



Gold Standard

Verification and Certification Report

Revision No:2.1

South Pole Carbon Asset
Management Ltd.

Guangzhou Zhujiang Beer
Methane Recovery Project

Report No: **GS-PRE-VER-0003-MP1**

Project ID:GS784

Monitoring period: 20/12/2008 - 19/12/2009 (Incl. both days)

No distribution without permission from the client or responsible organizational unit

Issue Date: 15/11/2011	Project Number: GS784
Project Title: Guangzhou Zhujiang Beer Methane Recovery Project	
Client: South Pole Carbon Asset Management Ltd.	
Publication of Monitoring Report	
Monitoring Period	20/12/2008 - 19/12/2009 (Incl. both days)
First Version and Date	Version 1, Date 18/04/2011
Final Version and Date	Version 2.2, Date 20/10/2011
Summary:	
CEPREI Certification body has conducted the GS-PRE-CDM retroactive verification of Guangzhou Zhujiang Beer Methane Recovery Project, CDM Registration Reference Number 2946, GS Project ID GS784 owned by Guangzhou Zhujiang Brewery Co., Ltd., which is located in Guangzhou City, Guangdong Province, P.R. China. (113°20'2"E and 23°06'32"N). And the methodologies AMS-III.H version 13 and AMS-I.D version 13 were applied, on the basis of Gold Standard requirements, UNFCCC criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting. The verification scope is defined as a periodic independent review and ex post determination by the Designated Operational Entity of the monitored reductions in GHG emissions and the project's sustainability during defined verification period, and consisted of the following three phases: i) desk review of the project design document and the baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final verification report and opinion. The overall verification, from Contract Review to Verification Report & Opinion, was conducted using CEPREI Certification internal procedures. The first output of the verification process is a list of Clarification Request, Corrective Actions Requests, Forward Actions Requests (CLs, CARs and FARs), presented in chapter 2.4. In summary, CEPREI confirms that the project is implemented as planned and described in validated and registered Gold Standard project design documents. The monitoring system is in place, the monitoring requirements as per Gold Standard have been complied with, the GHG emission reduction is calculated without material misstatements, and the GS-VER issued totalizes 17,656 tons of CO_{2e} for the monitoring period. Our opinion relating to the Projects' GHG emission reductions and sustainability are based on the valid and registered project baseline, monitoring plan and its associated documents.	

Reporting period : 20/12/2008 to 19/12/2009.

Baseline emissions : 17,656 t CO₂ equivalents.

Project emissions : 0 t CO₂ equivalents.

Emission reductions : 17,656 t CO₂ equivalents.

Subject	CDM Verification
Verification Team	Chen Chunyan Guo Zhiyuan
Technical Review	Wei Zhihong
Final approval	Zhong Lunyan
Authorized Signatory	Wang Xiuci

Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CEPREI	China Electronic Product Reliability and Environmental test Institute
CER	Certified Emission Reductions
CO ₂	Carbon Dioxide
CO ₂ e	Carbon Dioxide Equivalent
CL	Clarification Request
DNA	Designated National Authority
DOE	Designated Operational Entity
DRR	Daily Reading Records
SCPG	South China Power Grid
FAR	Forward Action Request
GHG	Green House Gas(es)
GS	Gold Standard
GS-CDM	Gold Standard CDM
GS-CDM-PDD	Gold Standard Clean Development Mechanism Project Design Document
GS TAC	Gold Standard Technical Advisory Committee
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MR	Monitoring Report
MRR	Monthly Reading Records
ODA	Official Development Assistance
PDD	Project Design Document
PP	Project Participant
PPA	Power Purchase Agreement
UNFCCC	United Nations Framework Convention on Climate Change
VVM	Validation and Verification Manual

Table of Content

1. Introduction	6
1.1 Objective	6
1.2 Scope	6
1.3 Project Activity Description	7
2. Methodology	7
2.1 General Approach	8
2.2 Verification Team for this Assessment	9
2.3 Means of Verification.....	9
2.3.1 Review of Documentation	9
2.3.2 Site Visits	9
2.4 Reporting of Findings	10
2.5 Internal Quality Control	17
3. Verification Findings	17
3.1 Project Documentation and Compliance with the Registered PDD	17
3.2 Monitoring Results.....	18
3.2.1 Emission Reductions	18
3.2.2 SD Indicators	22
3.2.3 Public Consultation Indicators	26
3.2.4 Potential Mitigation/Compensation Measures	26
3.3 Remaining Issues, CARs, CLs from Previous Validation or Verification	26
3.4 FARs raised by GS-TAC during the review process for the issuance of ERs for the previous monitoring period.....	26
3.5 Project Implementation	27
3.6 Completeness of Monitoring	27
3.7 Accuracy of Emission Reduction Calculations.....	27
3.8 Quality of Evidence to Determine Emission Reductions	27
3.9 Management System and Quality Assurance	29
3.10 Data from External Sources	29
4. Calculation of Emission Reductions	30
5. Recommendations for Changes in the Monitoring Plan.....	33
6. Overview of Results	33
7. Verification and Certification Statement	33
ANNEX A: References.....	35
ANNEX B: Verification Checklist	36
ANNEX C: List persons interviewed	48
ANNEX D: Curricula Vitae of the DOE's Verification Team Members	49

1. Introduction

South Pole Carbon Asset Management Ltd. has commissioned CEPREI Certification Body (hereinafter called “**CEPREI**”) to verify the pre-registration emissions reductions of its GS-CDM project “Guangzhou Zhujiang Beer Methane Recovery Project” (hereinafter called “**the Project**”) owned by Guangzhou Zhujiang Brewery Co., Ltd. (the project owner, hereinafter called “**the PP**”) at Guangzhou City, Guangdong Province, P.R. China. (113°20’2”E and 23°06’32”N). This report summarizes the findings of the verification of the Project, performed on the basis of Gold Standard requirements, UNFCCC criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

1.1 Objective

Verification is the periodic independent review and ex-post determination by the DOE of the monitored reductions in GHG emissions and the Project’s sustainability during the defined verification period.

The objective of Gold Standard verification is to verify the reported emission reductions and to confirm that actual monitoring systems and procedures are in compliance with those described in the monitoring plan and the additional requirements stated by the GS.

1.2 Scope

The verification scope is defined as an independent and objective review of the GS project design document, the project’s baseline study and GS monitoring plan and other relevant documents. The information in these documents is reviewed against Gold Standard requirements, Kyoto Protocol requirements, UNFCCC rules and associated interpretations.

The verification is not meant to provide any consulting service towards the PPs. However, the stated requests for clarifications and/or corrective actions may provide input for improvement of the project monitoring towards reductions in the GHG emissions and the Project’s sustainability.

1.3 Project Activity Description

This project has installed a biogas capturing and utilization system which consists of a biogas capturing system (a biogas storing tank), a biogas purifying system (a desulphurization unit and a gas processing unit), an electricity generation system (two power generators) and a Li-Br air conditioning system at the existing wastewater treatment plant.

The two methane combustion generators (G3516 and G3508) accept gas flows ranging from 150 m³/h to 700 m³/h. Their minimum and maximum capacities are 490 kw (the smaller one alone) and 1,400 kw (total for both generators) respectively.

Typically, the air conditioning system functions with the waste heat carried by the tail gas of the generators, while it can also burn any residual biogas for cooling. This project only claims the emission reductions that happen when the methane is used for electricity generation instead of being released into the air. The emission reductions during the waste heat recovery and air-conditioning with Li-Br are not considered for conservativeness and simplicity.

The annual estimated emission reductions over the crediting period are 35,780 tCO_{2e}.

The Project has been retroactively registered to GS on 08/02/2010 (Project ID GS784) and has been registered as a CDM project on 20/12/2009 (UNFCCC ref. No. 2946). According to GS requirement 2.1 V.a.2.3, *“project activities proceeding under the retroactive project cycle, may be eligible for retroactive crediting for realised emission reductions prior to Gold Standard registration of a maximum period of two years”*. In the context of the proposed project, the maximum retroactive crediting period is from 08/02/2008 to 07/02/2010 and this is the first GS-PRE-CDM retroactive verification covering the monitoring period from 20/12/2008 to 19/12/2009.

2. Methodology

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

In order to ensure transparency, a verification protocol was customized for the project, according to the Gold Standard Validation and Verification Manual for CDM projects, the Gold Standard requirements & Toolkit 2.1 issued by Gold Standard on

December 2006 and June 2009 respectively. The protocol shows, in a transparent manner, criteria (requirements), means of verification and the results from verifying the identified criteria. The verification protocol serves the following purposes:

- It organizes, details and clarifies the requirements a GS-PRE-CDM project is expected to meet;
- It ensures a transparent verification process where the verifier will document how a particular requirement has been verified and the result of the verification.

2.1 General Approach

CEPREI's verification approach is a two-stage process.

For the first stage, CEPREI conducted a strategic review and risk assessment of the projects activities and processes to acquire a full understanding of:

- 1) Activities associated with all the sources contributing to the project emissions and emission reductions, including leakage if relevant;
- 2) Protocols used to estimate or measure GHG emissions from these sources;
- 3) Collection and handling of data;
- 4) Controls on the collection and handling of data;
- 5) Means of verifying reported data;
- 6) Compilation of the monitoring report.

At the end of this stage, CEPREI produced a Verification Checklist which, based on the risk assessment of the parameters and data collection and handling processes for each of those parameters, described the verification approach and the sampling plan.

