



## Voluntary Carbon Standard Version 2007 Verification Report Template

**19 November 2007**

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### Verification Report:

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| <b>Name of Verification company:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Date of the issue:</b>  |
| TÜV NORD JI/CDM Certification Program                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 19-09-2008 (final)         |
| <b>Report Title:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Approved by:</b>        |
| Verification Report - Yangcun Hydropower Project                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Mr. Winter Rainer          |
| <b>Client:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Project Title:</b>      |
| South Pole Carbon Asset Management Ltd.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Yangcun Hydropower Project |
| <b>Summary:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                            |
| <p><i>South Pole Carbon Asset Management Ltd. has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 2<sup>nd</sup> periodic verification (2007-06-01 to 2008-05-25) of the project - Yangcun hydropower in Sichuan Province, China, with regard to the relevant requirements of VCS 2007 Standard.</i></p> <p><i>The project activity is a run-of-river hydropower project generating electricity to displace electricity generated by thermal power plants serving the China Central Power Grid, thus achieving GHG emission reduction.</i></p> <p><i>A risk based approach has been followed to perform this verification. In the course of the verification 3 Corrective Action Requests (CAR) and 2 Clarification Requests (CR) were raised and successfully closed.</i></p> |                            |

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The verification is based on the VCS PD, monitoring report and other supporting documents made available to the verifiers by project proponent.

As a result of the verification, the verifiers confirm that:

The project has achieved emission reductions in line with the requirements of the VCS 2007 in the 2<sup>nd</sup> monitoring period as below:

| <b>Emission reductions</b> | <b>CO2<br/>[t CO2]</b> |
|----------------------------|------------------------|
| Jun. 2007                  | 33,635                 |
| Jul. 2007                  | 29,554                 |
| Aug. 2007                  | 39,985                 |
| Sep. 2007                  | 44,515                 |
| Oct. 2007                  | 25,532                 |
| Nov. 2007                  | 25,623                 |
| Dec. 2007                  | 12,971                 |
| Jan. 2008                  | 11,401                 |
| Feb. 2008                  | 8,413                  |
| Mar. 2008                  | 23,537                 |
| Apr. 2008                  | 27,975                 |
| May 2008                   | 36,630                 |
| <b>TOTAL:</b>              | <b>319,771</b>         |

|                                       |                         |
|---------------------------------------|-------------------------|
| <b>Work carried out by:</b>           | <b>Number of pages:</b> |
| Mr. LI Yong Jun<br>Mr. Martin Saalman | 12                      |

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## 1 Introduction

### 1.1 Objective

The purpose of this verification, by independent checking of objective evidences, is as follows:

- to verify that the project is implemented as described in the project design document;
- to confirm that the monitoring system is implemented and fully functional to generate voluntary carbon units (VCUs) without any double counting, and
- to establish that the data reported are accurate, complete, consistent, transparent and free of material error or omission by checking the monitoring records and the emissions reduction calculation.

### 1.2 Scope and Criteria

The 2<sup>nd</sup> periodic verification is based on the VCS project design document<sup>/PD/</sup>, the monitoring report<sup>/MR-2/</sup>, supporting documents made available to the verifier and information collected through performing interviews during the on-site assessment and via telephone and e-mail. Furthermore publicly available information was considered as far as available and required.

The TÜV NORD JI/CDM CP has employed a risk-based approach in the verification, focusing on the identification of significant risks and reliability of project monitoring and generation of emission reductions.

### 1.3 VCS project Description

The project site is located within the territory of Yangcun Town, Ebian Yi Autonomous County, Leshan City at the Guanliao River P. R. China. The geographical coordinates of the project is 29°11'37" N, 103°08'55" E.

The purpose of the project activity is to deliver electricity to China Central Power Grid (CCPG), displacing electricity generated by thermal power plants in CCPG; thus GHG emission reduction is achieved.

The total installed capacity of the project is 66 MW (3\*22 MW).

Power generated by the project is exported to grid via YangE 110 kV bus.

Nevertheless CR1 was raised and successfully closed.

**CR 1:** The technical description of the project should be provided more in details in the MR, e.g. the information on key parameters/information of the turbines and generators, electricity export/import monitoring system etc.

**Corrective action:** The technical description of the project is provided in Section 1 of the revised monitoring report. Electricity export/import monitoring system information is also provided in Annex I of the report.

