<sub>2</sub>e*, detailed as below,

Reporting period: From *29 May 2008 to 28 April 2010*

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

GHG Emission Reductions or Removals	tCO <sub>2</sub> e in the monitoring period	tCO <sub>2</sub> e from 29 May 2008 to 25 Dec 2008	tCO <sub>2</sub> e from 25 Dec 2008 to 14 Dec 2009	tCO <sub>2</sub> e from 14 Dec 2009 to 28 April 2010
Baseline Emissions	62,389tCO <sub>2</sub> e	33,493tCO <sub>2</sub> e	26,088tCO <sub>2</sub> e	2,808tCO <sub>2</sub> e
Project Emissions	0	0	0	0



Leakage	0	0	0	0
<b>Net GHG emission reductions or removals</b>	62,389tCO <sub>2</sub> e	33,493tCO <sub>2</sub> e	26,088tCO <sub>2</sub> e	2,808tCO <sub>2</sub> e

**Abbreviations**

BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction(s)
CM	Combined Margin
CL	Clarification
CO <sub>2</sub>	Carbon dioxide
CO <sub>2</sub> e	Carbon dioxide equivalent
ER	Emission Reduction
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MR	Monitoring Report
NDRC	National Development and Reform Commission
ODA	Official Development Assistance
OM	Operating Margin
PD	Project Description
PDD	Project Design Document
PLF	Plant load factor
PPA	Power Purchase Agreement
SCPG	South China Power Grid
UNFCCC	United Nations Framework Convention for Climate Change
VCS	Voluntary Carbon Standard
VCU	Voluntary Carbon Unit
VER	Verified Emission Reductions
VVB	Verification and validation body