For the second stage, using the Periodic Verification checklist, CEPREI verified the implementation of the monitoring plan and the data presented in the Monitoring Report for the period in question. This involved a desk review and a site visit of the monitoring report. The verification report described the findings of this assessment.

2.2 Verification Team for this Assessment

Name	Role in the Verification team
Chen Chunyan	Lead Assessor
Guo Zhiyuan	Assessor

2.3 Means of Verification

2.3.1 Review of Documentation

The documentation reviewed includes: The Gold Standard Monitoring Report (GS-PRE-MR) submitted by South Pole Carbon Asset Management Ltd. (the consultant) and additional background documents related to the project design and baseline, i.e. country Law, GS validation report, the registered GS Project Design Document (GS-PDD), approved methodologies AMS-III.H Version 13 and AMS-I.D Version 13, and Kyoto Protocol.

The following documents were used as references to the verification work, in addition to internal CEPREI procedures: Gold Standard requirements & Toolkit 2.1; THE Gold standard Validation and Verification Manual for CDM projects; Validation and Verification Manual Version 01.2 (EB 55 Annex 1); ISO 14064-3-Greenhouse gases – Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions; ISO 14064-2-Greenhouse gases – Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements.

The verification findings presented in this report relate to the project as described in the registered GS-PDD version 3.7 dated 06/07/2010 and GS-MR version 2.2 of this monitoring period dated 20/10/2011.

2.3.2 Site Visits

As part of the verification, the following on-site inspections have been performed:

Location: Guangzhou Zhujiang Brewery Co., Ltd.		
Date: 19/05/2011 ~ 20/05/2011		
Coverage:	Source	of information/Persons

	Interviewed
1. Review of the monitoring report, metering reading records, invoices and monthly reading records.	ER calculation spreadsheet, GS-PRE-MR, manually taken records, automatically taken records, original testing records, operation logbook, monthly reports, etc./ Production Manager, Operator of Production Department, Biogas power plant, Wastewater treatment plant and wastewater laboratory.
2. An interview with project participants including reviewing the installation plan and key physical components of the project, CDM monitoring report and staff training records.	Site visit, interview operator, review the operator training records, etc./ Production Manager, Operator of Production Department, Biogas power plant, Wastewater treatment plant and wastewater laboratory.
3. Collection of the calibration certificates of all the meters involved and the accreditation certificate of the calibration entity.	The original certificate of calibration, the accreditation certificate of the calibration entity, etc. /Production Manager, Operator of Production Department.
4. Inspection of the control room, instrument room and wastewater laboratory.	Site visit, interview operator, etc. / Production Manager, Operator of Production Department, Biogas power plant, Wastewater treatment plant and wastewater laboratory.

2.4 Reporting of Findings

The verification team may raise different types of findings during the verification process.

Generally where insufficient or inaccurate information is provided and clarification or new information is required the team shall raise a Clarification Request (CL) specifying what additional information is required.

Where a non-conformance arises the team shall raise a Corrective Action Request (CAR). A CAR is issued where:

- 1) the verification is not able to obtain sufficient evidence for the reported emission reductions or part of the reported emission reductions. In this case these emission reductions shall not be verified and certified;

- 2) the verification has identified misstatements in the reported emission reductions. Emission reductions with misstatements shall be discounted based on the verifiers' ex-post determination of the achieved emission reductions.

The verification process may be halted until this information has been made available to the assessors' satisfaction. Failure to address a CL may result in a CAR. Information or clarifications provided as a result of a CL may also lead to a CAR.

Observations may be raised which are for the benefit of future projects and future verification actors. These have no impact upon the completion of the verification activity.

Corrective Action Requests and New Information Requests are detailed in Periodic Verification Checklist. The Project Developer is given the opportunity to "close" outstanding CARs and respond to CLs and Observations.

In the following paragraphs the findings from the desk review of the monitoring report, the calculation spreadsheet, PDD, the Validation Report and other supporting documents, as well as the findings from the on-site assessment and the interviews are summarized.

The summary of CAR, FAR and CL issued are shown in Table 4-1:

Table 4-1: Summary of CAR, CL and FAR

Verification topic	No. of CAR	No. of CL	No. of FAR
Project History			
Update on Changes and Incidents			
Monitoring Report - General		7	
Monitoring	1		
Monitoring Parameters		2	
Emission Reduction Calculation			
Quality Management			
SUM	1	9	

The following tables include all raised CARs, CLs and FARs.

CARs:

No.	1		
Classification	☒ CAR	☐ FAR	☐ CL

Findings	The power meters used to measure EG_{3508,y} and EG_{3516,y} were calibrated once within this monitoring period: EG_{3508,y}: 19/02/2009~18/02/2010 EG_{3516,y}: 12/02/2009~11/02/2010 This monitoring period is from 20/12/2008 to 19/12/2009 and the calibration did not cover the entire monitoring period.
Project Participant Response:	
Since the original power meters were damaged, the project participant replaced the power meters on 19/02/2009. As there was no calibration of the power meters to cover the period from 20/12/2008 to 19/02/2009, The emission reduction for this period was taken as "0" to be conservative and simple. See details in the ER calculation spreadsheet.	
Documentation Provided as Evidence by Project Participant:	
ER calculation spreadsheet was checked OK.	
Conclusion:	☐ To be checked during next periodic verification ☒ Appropriate action was taken ☐ MR was corrected correspondingly ☐ Appropriate action was not taken

CLs:

No.	1		
Classification	☐ CAR	☐ FAR	☒ CL
Findings	The statement in A.1 of the GS-MR (Version 1), "wastewater from 2,526 mg/l to less than 500 mg/l, which is below the prescribed discharge value of 110 mg/l", is inconsistent from what was described in the registered PDD.		
Project Participant Response:			
Section A.1 "Brief description of the project activity" has been revised according to registered PDD.			
Documentation Provided as Evidence by Project Participant:			
Revised monitoring report was checked OK.			
Conclusion:	☐ To be checked during next periodic verification ☐ Appropriate action was taken ☒ MR was corrected correspondingly ☐ Appropriate action was not taken		

No.	2		
Classification	☐ CAR	☐ FAR	☒ CL
Findings	In the GS-MR (Version 1), the project was referred to as "the proposed project (activity)" several times, which was not appropriate as the project has been implemented.		
Project Participant Response:			
MR has been revised accordingly.			
Documentation Provided as Evidence by Project Participant:			
Revised monitoring report was checked OK.			
Conclusion:	☐ To be checked during next periodic verification ☐ Appropriate action was taken ☒ MR was corrected correspondingly ☐ Appropriate action was not taken		

No.	3		
Classification	☐ CAR	☐ FAR	☒ CL
Findings	The GS-MR (Version 1) stated the applied methodology as "Methane Recovery in Wastewater Treatment" (Version 12)" several times when it was identified as Version 13 of this methodology in the registered PDD.		
Project Participant Response:			
Methodology AMS. III.H version 13 was applied for this registered project. Therefore, MR has been revised accordingly.			
Documentation Provided as Evidence by Project Participant:			
Revised monitoring report was checked OK.			
Conclusion:	☐ To be checked during next periodic verification ☐ Appropriate action was taken ☒ MR was corrected correspondingly ☐ Appropriate action was not taken		

No.	4		
Classification	☐ CAR	☐ FAR	☒ CL
Findings	The following issues in D.1 of the GS-MR (Version 1) need to be clarified: 1) The MP in the registered PDD did not identify the parameter		

	$MCF_{ww, discharge}$; 2) $MCF_{ww, treatment, BL}$ was stated as “Value applied: 1.0 (for calculation of project emissions)”, but 0.8 was given in the MP of the registered PDD and used in the actual calculation for the same purpose.
Project Participant Response:	
$MCF_{ww, discharge}$ has been deleted from Section D.1. of the MR. It was a typo to have assigned 1.0 as the value of both $MCF_{ww, treatment, BL}$ and $MCF_{ww, treatment, PJ}$ in section D.1. The value 0.8 was applied in the actual calculation of ER, which was compliant with the registered PDD. This information in section D.1 of the MR has been revised.	
Documentation Provided as Evidence by Project Participant:	
Revised monitoring report was checked OK.	
Conclusion:	☐ To be checked during next periodic verification ☐ Appropriate action was taken ☒ MR was corrected correspondingly ☐ Appropriate action was not taken

No.	5		
Classification	☐ CAR	☐ FAR	☒ CL
Findings	$Flow_{biogas, y}$ was stated as being “Measured by meter” in section D.2 of the GS-MR (Version 1) while it was “Measured by flow meters corrected with temperature and pressure” in the monitoring plan of the registered PDD.		
Project Participant Response:			
In the actual monitoring and calculation, $Flow_{biogas, y}$ has been measured with flow meters and corrected with temperature and pressure as specified in the monitoring plan of the PDD. Relevant sections in the MR have been revised according to registered PDD.			
Documentation Provided as Evidence by Project Participant:			
Revised monitoring report was checked OK.			
Conclusion:	☐ To be checked during next periodic verification ☐ Appropriate action was taken ☒ MR was corrected correspondingly ☐ Appropriate action was not taken		

No.	6		
Classification	☐ CAR	☐ FAR	☒ CL
Findings	The description of COD data generation, recording and aggregation is missing from Section C of MR. There is no diagram to describe the monitoring location of $Q_{ww,y}(R201)$, $Q_{ww,y}(R202)$ and COD values before and after the anaerobic tank (IC201, IC202) in Section C of MR.		
Project Participant Response:			
Section C of MR has been revised accordingly, and the description of COD data generation, recording and aggregation has been added. A diagram (figure 3, Schematic diagram of wastewater flow) has been added in Section C of MR. The monitoring location of $Q_{ww,y}(R201)$, $Q_{ww,y}(R202)$ and COD values before and after the anaerobic tank (IC201, IC202) has been highlighted and explained.			
Documentation Provided as Evidence by Project Participant:			
Revised monitoring report was checked OK.			
Conclusion:	☐ To be checked during next periodic verification ☒ Appropriate action was taken ☐ MR was corrected correspondingly ☐ Appropriate action was not taken		