**Conclusion:** The revision is check to be OK. CR is closed.

#### 1.4 Level of assurance

The verification report is based on VCS PD, Monitoring report<sup>/MR-2/</sup>, supporting documents made available to the verifier and information collected through performing interviews and during the on-site assessment. The verification opinion is assured through checking the credibility of all documents submitted by the project proponent. Where possible additional documents were used to ensure the credibility of the information provided by the project proponent.

Nevertheless CAR1 was issued and successfully closed.

**CAR1:** More information e.g. meter reading time, calibration, accuracy etc. of the meters involved in the monitoring system esp. meter for *Elec<sub>import,35kV</sub>*, and *Elec<sub>Hetaoping,y</sub>* etc. should be demonstrated clearly in the MR.

**Corrective action:** Detailed information of the meters is provided in Annex I of the report. The emission reduction is calculated accordingly.

**Conclusion:** The meter information as well as the calculation were checked by the verification team and assessed to be correct.

## 2 Methodology

The verification of the project was carried out from June to September 2008.

|                       |                          |
|-----------------------|--------------------------|
| Preparations:         | 2008-05-20 to 2008-06-10 |
| On-site verification: | 2008-06-12               |
| Reporting:            | 2008-08-10 to 2008-09-30 |

The verification consisted of the following steps:

- A desk review of the VCS PD <sup>/PD/</sup> and supporting documents with the use of the relevant sections of a customised protocol according to the VCS 2007;
- A desk review of the Monitoring Report <sup>/MR-1//MR-2/</sup> and additional supporting documents which were submitted by the client was conducted. The relevant sections of the above mentioned customised protocol according to the VCS 2007 were used.
- Verification audit planning,
- On-Site assessment,
- Background investigation and follow-up interviews with personnel of the project developer,
- Review of monitoring results and assessment of correct methodology application
- Determination of monitored and calculated emission reductions,
- Verification reporting (Draft Verification Report and Final Verification Report).

The criteria of this verification include the relevant rules and steps as set out in the VCS.

### 3 Verification Findings

#### **3.1 Remaining issues, including any material discrepancy, from previous validation and verification**

There is no remaining issue from previous validation or 1<sup>st</sup> verification.

#### **3.2 Project Implementation**

The project has been implemented as described in the VCS PD <sup>/PD/</sup>. There are no major changes in the key equipment since the validation of the project.

#### **3.3 Completeness of Monitoring**

The reporting <sup>/MR-2/</sup> is in line with the requirements of the validated monitoring plan as well as with the applied methodology ACM0002 ver.06.

7 meters with accuracy 1% are installed for the net electricity monitoring. The table on page 6 of the monitoring report gives an appropriate overview of the

technical parameters of the meters and how these are considered to calculate emission reductions.  
A simplified wiring diagram shows the meter locations:

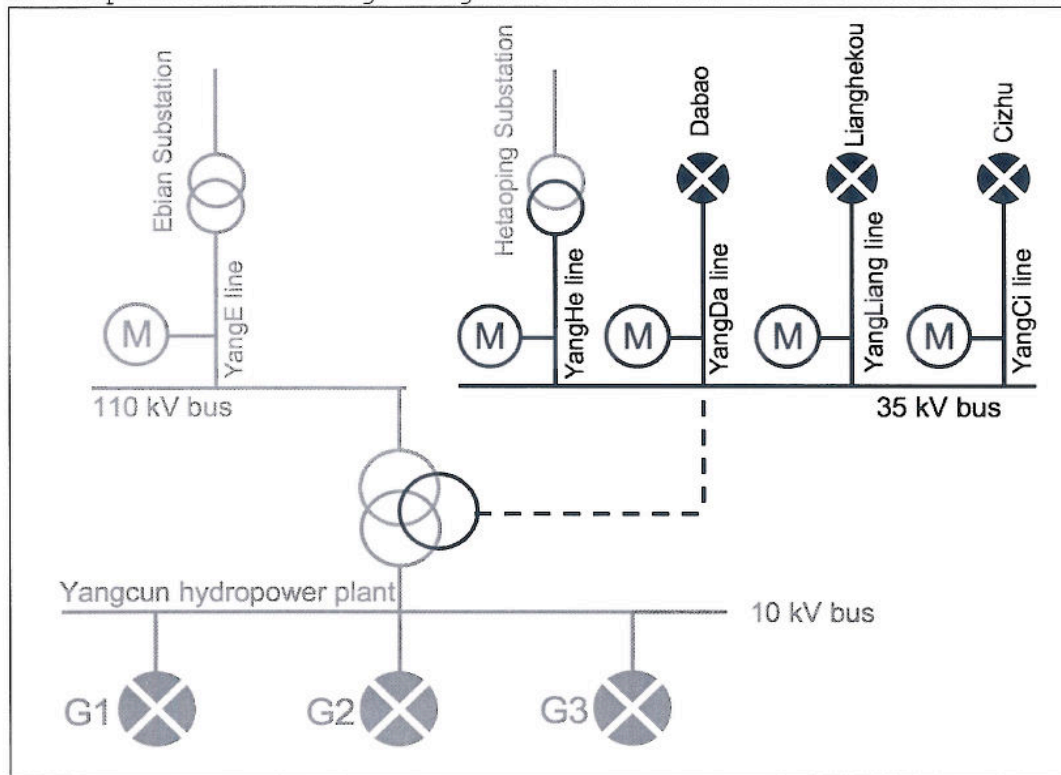


Figure 1: Wiring diagram as indicated in the monitoring report, page 6

The three power plants Dabao, Lianghekou and Cizhu usually supply the generated electricity through Hetaoping Substation via the 35 kV bus line. In special cases (maintenance of the substation or malfunction) the projects are connected to the Yangcun transformer to utilize the Ebian substation for electricity supply. To ensure that only emission reductions are accounted which belong to the proposed project, the verifier accepted the calculations as indicated below. All the exports of the three projects to the 35 kV line as well as the imports through Hetaoping Substation were summarized and deducted from the exported electricity through the Hetaoping Substation. Kindly refer to the calculation below:

The  $EG_{Yangcun\ net,y}$  is calculated as  $Elec_{export,110kV,y} - Elec_{import,110kV,y} - Elec_{import,35kV,y}$

The  $Elec_{import,35kV,y}$  is calculated as  $EG_{Cizhu,y} + EG_{Lianghekou,y} + EG_{Dabao,y} + Elec_{import,Hetaoping,y} - Elec_{export,Hetaoping,y}$  all the meter readings were recorded at 24:00 On 25<sup>th</sup> of each month.

Nevertheless CAR1, CAR2 and CR1 were issued and successfully closed

**CAR2:** The monthly records for electricity imported from the 35KV bus line (Yangda and Yangzi line etc. should be provided).

**Corrective action:** The monthly records for electricity imported from the 35KV bus line were provided to the verification team.

**Conclusion:** The submitted records which were confirmed by the grid company (Sichuan Dadu River Electric Power Co., Ltd.) were checked and assessed to be credible.

### 3.4 Accuracy of Emission Reduction Calculations

The approved CDM baseline and monitoring methodology

ACM0002 ver06 is applied to the project activity.

GHG emission reduction is calculated as baseline emission minus project emission minus leakage.

Project emissions and leakage are not to be considered as the project is a run-of-river hydro power plant and leakage consideration is excluded according to ACM0002.

The baseline emissions are calculated as net electricity delivered to the grid times the emission factor, in compliance with methodology.

EF is determined ex-ante and will be fixed during the 1<sup>st</sup> crediting period as 0.94445 tCO<sub>2</sub>e/MWh.

All meters were appropriately calibrated by the grid company (independent third party). The calibration records are covering the monitoring period and were available during the course of verification.

It was verified in the course of this verification that the above mentioned methodology has been correctly and accurately applied in calculating the total emission reductions and the emission reduction calculation is accurate and conservative.

Nevertheless CAR3 and CR2 was raised and successfully closed.

**CAR3:** The net electricity calculated in the MR is inconsistent with data and information received during on-site interview. Correction is necessary.

**Corrective action:** The monitoring report has been revised in following aspects:

1. In the first version of monitoring report, electricity meters of each generator are the basis of emission reduction calculation. In revised monitoring report, reading of grid gateway meters is used for emission reduction calculation. This ensures conservativeness and application of monitoring as per the PD.

2. Reading of electricity meters installed at 35 kV bus is reported in the revised monitoring report to reflect the electricity exchange between Yangcun and 35 kV bus, if there is any.

**Conclusion:** The calculation was cross checked by the verification team and assessed to be correct.

**CR2:** Methodologies AMS-I.D., Version 11 was not applied for the project. Revision on MR page 2 is necessary.

**Corrective action:** The Monitoring report revised.

**Conclusion:** The revision is appropriate.

### **3.5 Quality of Evidence to Determine Emission Reductions**

Several documents were submitted by the project proponent as evidence to determine emission reductions. Refer to Table 5-1.

The evidences were assessed as of sufficient quantity and appropriate quality.

### **3.6 Management and Operational System**

The management and operational system of the project is suitable.

An operational structure was established with responsibilities identified.

The Quality management and procedures in case of errors were clearly defined.