No.	7		
Classification	☐ CAR	☐ FAR	☒ CL
Findings	8 power meters were shown in Figure 3. Line Connection Diagram in section D of the GS-MR (Version 1). However, E6, E7 and E8 were not seen by the verification team during the site visit. Please clarify the role and installation status of those three meters.		
Project Participant Response:			
E6 is the meter for the monitoring of internal power supply between the two generators. According to plant owner, the "bridge" in between is never connected. This meter is not yet installed and it is not required for the calculations of emission reduction. E7 and E8 were installed at the coal power plant measuring the electricity imported from and exported to the grid. Therefore, they are irrelevant to the ER calculations. The above information has been added in the MR.			
Documentation Provided as Evidence by Project Participant:			

Revised monitoring report was checked OK.	
Conclusion:	☐ To be checked during next periodic verification ☐ Appropriate action was taken ☒ MR was corrected correspondingly ☐ Appropriate action was not taken

No.	8		
Classification	☐ CAR	☐ FAR	☒ CL
Findings	The value of Fraction_{biogas,y} was 70% from 0:00 Dec.20th, 2008 to 7:00 Nov.26th, 2009 in the ER calculation sheet provided to the verification team. However, there was no data of Fraction_{biogas,y} found for the same period in the manually taken records during the site visit.		
Project Participant Response:			
For the period from 0:00 Dec.20th, 2008 to 7:00 Nov.26th, 2009, the gas analyzer was not in use officially. Fraction_{biogas,y} tested by the gas analyzer from Nov.27th, 2009 to April 20th, 2011 remained within the range from 79.8% to 89%. The value of Fraction_{biogas,y} was taken as 70% for the principle of conservativeness.			
Documentation Provided as Evidence by Project Participant:			
ER calculation spreadsheet was checked OK.			
Conclusion:	☐ To be checked during next periodic verification ☒ Appropriate action was taken ☐ MR was corrected correspondingly ☐ Appropriate action was not taken		

No.	9		
Classification	☐ CAR	☐ FAR	☒ CL
Findings	Zhujiang Brewery Co. Ltd. has monitored the NO_x emission contained in tail gas of the two CH₄ consuming generators respectively and yearly, but only a part of monitored values have been included in the MR D.2.		
Project Participant Response:			
MR D.2 has been revised as requested.			
Documentation Provided as Evidence by Project Participant:			
MR D.2 checked OK.			

Conclusion:	☐ To be checked during next periodic verification ☐ Appropriate action was taken ☒ MR was corrected correspondingly ☐ Appropriate action was not taken
-------------	--

2.5 Internal Quality Control

Following the completion of the assessment process and a recommendation by the Assessment Team, all documentation will be forwarded to a Technical Reviewer. The task of the Technical Reviewer is to check that all procedures have been followed and all conclusions are justified. The Technical Reviewer will either accept or reject the recommendation made by the assessment team.

3. Verification Findings

3.1 Project Documentation and Compliance with the Registered PDD

From the information available on the Gold Standard website, <https://gs1.apx.com/mymodule/ProjectDoc/EditProjectDoc.asp?id1=784>, the project is approved as a GS-PRE-CDM project with GS Project ID of GS784.

This is the first GS-PRE-CDM periodic verification for the project covering from 20/12/2008 to 19/12/2009.

The project was registered against the approved small scale methodologies AMS-III.H. version 13 and AMS-I.D. version 13. The monitoring methodologies have been correctly applied and the documents for this monitoring period are complete and transparent. The project boundary is consistent with the registered PDD. Management and operational system is in place. QA/QC procedures stipulated in the registered PDD have been followed. The project has been implemented in compliance with the registered PDD.

3.2 Monitoring Results

3.2.1 Emission Reductions

During the verification all relevant monitoring parameters (as listed in chapter 7.1 of the PDD) have been verified with regard to correct application of the identified measurement / determination method, the correctness of the values applied for ER calculation, the accuracy, and applied QA/QC measures.

The verification of the parameters required by the monitoring plan is provided as follows:

1) Methane avoidance component:

Data / Parameter:	$Q_{ww,y}$
Data unit:	m ³ /year
Description:	Volume of wastewater treated in the year “y”
Measurement/ Determination method	Ongoing measurement by the flow meters; accessed and recorded by the operators once a day.
Source of data:	Flow meter records/operation logbook
Means of verification:	During the site visit the verification team looked at the data of the wastewater flow meters in the manually taken records (in operation logbook) and monthly reports and compared it with the data in the ER calculation spreadsheet and the MR. Readings on the flow meters on the first and the last day of this monitoring period were also requested to calculate the total volume, which was checked with the value of $Q_{ww,y}$ in the MR and the ER calculation spreadsheet.
Comments:	It was assured that the value of $Q_{ww,y}$ applied in the Final MR was correct.

Data / Parameter:	$COD_{removed,y}$
Data unit:	tonnes/m ³ (or mg/l)
Description:	Chemical oxygen demand removed in the wastewater through the anaerobic treatment reactor/system with methane capture in the year “y”
Measurement/ Determination method	The wastewater analyzing lab at Zhujiang Brewery measured the COD of the water going into and out of the anaerobic reactors daily and the difference between these two values was $COD_{removed,y}$. The lab adopted the potassium dichromate method with

	compliance with the national standard to test COD daily.
Source of data:	Operation records of lab test
Means of verification:	During the site visit the verification team looked at the COD data in the original testing records (in operation logbook) and monthly reports and compared it with the data in the ER calculation spreadsheet and the MR.
Comments:	It was confirmed that the value of $COD_{removed,y}$ applied in the Final MR was correct.

Data / Parameter:	$P_{biogas,y}$
Data unit:	kPa
Description:	Pressure of biogas at entrance of power generation system in the year "y"
Measurement/ Determination method	Ongoing measurement by the manometer and operators read and recorded the Value on the manometer hourly.
Source of data:	Operation records
Means of verification:	During the site visit the verification team looked at the data in the manually taken records(in operation logbook) and compared it with the data in the ER calculation spreadsheet and the MR.
Comments:	The value of $P_{biogas,y}$ applied in the Final MR was confirmed to be correct.

Data / Parameter:	$T_{biogas,y}$
Data unit:	°C
Description:	Temperature of methane at entrance of power generation system in the year "y"
Measurement/ Determination method	Ongoing measurement by the thermometer and operators read and recorded the value on the thermometer hourly.
Source of data:	Operation records
Means of verification:	During the site visit the verification team looked at the data in the manually taken records(in operation logbook) and compared it with the data in the ER calculation spreadsheet and the MR.
Comments:	The value of $T_{biogas,y}$ applied in the Final MR was confirmed to be correct.

Data / Parameter:	$Flow_{biogas,y}$
Data unit:	$m^3/year$
Description:	Amount of methane recovered, fuelled or flared in the year "y"
Measurement/ Determination method	Ongoing measurement by the flow meter and operators read and recorded the value on the flow meter hourly.

Source of data:	Operation records
Means of verification:	During the site visit the verification team looked at the data in the manually taken records(in operation logbook) and compared it with the data in the ER calculation spreadsheet and the MR.
Comments:	The value of Flow _{biogas,y} applied in the Final MR was confirmed to be correct.

Data / Parameter:	<i>Fraction_{biogas,y}</i>
Data unit:	% volume
Description:	Fraction of methane in biogas in year “y”
Measurement/ Determination method	For the period from 0:00 Dec.20 th , 2008 to 7:00 Nov.26 th , 2009, the gas analyzer was not in use officially. The value of Fraction _{biogas,y} was taken as 70% for the principle of conservativeness in the ER calculation sheet. The gas analyzer was officially in use from 8:00 Nov.26 th , 2009 to 24:00 Dec.19 th , 2009. It was ongoing measurement by the gas analyzer and the data was accessed and recorded by operators hourly.
Source of data:	Operation records
Means of verification:	During the site visit, the verification team looked at the data of Fraction _{biogas,y} tested by the gas analyzer between Nov.27 th ,2009 and April 20 th , 2011, during which period the value of Fraction _{biogas,y} remained within the range of 79.8%~89%. Therefore, it was believed to be conservative to apply 70% for Fraction _{biogas,y} for the period from 0:00 Dec.20 th , 2008 to 7:00 Nov.26 th , 2009. See CL8 for the details. For the tested value of Fraction _{biogas,y} from Nov.26 th , 2009 to Dec.19 th , 2009, data in the manually taken records was looked at and compared with that in the ER calculation sheet and the MR. It was confirmed that the value applied for Fraction _{biogas,y} in that period was correct.
Comments:	The verification team affirmed the value of Fraction _{biogas,y} in the Final MR was conservative and correct.

Data / Parameter:	Time for Flaring
Data unit:	N/A
Description:	Amount of minutes per hour where a flame had a temperature higher than 500°C, whenever biogas was sent to the flare.
Measurement/ Determination method	Measured by an online timekeeper. As a part of the biogas control system, the timekeeper recorded the start time and the end time of flaring whenever it flared.

	Operators at the site aggregated the time for flaring daily on the <i>Flaring Monitoring Report</i> .
Source of data:	Operation records
Means of verification:	During the site visit the verification team looked at the data in both the records kept automatically by the timekeeper and the <i>Flaring Monitoring report</i> and compared it with the data in the ER calculation spreadsheet and the MR.
Comments:	The value of Time for Flaring applied in the Final MR was confirmed to be correct.

Data / Parameter:	<i>Final disposal of sludge</i>
Data unit:	--
Description:	For the proposed project, the final sludge would be transported outside of the project site and put into controlled landfills as in the baseline scenario.
Measurement/ Determination method	The sludge out of the project was handed over to Guangzhou Chenxiwang Cleanliness Serve Co., Ltd. once a month for disposal. Guangzhou Chenxiwang Cleanliness Serve Co., Ltd. provided monthly receipts specifying the quantity of sludge disposed and the fee. Operators at the site filled out a Monthly Report of Sludge Quantities.
Source of data:	Operation records.
Means of verification:	During the site visit, the verification team compared the data in the sludge disposal receipts with that in the Monthly Reports of Sludge Quantities for consistency.
Comments:	It was confirmed that the sludge out of the project was disposed appropriately and the <i>Final disposal of sludge</i> information given in the Final MR was accurate.

2) Electricity generation component:

Data / Parameter:	<i>EG_{3508,y}, EG_{3516,y}</i>
Data unit:	<i>MWh</i>
Description:	Power generation by “3508” and “3516” generator respectively in the year “y”
Measurement/ Determination method	Ongoing measurement by the power meters and operators read and recorded the value on the power meters daily at 23:00.
Source of data:	Operation records.
Means of verification:	During the site visit the verification team looked at the data in both the automatically and manually taken records and compared it with the data in the ER calculation spreadsheet and the MR.

	Readings on the power meters on the first and the last day of this monitoring period were also requested to calculate the total electricity generated, which was checked with the total electricity generated given in the MR and the ER calculation spreadsheet.
Comments:	The values of $EG_{3508,y}$ and $EG_{3516,y}$ applied in the Final MR were confirmed to be correct.

Data / Parameter:	$EC_{y,project}$
Data unit:	MWh/yr
Description:	Amount of electricity consumed by the equipment installed in addition to the existing wastewater treatment facility.
Measurement/ Determination method	Ongoing measurement by the power meters and operators read and recorded the readings on the power meters daily at 00:00.
Source of data:	Operation records.
Means of verification:	The verification team looked at the data in the operation logbook, against which the data in the ER calculation spreadsheet and the MR was checked. Readings on the power meters on the first and the last day of this monitoring period were also requested to calculate the total electricity generated, which was checked with the total electricity generated given in the MR and the ER calculation spreadsheet.
Comments:	The value of $EC_{y,project}$ applied in the Final MR was confirmed to be correct.

3.2.2 SD Indicators

No	1
Indicator	Air quality during operation
Chosen parameter	Hours of normal operations of the desulfurization and purification system
Future target for parameter	The normal operation hours of the desulphurization and purification system should match the operation hours of generators (to ensure the gas treatment for the generators is supported by an effective desulfurization and purification system)
Way of monitoring	How
	The normal operation hours of the desulphurization and purification system will be

		recorded with PH value of washing liquid, matching the operation hours of generators. According to the PDD, pH value of washing liquid is between 7 to 9, desulfurization and purification system is under normal operation.
	When	Continuously
	By who	Plant operator
Means of verification and comments:	The verification team looked at the Operation Record of Desulphurization Pre-processing and the operation records of the two generators. It could be seen that the desulphurization pre-processing system was in normal operation during the working hours of the generators. The PH value of the washing liquid was between 8 and 9, which was in accordance with the requirements for the monitoring parameters. In addition, the verification team looked at the tail gas monitoring report of the generators for a cross check and affirmed the tail gas released by the two generators during the specified monitoring period was compliant with the national and Guangzhou standards for pollution emissions into the atmosphere. The monitoring report mentioned above was issued by the environmental monitoring center authorized by Ministry of Environmental Protection of China after the annual monitoring in 2008, 2009 and 2010.	

No	2	
Indicator	Air quality (emission of NO _x)	
Chosen parameter	NO _x emission (mg/m ³)	
Future target for parameter	Less than or equal to 400 mg/m ³	
Way of monitoring	How	The Local Environmental Agency authorized by the national Environmental authorities will be assigned for the monitoring activity.
	When	Once a year.
	By who	The Local Environmental Agency authorized by the national Environmental authorities.
Means of verification and comments:	The verification team looked at the tail gas monitoring report of the generators and affirmed the content of NO_x in the tail gas released by the two generators during the specified monitoring period was in accordance with the Final MR and	

	compliant with the national and Guangzhou standards for pollution emissions into the atmosphere. The monitoring report mentioned above was issued by the environmental monitoring center authorized by Ministry of Environmental Protection of China after the annual monitoring in 2008, 2009 and 2010.
--	--

No		3
Indicator		Biogas flaring
Chosen parameter		Time of biogas flared
Future target for parameter		Methane utilization ratio > 65%
Way of monitoring	How	An on-line monitoring system has been installed to continuously monitor the time of flaring.
	When	Continuously
	By who	Plant operator
Means of verification and comments:		During the site visit the verification team reviewed the electronic records of the online monitoring system and the value in the Flaring Monitoring Report, which was then compared with the data in the ER calculation sheet and the MR. It was affirmed the value of Time for Flaring in the Final MR was correct.

No		4
Indicator		Employment
Chosen parameter		Implementations of safety manual
Future target for parameter		Safety manual has been provided to staff.
Way of monitoring	How	The monitoring report of the implementations of safety manual has been provided.
	When	Once a year.
	By who	Plant manager
Means of verification and comments:		The verification team interviewed the employees at the site, reviewed documents such as the safety manual, safety monitoring report, training records... It was affirmed that all the employees at the site had access to the safety manual, received training on it, followed the requirements in the safety manual strictly and no occurrence of any safety accidents.

No		5
Indicator		Noise
Chosen parameter		Noise (dB(a))
Future target for parameter		Day time: less than or equal to 60dB(A), Night time: less than or equal to 55dB(A) GB12348-90 class II.IV
Way of monitoring	How	Monitoring Centre of Guangdong Prevention and Treatment Centre for Occupational Disease was assigned to monitor the level of noise. Report would be provided.
	When	Once a year.
	By who	The Local Environmental Agency authorized by the national Environmental authorities.
Means of verification and comments:		The verification team reviewed the environmental noise monitoring report and affirmed that the noise generated by this project during the specified monitoring period was in accordance with the Final MR and compliant with the national noise control standard GB12348. The monitoring report mentioned above was issued by the monitoring center authorized by Ministry of Environmental Protection of China after the annual monitoring in 2008, 2009 and 2010.

No		6
Indicator		Employment
Chosen parameter		Number of employed staff
Situation of parameter before		N/A
Future target for parameter		Job creation > 0
Way of monitoring	How	Number of employees will be recorded through salary payment records.
	When	Monthly
	By who	The plant management.
Chosen parameter		Level of income
Future target for parameter		Each job created should receive reasonable level of income
Way of monitoring	How	The level of income generation will be recorded through salary payment records.
	When	Monthly
	By who	The plant management.

Means of verification and comments:	The verification team reviewed the employment contracts of the employees and their salary payroll. It was affirmed that the number of employees and their payment were consistent with the Final MR. The average annual income of the employees was higher than the average of the country and Guangdong province.
-------------------------------------	--

3.2.3 Public Consultation Indicators

N/A. This project is registered with Gold Standard Ver.01.

3.2.4 Potential Mitigation/Compensation Measures

As per the registered PDD and the Gold Standard validation report for the project, no potential mitigation/compensation measures need to be monitored.

3.3 Remaining Issues, CARs, CLs from Previous Validation or Verification

There is no FAR or any other open issues left from validation process.

This is the 1st periodic verification.

3.4 FARs raised by GS-TAC during the review process for the issuance of ERs for the previous monitoring period

N/A. This is the 1st periodic verification.

3.5 Project Implementation

The project was implemented and equipment installed as described in the registered PDD.

3.6 Completeness of Monitoring

The reporting procedure reflects the content of the monitoring plan. The monitoring mechanism is effective and reliable.

3.7 Accuracy of Emission Reduction Calculations

The calculation of emission reductions is found to be correct in the monitoring report version 2.2. One CAR and nine CLs regarding accuracy of emission reduction calculation were raised, the responses to CLs were satisfactory and the findings were closed. The details of the reported and the verified values for all parameters are listed in section 4.

3.8 Quality of Evidence to Determine Emission Reductions

Critical parameters used for the determination of the Emission Reductions are discussed above in section 3.2 above. All the data recorded are in compliance with the monitoring report.

The operator is responsible for on-site data collection and recording every day. An emission reduction manager has been appointed to be responsible for the GS CER monitoring system. Monthly recording of relevant meters falls under the responsibility of the site. The training records were delivered to the verification team and it is demonstrated that all CDM monitoring staff had been trained for their jobs.

The calibration of meters was carried out as planned in MP, except that the calibration period of the power meters used for $EG_{3508,y}$ and $EG_{3508,y}$ was not cover the entire monitoring period. See details in CAR1.