Staff training plan was clear; training records were available.

## **4 Verification conclusion**

The scope of this verification covers the determination of voluntary greenhouse gas emission reductions generated by the above mentioned project. The verification is based on the submitted VCS PD and Monitoring report<sup>/MR-1/ /MR-2/</sup>, and supporting documents made available to the verifiers by the project proponent.

As a result of the verification, the verifier confirms that:

- all operations of the project are implemented and installed as planned and described in the project design document. The monitoring system is in place and functional. The installed equipment essential for generating emission reductions runs reliable and is calibrated appropriately.

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- the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner.

Reporting period: From 01-06-2007 to 25-05-2008

Verified emission in the above reporting period:

|                            |                |                          |
|----------------------------|----------------|--------------------------|
| <b>Project emissions</b>   | <b>0</b>       | <b>t CO2 equivalents</b> |
| <b>Baseline emissions</b>  | <b>319,771</b> | <b>t CO2 equivalents</b> |
| <b>Emission reductions</b> | <b>319,771</b> | <b>t CO2 equivalents</b> |

Essen, 2008-09-19



Rainer Winter

TÜV NORD JI/CDM Certification Program

Senior Assessor



## 5 References

Table 5-1: Documents provided by the project proponent

| Reference | Document                                                                                                                                                   |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| /AFSR/    | Approval of Feasibility Study Report                                                                                                                       |
| /ASWP/    | Approval Soil and Water Conservation Programme                                                                                                             |
| /BL/      | Business License                                                                                                                                           |
| /CAL/     | Meters Calibration Records covered the monitoring period                                                                                                   |
| /CON/     | Verification contract                                                                                                                                      |
| /CPC/     | Calrification of the power connection for Yangcu power plant issued by grid company                                                                        |
| /EIA/     | Environmental impact assessment                                                                                                                            |
| /EIAA/    | Environmental impact assessment approval by local authority                                                                                                |
| /MBS/     | Monthly Power Balance sheet                                                                                                                                |
| /MR/      | 1. Draft Monitoring report "Yangcun hydropower" Ver.01 submitted 05/06/2008<br>2. Final Monitoring report "Yangcun hydropower" Ver.01 submitted 19/09/2008 |
| /PCD/     | Power Connection Diagram                                                                                                                                   |
| /PD/      | Project Design Document entitled "Yangcun hydropower"                                                                                                      |
| /QA-QC/   | Quality Assurance Procedures                                                                                                                               |
| /WIL/     | Water intake license                                                                                                                                       |
| /XCS/     | Baseline and Emission Reduction Calculations (Excel Sheets)                                                                                                |

Table 5-2: Background investigation and assessment documents

| Reference | Document |
|-----------|----------|
|-----------|----------|

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| Reference        | Document                                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>/ACM0002/</b> | Consolidated baseline methodology for grid-connected electricity generation from renewable sources (Version 06: 19 May 2006) |
| <b>/DLS/</b>     | DL/T448-2000, Chinese electricity measuring device technical management standard                                             |
| <b>/GEF/</b>     | Official data sources for Grid Emission Factor (CcPG Grid) published by the Chinese DNA.                                     |
| <b>/PD/</b>      | Validated project description of Yangcun Hydropower Project                                                                  |
| <b>/VCS2007/</b> | Voluntary Carbon Standard 2007                                                                                               |
| <b>/VVP/</b>     | VCS Validation report of Yangcun Hydropower Project                                                                          |

Table 5-3: Websites used

| Reference    | Link                                             | Organisation |
|--------------|--------------------------------------------------|--------------|
| <b>/vcs/</b> | <a href="http://www.v-c-s.org">www.v-c-s.org</a> | VCS website  |

Table 5-4: List of interviewed persons

| Reference     | Mol <sup>1</sup> |                                                                        | Name              | Organisation / Function                                  |
|---------------|------------------|------------------------------------------------------------------------|-------------------|----------------------------------------------------------|
| <b>/IM01/</b> | V                | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms | Hu Huajun         | Yangcun Hydropower Development Co.,Ltd / station manger  |
| <b>/IM01/</b> | V                | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms | Qin Qizhi         | Yangcun Hydropower Development Co.,Ltd / financial dept. |
| <b>/IM02/</b> | V                | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms | Marco Hirsbrunner | South Pole Carbon Asset Management Ltd./consultant       |
| <b>/IM02/</b> | V                | <input checked="" type="checkbox"/> Mr.<br><input type="checkbox"/> Ms | Wang Liangliang   | South Pole Carbon Asset Management Ltd./consultant       |