Table: Detailed meter information

Meter Measuring	Meter No.	Serial	Accuracy (%)	Calibration date	Valid until	Certificate No.	Verified
$Q_{ww,y} (R201)$	4500D691000	(R201)	1.0	01/12/2008	30/11/2010	Manufacturer's statement (01/12/2008)	OK
$Q_{ww,y} (R202)$	4500D591000	(R202)	1.0	01/12/2008	30/11/2010	Manufacturer's statement (01/12/2008)	OK
$Flow_{biogas,y}$	6083101		0.5	10/03/2008	09/03/2010	LL-080300424	OK
$P_{biogas,y}$	4753475		0.5	10/03/2008	10/03/2010	LY-090100049	OK
$T_{biogas,y}$	17		0.5	21/04/2008	20/04/2009	20081695	OK
				22/04/2009	21/04/2010	20092046	OK
$Fraction_{biogas,y}$	1090	9110	1.0	30/10/2008	29/10/2009	2008110303	OK
	3061	8200		14/10/2009	13/10/2010	NH-200914152	
0029							
$EG_{3508,y}$	164649890902		0.5	19/02/2009	18/02/2010	DN-20090107	Not meet
$EG_{3516,y}$	148744260608		0.5	12/02/2009	11/02/2010	DN-2009008	Not meet
$EG_{backup\ 3508}$	06012500		0.2	25/09/2007	24/09/2010	DN-20072166	OK
$EG_{backup\ 3516}$	06012578		0.2	25/09/2007	24/09/2010	DN-20072161	OK
$EC_{y,project}$	06012038		0.5	25/09/2007	24/09/2010	DN-20072145	OK

Data was archived at the end of each month using electronic spreadsheets. The electronic files were stored on a hard disk, and hard copies were printed out and archived also. The CDM project manager of Guangzhou Zhujiang Brewery Co. Ltd rechecked and collected the monitoring data from each operation team leaders and sent them to South Pole Carbon Asset Co. Ltd. By the end of this monitoring period, a monitoring report was compiled to provide detailed metering results and evidences.

Physical documents such as paper-based maps and diagrams, were collected and stored at the same place, together with the monitoring plan. In order to facilitate the auditor's reference, monitoring results were indexed. All paper-based information was stored by the project owner.

All data were kept well following the end of the monitoring period.

3.9 Management System and Quality Assurance

Management system and quality assurance procedures have been stipulated in the CDM monitoring plan and have been implemented during daily operation. This has been verified by on-site visit and document review following the VVM. Therefore we can affirm that the management system of the CDM project is in place; with the responsibilities properly identified and in place.

3.10 Data from External Sources

The project applied the emission factor which was issued by China DNA and approved by EB and correctly applied IPCC default values.

- (1) Methane producing capacity of the wastewater

$B_{o,ww}=0.21$ kg CH₄/kg COD (AMS.III.H Version 13)

- (2) Global Warming Potential for methane

$GWP_{CH_4}=21$ (IPCC default value)

- (3) Methane correction factor for the wastewater treatment system that will be equipped with methane recovery and combustion

$MCF_{ww,treatment,PJ} = 0.8$ (for calculation of project emissions)

$MCF_{ww,treatment,BL} = 0.8$ (for calculation of baseline emissions)

- (IPCC default value)

- (4) Model correction factor to account for model uncertainties

$UF_{BL}=0.94$ (AMS.III.H Version 13)

$UF_{PJ}=1.06$ (AMS.III.H Version 13)

- (5) Capture efficiency of the biogas recovery equipment in the wastewater treatment systems

$CFE_{ww}=0.9$ (AMS.III.H Version 13)

(6) Combined margin CO2 emission factor of China Southern Power Grid in year y

$$EF_{grid,CM,y}=0.87118 \text{ (CHINA DNA)}$$

4. Calculation of Emission Reductions

The formulae applied in the MR and the ER calculation spreadsheet were verified to be consistent with those in the monitoring plan of the registered PDD and compliant with the approved methodologies.

The parameter values and monitoring data referenced in the MR and the ER calculation spreadsheet were verified to be compliant with those in the monitoring plan of the registered PDD and the approved methodologies.

A briefing of the ER calculation formulae and steps is given below. Please refer to the MR and the ER calculation spreadsheet for the complete and detailed calculation.

Baseline Emissions:

1) Methane recovery component

$$BE_{methane,y} = BE_{ww,treatment,y} = \sum_i Q_{ww,i,y} * COD_{removed,i,y} * MCF_{ww,treatment,BL,i} * B_{o,ww} * UF_{BL} * GWP_{CH4}$$

2) Electricity displacement component

$$BE_{electricity,y} = ER_{electricity,y} = EG_y * EF_y$$

Project Emission:

1) Methane recovery component

$$\begin{aligned} PE_{methane,y} &= PE_{fugitive,y} + PE_{flaring,y} \\ &= (1 - CFE_{ww}) * MEP_{ww,treatment,y} * GWP_{CH4} + PE_{flaring,y} \\ &= (1 - CFE_{ww}) * Q_{ww,y} * B_{o,ww} * UF_{PJ} * \sum COD_{removed,PJ,k,y} * MCF_{ww,treatment,PJ,k} * GWP_{CH4} + PE_{flaring,y} \end{aligned}$$

2) Electricity displacement component

Project emissions are not applicable as the project activity will not consume electricity, and EG_y refers to net electricity supplied to the grid.

Leakage

Leakage = 0

Emission Reduction:

1) Methane recovery component

$$ER_{y,expost} = \min[(BE_{methane,y,expost} - PE_{methane,y,expost} - LE_{methane,y,expost}), (MD_{methane,y} - PE_{methane,y,expost} - LE_{methane,y,expost})]$$

$$= BE_{methane,y,expost} - PE_{methane,y,expost} - LE_{methane,y,expost}$$

2) Electricity displacement component

$$ER_{electricity,y} = BE_{electricity,y} - PE_{electricity,y} - Leakage_{electricity,y}$$

$$= BE_{electricity,y}$$

$$= EG_y * EF_y$$

3) Total emission reductions

$$ER_{total,y} = ER_{y,expost} + ER_{electricity,y}$$

Summary of Emission Reductions using above formulae during the monitoring period:

Parameter:	Reported Value (Final MR)	Verified Value
$B_{o,ww}$ (kg CH ₄ /kg COD) : Methane producing capacity of the wastewater	0.21	0.21
GWP_{CH_4} : Global Warming Potential for methane	21	21
$MCF_{ww,treatment}$: Methane correction factor for the wastewater treatment system that will be equipped with methane recovery and combustion	0.8	0.8

UF_{BL} : Model correction factor for baseline emission to account for model uncertainties	0.94	0.94
UF_{PJ} : Model correction factor for project emission to account for model uncertainties	1.06	1.06
$C_{FE_{ww}}$: Capture efficiency of the biogas recovery equipment in the wastewater treatment systems	0.9	0.9
$EF_{grid,CM}$ (tCO ₂ /MWh): Combined margin CO ₂ emission factor of China Southern Power Grid	0.87118	0.87118
Q_{ww} (m ³) : Volume of wastewater treated	2,993,711	2,993,711
$COD_{removed}$ (mg/L) : Chemical oxygen demand removed in the wastewater through the anaerobic treatment reactor/system with methane capture	1704(Average)	1704(Average)
$Flow_{biogas}$ (m ³) : Amount of methane recovered	2,579,414	2,579,414
W_{CH4} (%) : Fraction of methane in biogas	Measured value: 79.8 to 89 estimated value: 70	Measured value: 79.8 to 89 estimated value: 70
Time for Flaring (days) : Amount of minutes per hour where a flame has a higher temperature than 500°C, whenever biogas is sent to the flare.	3	3
EG_{3508} (MWh): Power generation by “3508” generator	1,332,715	1,332,715
EG_{3516} (MWh): Power generation by “3516” generator	2,237,810	2,237,810
$EC_{project}$ (MWh): Amount of electricity consumed by the equipment installed in addition to the existing wastewater treatment facility.	6.15	6.15
Baseline Emissions:		
$BE_{methane}$ (tCO ₂ e)	16,466	16,466
$BE_{electricity}$ (tCO ₂ e)	3,105	3,105
Project Emissions:		
$PE_{methane}$ (tCO ₂ e)	1,915	1,915
Leakage:	0	0
ER:		

<i>ER_{methane}</i> (tCO ₂ e)	14,550	14,551
<i>ER_{electricity}</i> (tCO ₂ e)	3,105	3,105
<i>ER_{Total}</i> (tCO ₂ e)	17,656	17,656

The actual emission reductions of the project are 17,656 tCO₂e which is 51% lower than the estimate of 35,780 tCO₂e in the registered PDD. The verification team checked the production numbers of the brewery and found that due to the economic downtime its annual production in 2009 was only 985,000 tons on average, 34% lower than the estimated annual average of 1,500,000 tons. That's the main cause of the much lower emission reductions. In addition, the brewery increased the output by implementing clean production and improving process in recent years, which led to the reduction in the volume of wastewater generated. Therefore, the total amount of organics released into the wastewater treatment system dropped and so did the emission reductions. In other words, the fact of lower emission reductions than estimated during this monitoring period is justifiable.

5. Recommendations for Changes in the Monitoring Plan

No recommendation for changes in the monitoring plan was made during this periodic verification.

6. Overview of Results

All necessary and requested documents were provided by the project participants so that a complete verification of all relevant issues could be carried out.

Access was granted to all installations at the plant which are relevant to the project performance and the monitoring activities.

No issues have been identified to indicate that the implementation of the project activity and the steps to claim emission reductions are not compliant with Gold Standard and the UNFCCC criteria and relevant guidance provided by the GS-TAC, COP/CMP and the CDM EB (clarifications and/or guidance).

7. Verification and Certification Statement

CEPREI Certification Body has been contracted by South Pole Carbon Asset

Management Ltd. to perform the verification of the emission reductions reported for the GS-PRE-CDM project “Guangzhou Zhujiang Beer Methane Recovery Project” (GS Project ID GS784) in the period 20/12/2008 - 19/12/2009.

The verification is based on the validated and registered project design document and the monitoring report for this project. Verification is performed in accordance with section I of Decision 3/CMP.1, and relevant decisions of the CDM EB, CoP/MoP and GS-TAC. The scope of this engagement covers the verification and certification of greenhouse gas emission reductions generated by the above mentioned project during the specified period, as reported in Monitoring Report Version 2.2 dated 20/10/2011 of “Guangzhou Zhujiang Beer Methane Recovery Project”.

The management of the Guangzhou Zhujiang Brewery Co., Ltd. is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project Monitoring Report Version 2.2 dated 20/10/2011. Calculation and determination of GHG emission reductions from the project are the responsibility of the management of the “Guangzhou Zhujiang Beer Methane Recovery Project”. The development and maintenance of records and reporting procedures are in accordance with the monitoring report.

It is our responsibility to express an independent GHG verification opinion on the GHG emissions and on the calculation of GHG emission reductions from the project for the period 20/12/2008 - 19/12/2009 based on the reported emission reductions in the Monitoring Report Version 2.2 dated 20/10/2011 for the same period.

Based on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these, CEPREI planned and performed its work to obtain the information and explanations that we considered necessary, to provide sufficient evidences for us, and to give reasonable assurance that this reported amount of GHG emission reductions for the period is fairly stated.

Signed on behalf of the Verification Body by Authorized Signatory

Name:



Date: 15/11/2011

ANNEX A: References

1. Registered GS-PDD
2. GS Validation Report
3. GS Monitoring Report
4. AMS-III.H. Methane recovery in wastewater treatment, Version 13
5. AMS-I.D. Grid connected renewable electricity generation, Version 13
6. Validation and Verification Manual
7. Gold Standard Validation and Verification Manual for CDM projects
8. Gold Standard Version 1
9. Gold Standard Requirements & Toolkit 2.1 dated Jun 2009
10. Diagram of power system connection of the project
11. Implementation log of the Project
12. Daily/Monthly Reading Records of the Project
13. Labour contracts for employees of the Project
14. Environmental Test and Acceptance Report
15. Monitoring & Management Manual
16. Training records & Certificates

ANNEX B: Verification Checklist

Gold Standard Verification Checklist

Checklist Item (incl. guidance for the verification team)	Ref.	Verifiers Comments (Means and results of assessment)	Draft Concl.	Final Concl.
1. Remaining Issues				
Have all issues identified in the validation report to be verified during verification been resolved by the project participant and are there any open issues identified in the previous verification?		N/A. There is no FAR or any other open issues left from validation process.	OK	OK
2. Emission reductions				
2.1 Is the ER calculation in compliance with the Gold Standard conservativeness principle? Any deviation report in GHG emission reduction?		The selection of the baseline scenario and baseline emissions was verified already in the course of the validation. CEPREI confirms that the emission reduction has been determined in a conservative manner and is in compliance with the applied version of the methodologies AMS-III.H and AMS-I.D. There is no deviation of the requested GS emission reductions for this monitoring period in consideration.	OK	OK

2.2 In case of CDM project activities proceeding under the retroactive project cycle, project may be eligible for retroactive crediting for realised emission reduction prior to Gold Standard registration of a maximum period of two years.		The project is under retroactive project cycle. The CDM registration date of the project is 20/12/2009, the GS registration date of the project is 08/02/2010, hence the project is eligible for retroactive crediting for realized ERs of a maximum period from 08/02/2008 to 07/02/2010. The requested retroactive crediting period for this vintage is from 20/12/2008 to 19/12/2009 and is considered to be eligible.	OK	OK
3. Leakage				
Is the leakage indicator(s) appropriately addressed?		As per AMS.III.H and AMS. I.D leakage effects do not have to be considered since the used technology equipment is not being transferred from or to another activity. This project activity does not involve upgrading and bottling of biogas and no leakage will happen from this part either, hence: <i>Leakage =0</i>	OK	OK
4. Changes to the key sustainable development indicators(list all parameters described in SD MP)				
4.1 Air quality during operation				
4.1.1 Measurement / Determination method <i>Describe how the monitoring parameter was measured / determined. Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other</i>	/MR/ /PDD/	The chosen parameter of this indicator is: Hours of normal operations of the desulfurization and purification system. The normal operation hours of the desulphurization and purification system will be recorded with PH value of washing liquid, matching the operation hours of	OK	OK

measurement / determination methods have been used. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD.		generators. According to the PDD, pH value of washing liquid is between 7 to 9, desulfurization and purification system is under normal operation.		
4.1.2 Correctness Determine whether the value given in the monitoring report is correct. In case of mistakes pl. provide details and descriptions of the CARs raised.		The verification team looked at the Operation Record of Desulphurization Pre-processing and the operation records of the two generators. It could be seen that the desulphurization pre-processing system was in normal operation during the working hours of the generators. The PH value of the washing liquid was between 8 and 9, which was in accordance with the requirements for the monitoring parameters. In addition, the verification team looked at the tail gas monitoring report of the generators for a cross check and affirmed the tail gas released by the two generators during the specified monitoring period was compliant with the national and Guangzhou standards for pollutant emissions into the atmosphere. The tail gas monitoring report mentioned above was issued by the environmental monitoring center authorized by Ministry of Environmental Protection of China after the annual monitoring in 2008, 2009 and 2010.	OK	OK
4.1.3 QA/QC Procedure Describe whether all applicable QA/QC procedures are met. Assess further if the calibration and maintenance of the monitoring		Operators logged the time of the desulphurization pre-processing system's operation and the PH value of the washing liquid in the system in the Operation Record of	OK	OK

equipment has been carried out by competent personnel.		Desulphurization Pre-processing. All the data were collected, aggregated and properly kept by the emission reduction manager on a monthly basis as required by the monitoring manual. By reviewing the Operation Record of Desulphurization Pre-processing, it was affirmed the records were filled out by trained and qualified personnel.		
4.1.4 Verification Describe how the value was verified. Consider the measurement / determination procedure, accuracies, QA/QC procedures. Consider as well plausibility checks as far as possible. Check if the applied value could be backed up by corresponding evidences.		The Operation Record of Desulphurization Pre-processing, training records of the operators and the monitoring reports of the tail gas released by the generators for 2008, 2009 and 2010 were reviewed .	OK	OK
4.2 Air quality (emission of NO _x)				
4.2.1 Measurement / Determination method Describe how the monitoring parameter was measured / determined. Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD.	/MR/ /PDD/	The chosen parameter of this indicator is: NO _x emission (mg/m ³). Annual monitoring by the environmental monitoring center authorized by Ministry of Environmental Protection of China.	OK	OK
4.2.2 Correctness Determine whether the value given		The project owner requested the monitoring center to test	CL9	OK

<i>in the monitoring report is correct. In case of mistakes pl. provide details and descriptions of the CARs raised.</i>		the tail gas out of the two generators in August of 2008, 2009 and 2010 respectively and got the results below: <table><tr><th rowspan="2"></th><th colspan="2">NO_x (mg/m³)</th></tr><tr><th>1# generator</th><th>2# generator</th></tr><tr><td>2010.8.25</td><td>169.3</td><td>221</td></tr><tr><td>2009.8.27</td><td>162</td><td>226</td></tr><tr><td>2008.8</td><td>279.</td><td>199.6</td></tr></table> According to the Draft Comments on the Environmental Impact Report of the Technical Modification of the Wastewater Treatment Plant for Biogas Recovery at Guangzhou Zhujiang Brewery Co., Ltd, and the Guangdong Air Pollutant Emission Limits (DB44/27-2001), the allowed concentration of NO_x emission was ≤400 mg/m3. So the monitoring results showed the NO_x emission from this project was compliant. However, only a part of the NO_x value was described in the GS-MR provided to the DOE. See CL9 for details.		NO _x (mg/m ³)		1# generator	2# generator	2010.8.25	169.3	221	2009.8.27	162	226	2008.8	279.	199.6		
	NO _x (mg/m ³)																	
	1# generator	2# generator																
2010.8.25	169.3	221																
2009.8.27	162	226																
2008.8	279.	199.6																
4.2.3 QA/QC Procedure <i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration and maintenance of the monitoring equipment has been carried out by competent personnel.</i>		The above mentioned monitoring reports were reviewed and it was assured that they were issued by the environmental monitoring center authorized by Ministry of Environmental Protection of China.	OK	OK														
4.2.4 Verification <i>Describe how the value was verified. Consider the measurement / determination</i>		The verification team looked at the environmental monitoring reports for the tail gas emission of the	OK	OK														

procedure, accuracies, QA/QC procedures. Consider as well plausibility checks as far as possible. Check if the applied value could be backed up by corresponding evidences.		generators.		
4.3 Biogas flaring				
4.3.1 Measurement / Determination method Describe how the monitoring parameter was measured / determined. Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD.	/MR/ /PDD/	The chosen parameter of this indicator is: Time of biogas flared Time for biogas flaring was measured by an online timekeeper. As a part of the biogas control system, the timekeeper recorded the start time and the end time of flaring whenever it flared. Operators at the site aggregated the time for flaring daily on the Flaring Monitoring Report.	OK	OK
4.3.2 Correctness Determine whether the value given in the monitoring report is correct. In case of mistakes pl. provide details and descriptions of the CARs raised.		The verification team looked at the data in both the records kept automatically by the timekeeper and the Flaring Monitoring report and compared them with the data in the ER calculation spreadsheet and the MR. The value of Time for Flaring applied in the MR was correct. During this monitoring period, to lower the pressure in the biogas storage tank and ensure a safe running of the biogas system, the flaring was turned on. By reviewing the Flaring Monitoring sheets and retrospect records during the monitoring period, the verification team found it had been turned on 3 times:	OK	OK

		<table><tr><th>Date</th><th>Flare turned on or not</th><th>Duration</th></tr><tr><td>2009/8/2</td><td>Yes</td><td>2 min 43 sec</td></tr><tr><td>2009/9/3</td><td>Yes</td><td>1 min 20 sec</td></tr><tr><td>2009/11/1</td><td>Yes</td><td>36 min 5 sec</td></tr></table>	Date	Flare turned on or not	Duration	2009/8/2	Yes	2 min 43 sec	2009/9/3	Yes	1 min 20 sec	2009/11/1	Yes	36 min 5 sec		
Date	Flare turned on or not	Duration														
2009/8/2	Yes	2 min 43 sec														
2009/9/3	Yes	1 min 20 sec														
2009/11/1	Yes	36 min 5 sec														
		Same as described in the MR, flare was only on 3 days during this monitoring period, which only covered about 1% of the total operation time.														
4.3.3 QA/QC Procedure Describe whether all applicable QA/QC procedures are met. Assess further if the calibration and maintenance of the monitoring equipment has been carried out by competent personnel.		By reviewing the Flaring Monitoring Reports, it was confirmed the records were filled out by trained and qualified personnel. The online timekeeper logged the time for flaring automatically and the operators at the site aggregated the time for flaring daily on the Flaring Monitoring Report. All the data were collected, aggregated and properly kept by the emission reduction manager in accordance with the monitoring manual.	OK	OK												
4.3.4 Verification Describe how the value was verified. Consider the measurement / determination procedure, accuracies, QA/QC procedures. Consider as well plausibility checks as far as possible. Check if the applied value could be backed up by corresponding evidences.		The online timekeeper reading data in the automatically taken records and Flaring Monitoring Reports was looked at, as well as the training records of the operators.	OK	OK												

4.4 Employment				
4.4.1 Measurement / Determination method <i>Describe how the monitoring parameter was measured / determined. Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD.</i>	/MR/ /PDD/	The chosen parameter of this indicator is: Implementation of safety manual The monitoring report of the implementation of safety manual has been provided.	OK	OK
4.4.2 Correctness <i>Determine whether the value given in the monitoring report is correct. In case of mistakes pl. provide details and descriptions of the CARs raised.</i>		The verification team interviewed the employees at the site, reviewed documents like the safety manual, safety monitoring report, training records... It was affirmed that all the employees at the site had access to the safety manual, received training on it, followed the requirements in the safety manual strictly and no occurrence of any safety accidents. The description in the MR was affirmed to be accurate.	OK	OK
4.4.3 QA/QC Procedure <i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration and maintenance of the monitoring equipment has been carried out by competent personnel.</i>		By reviewing the safety monitoring reports, it was understood that the reports were prepared by the plant manager responsible for the safety of the staff.	OK	OK
4.4.4 Verification <i>Describe how the value was</i>		The safety manual, safety monitoring reports and training	OK	OK

verified. Consider the measurement / determination procedure, accuracies, QA/QC procedures. Consider as well plausibility checks as far as possible. Check if the applied value could be backed up by corresponding evidences.		records of the operators were looked at. Employees at the site were interviewed.														
4.5 Noise																
4.5.1 Measurement / Determination method Describe how the monitoring parameter was measured / determined. Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD.	/MR/ /PDD/	The chosen parameter of this indicator is: Noise level [Leq dB(A)]. Annual monitoring by the environmental monitoring center authorized by Ministry of Environmental Protection of China.	OK	OK												
4.5.2 Correctness Determine whether the value given in the monitoring report is correct. In case of mistakes pl. provide details and descriptions of the CARs raised.		The project owner requested the monitoring center to test the noise level at the plant in August, 2009, and July, 2010 respectively and got the results below: <table><tr><td></td><td colspan="2">Noise [Leq dB(A)]</td></tr><tr><td></td><td>Day</td><td>Night</td></tr><tr><td>10/08/2009</td><td>53.7</td><td>---</td></tr><tr><td>20/07/2010</td><td>53.7</td><td>53.5</td></tr></table>		Noise [Leq dB(A)]			Day	Night	10/08/2009	53.7	---	20/07/2010	53.7	53.5	OK	OK
	Noise [Leq dB(A)]															
	Day	Night														
10/08/2009	53.7	---														
20/07/2010	53.7	53.5														

		According to the Draft Comments on the Environmental Impact Report of the Technical Modification of the Wastewater Treatment Plant for Biogas Recovery at Guangzhou Zhujiang Brewery Co., Ltd, and the Standard of Noise at Boundary of Industrial Enterprises (GB12348), the allowed noise level for this project was daytime $\leq 70\text{dB (A)}$ and night $\leq 55\text{dB (A)}$. So the monitoring results showed the noise level of this project was compliant. It was affirmed the description of noise in the MR was accurate.		
4.5.3 QA/QC Procedure <i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration and maintenance of the monitoring equipment has been carried out by competent personnel.</i>		The above mentioned monitoring reports were reviewed and it was assured that they were issued by the environmental monitoring center authorized by Ministry of Environmental Protection of China.	OK	OK
4.5.4 Verification <i>Describe how the value was verified. Consider the measurement / determination procedure, accuracies, QA/QC procedures. Consider as well plausibility checks as far as possible. Check if the applied value could be backed up by corresponding evidences.</i>		The verification team looked at the environmental monitoring reports for the noise level at the plant.	OK	OK
4.6 Employment				
4.6.1 Measurement / Determination method <i>Describe how the monitoring parameter was</i>	/MR/ /PDD/	The chosen parameter of this indicator is: Number of employed staff	OK	OK

<i>measured / determined. Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD.</i>		Number of employees has been recorded through salary payment records.		
4.6.2 Correctness <i>Determine whether the value given in the monitoring report is correct. In case of mistakes pl. provide details and descriptions of the CARs raised.</i>		The verification team reviewed the employment contracts of the employees and their salary payroll. It was affirmed that the number of employees and their payment was consistent with the Final MR. The average annual income of the employees was higher than that of the country and Guangdong province.	OK	OK
4.6.3 QA/QC Procedure <i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration and maintenance of the monitoring equipment has been carried out by competent personnel.</i>		The verification team looked at the contracts with the employees, which were signed in accordance with the Labor Contract Law of P.R.China. The salary payroll was also reviewed to assure it was prepared by the HR Dept. of the company.	OK	OK
4.6.4 Verification <i>Describe how the value was verified. Consider the measurement / determination procedure, accuracies, QA/QC procedures. Consider as well plausibility checks as far as possible. Check if the applied value could be backed up by corresponding evidences.</i>		The verification team reviewed the employment contracts of the employees and their salary payroll.	OK	OK

5. Achievement and implementation of mitigation/compensation measures, according to the success indicators as established in the monitoring plan(s)				
Mitigation Measures during constructing period		As per the registered PDD and the Gold Standard validation report for the project, no potential mitigation/compensation measures need to be monitored.	OK	OK

ANNEX C: List of persons interviewed

	Name	Organisation / Function
☐ Mr. ☒ Ms.	Lv Dan	Guangzhou Zhujiang Brewery Co., Ltd. /Production Manager
☐ Mr. ☒ Ms.	Li Qianwen	Guangzhou Zhujiang Brewery Co., Ltd. / Operator of Production Department
☒ Mr. ☐ Ms.	Xi Tiepeng	Guangzhou Zhujiang Brewery Co., Ltd./ Operator of Biogas power plant
☒ Mr. ☐ Ms.	Xiang Haibao	Guangzhou Zhujiang Brewery Co., Ltd./ Operator of Biogas power plant
☐ Mr. ☒ Ms.	Zhu Min	Guangzhou Zhujiang Brewery Co., Ltd./ Operator of Wastewater treatment plant
☐ Mr. ☒ Ms.	Pan Cunru	Guangzhou Zhujiang Brewery Co., Ltd./ Operator of Wastewater Laboratory
☒ Mr. ☐ Ms.	Sun Mingming	South Pole Carbon Asset Management Ltd./ Consultant
☒ Mr. ☐ Ms.	Lin Yi	South Pole Carbon Asset Management Ltd./ Consultant
☐ Mr. ☒ Ms.	Fang Qun	South Pole Carbon Asset Management Ltd./ Consultant

ANNEX D: Curricula Vitae of the DOE's Verification Team Members

1. Team Leader: Chen Chunyan

☐ Mr. ☒ Ms.	Chen Chunyan	Birth date	April, 1974
Position	CDM Project Manager CDM Technical Manager	Diploma	Postgraduate
Tel & Mobile	020-87237208 13312859859	E-mail	chency@ceprei.org
Major	Environmental Engineering	Work Start Date	September, 1997
Training Experience			
Duration of Training	Training Provider	Training hours	Major Training Content
21th Feb.2011	The Gold Standard Foundation Wang Liangliang, Luo Qun	1 day	Gold standard training
19th Feb.2011	Nie Bing	1 day	EB58 and EB59 meeting decisions;
29 th Nov. 2010	Sinoma Zhuzhou Cement Factory	4 hrs	On-site study of the power generation from waste heat at Sinoma Zhuzhou Cement Factory
19 th May 2010	Chengdu Water Resource and Hydropower Survey	1 day	Calculation of hydropower Calculation of water surface area of reservoir

	and Design Institute		
15 th -16 th Mar 2010	Climate Change Department of National Development and Reform Commission (NDRC) Clean Development Mechanism Project Management Center under Energy Research Institute of NDRC	16 hrs	Fifth Sino-Japanese symposium on CDM management capacity building ● CDM rules in China ● CDM issues analysis and solution ● Attention points for implementation of CDM projects in China ● New progress and potential development direction of CDM methodology ● Calculation method of greenhouse gas emission ● Introduction to CDM projects management database of China ● Issues concerned by DOE during validation and verification ● result and prospect of Copenhagen conference
19 th Nov. 2009	Social Department under the Ministry of Science and Technology of the People's Republic of China United Nations Development Programme	8 hrs	China CDM capacity building and experience exchange conference 2009 ● Introduction to project result and experience ● CDM-Verification and Validation Manual, and opportunities and challenges of EB new rules ● CDM new areas and opportunities of energy saving and emission reduction for domestic enterprises ● Carbon trade and green financing ● Climate change negotiation and CDM development trend after 2012
2009	CNCA	3days	Training of EMS auditor lecturers
6 th - 10 th July	The Ministry of	5 days	<i>Research and study class of Sino-Japanese policies on climate change and CDM</i>

2009	Science and Technology of the People's Republic of China Japan International Cooperation Agency (JICA) The Administrative Centre for China's Agenda 21		● <i>Related CDM policies and issues</i> ● <i>CDM project investment analysis and the explanation of additionality tools</i> ● <i>ACM0002;ACM0006;ACM0013;AM0058;AM0061;AM0062;AM0029</i> ● <i>ACM 0010; AM0025;ACM0012;AM0044</i> ● <i>ACM0001</i> ● <i>AM0034, Catalytic decomposition of N₂O:</i> ● <i>AM0035, SF6 emission reduction in power grid</i> ● <i>Effective validation and verification and case study</i>
14 th – 17 th Jun. 2009	Social Department under the Ministry of Personnel of the People's Republic of China	4 days	<i>Energy management system</i> <i>Energy- saving cases of specific industries</i>
Apr. 15-20, 2009	Duan Maosheng, Wang Can, Chen Wu, Tang Renhu, Lv Xuedu	6 days	CDM project cycle: GHG; CDM methodology (large, small); VVM; climate change prospect; CDM project analysis Relevant EB/CMP decisions
Nov. 2008	CEPREI Certification Body	40hrs	OHSMS standards, regulations and professional knowledge
Jan. 2006	IECQ	24hrs	QC080000 (HSPM) lead auditor training
2005-2008	State Administration of Work	Total: 80hrs	Qualification training and reeducation training

	Safety State Administrati on of Coal Mine Safety		
June, 2002	NECCA	40hrs	QMS auditor training
Decemb er, 2001 April, 2002	Bureau of Environmen tal Protection of the People's Republic of China	40hrs	EMS auditor training
Qualifications			
1 QMS senior auditor 2 EMS senior auditor, Verification Auditor 3 National registered Quality engineer 4 IEC QC080000 Lead Auditor 5 Safety Assessor 6 QMS/EMS/QC80000 internal auditor Teacher 7 Energy Manager (senior) 8 Quality Engineer Certified by America Society for Quality (ASQ CQE) 9 EMS Auditor Training Teacher 10 CDM validator/verifier			
Auditing Experience			
Since 15 th JAN 2003, QMS Auditor / EMS Auditor ~10 days, QMS Auditing in Chemistry Industry, such as Zhongcheng Chemicals ~40 days, QC080000 Auditing in fine chemical industry ~10 days, QMS Auditing in energy industry, such as Wind Complementary			
Work experience related to CDM project			
Date	Organizati on	Work details	
08.02-0 9.25	TÜV Rheinland	● Participated in the validation of CDM project i.e. "Active Synergy Landfill Gas Power Generation Project Nakhon Pathom"	

2009	Headquarters in Cologne, Germany	- Participated in the validation of "Sichuan Pingwu Sancha Hydropower Station Project" - Participated in the validation of "Sichuan Dechang Xinma 120 MW Hydropower project" - Participated in the validation of "SBBC Fuel Switch Project" - Participated in the validation of "Wind farm extension project for Lafarge's cement plant in Tétouan" Under the guidance of Prof. Dr.-Ing. Gunter Schock and others.
Sept. 2010 - now	CEPREI Certification Body	- As the Lead Assessor participated in the verification of "Coke Dry Quenching (CDQ) Waste Heat Recovery for Power Generation Project of Laiwu Iron & Steel Group Corp." - As the Lead Assessor participated in the validation of "Tangshan Yandong Huacheng Cement Waste Heat Recovery Generation Project" - As the Lead Assessor participated in the validation of "Daocheng County Dong Yi River bundled Hydropower Project"

Work Experience

Duration	Employer	Title	Work Experience
Sept. 1997-Jul. 2000	Sichuan University	Assistant research fellow	- Participated in the research on denitrification of waste leachate (waste leachate treatment engineering project of Chengdu City waste landfill yard) - Participated in key technology research on municipal sludge anaerobic, aerobic and composting (sludge reclamation project in Chengdu City Wastewater Treatment Plant) - Participated in study on feed water of ozone-active carbon deep treatment (feed water project of ozone-active deep treatment in Chengdu Municipal Waterworks Plant)
Jul. 2000-Sept. 2001	Central South Forestry University	Environment engineering research fellow	- Participated in the power generation station project of Youxian County Grain Processing Plant (in which rice husk and straw bales are mixed burned with coal) - Participated in self-supplied thermal and electricity station project for Zhuzhou Jiubjiang Paper Mill
Sept. 2001 -	CEPREI Certification	Senior EMS	Engaged in the auditing of manufacturing industry, chemical industry and electronic industry; accumulated

now	n Body	auditor	rich experience, and carried out deep research and had deep understanding on various environmental impact evaluation and pollution prevention and control techniques as well as the monitoring of pollution agents
		Senior QMS auditor	QMS auditing; mastered various auditing skills and knowledge; mastered company operation and project operation; familiar with product design and development process, as well as production, measurement, calibration, uncertainty analysis, and the failure analysis and treatment of measurement equipment
		Senior IECQ HSPM auditor	Auditing of hazardous substance process management system; carried out deep research and had deep understanding on chemical analysis technique and hazardous substance monitoring techniques and equipment
		Teacher	Development of professional knowledge course for environment management system (including climate change and greenhouse effect and various environment treatment techniques);
		CDM project manager	Responsible for the development of the system of CDM project validation and verification, and led the establishment of CDM management system

2. Team Member: Guo Zhiyuan

☒ Mr. ☐ Ms.	Guo Zhiyuan	Birth date	April 1983.
Title	Auditor	First Degree	Bachelor
Subject	Environmental Science	Work Start Date	July 2005
Training Experience			
Duration of Training	Given by	Days & Hours	Major Training Content
21th Feb.2011	The Gold Standard Foundation Wang Liangliang, Luo Qun	1 day	Gold standard training
19th Feb.2011	Nie Bing	1 day	EB58 and EB59 meeting decisions;
April 2~5, 2010	Training Center of National Development and Reform Commission	3 days	Carbon measurement methods
December 28~29 2009	CEPREI Chen Chunyan	2 days	EB49 meeting decisions; EB50 meeting decisions; EB51 meeting decisions;
October 16~18 2009	Ms. Chen Chunyan of CEPREI	3 days	IRR calculation; CDM procedures, validation report; Validation protocol, verification report, verification protocol
2009.6	CEPREI	40 hrs	QMS auditor certification training
Apr. 15-20, 2009	Duan Maosheng, Wang Can, Chen Wu, Tang Renhu, Lv Xuedu	6 days	CDM project cycle: GHG; CDM methodology (large, small); VVM; climate change prospect; CDM project analysis Relevant EB/CMP decisions
March 2009	Shenzhen Shen Jian Management and Certification Training Center	40 hrs	EMS auditor certification training
Qualifications			

1. EMS senior auditor
2. QMS auditor-in-training
3. CDM validator/verifier
4. IEC QC080000 Lead Auditor

Auditing Experience

Two year's experience of conducting EMS audits

Work experience related to CDM project

Date	Organization	Work details
Sept. 2010 - now	CEPREI Certification Body	- As the assessor participated in the verification of "Coke Dry Quenching (CDQ) Waste Heat Recovery for Power Generation Project of Laiwu Iron & Steel Group Corp." - As the assessor participated in the verification of "Yunnan Shangri-La Shiwang River Hydropower Station". - As the lead assessor participated in the validation of "Gansu waste heat generation project of Lantian float-glass".

Work Experience

Duration	Employer	Title	Work Experience
February 2009 till now	CEPREI Certification Body	Auditor	1.Assisting the Audit Department with the preparation of ISO9000, ISO14000 and GB/T28001 audit plans, supporting the implementation of GB/T27021-2007 standard and making improvements to the audit process accordingly, e.g. print audit schedules, organize audit records and sheets, track pending tasks and etc. 2.Assisting the Audit Department with tasks like the review of audit records and statistics of non-conformance (of auditees) distribution 3.Assisting the Audit Department with verification of non-conformances out of audits

			4.Audits of ISO9001 and ISO14001 for the purpose of auditor training 5.Development of energy management system project and its training 6.Tasks related to the development of CDM project 7.Computer System Integration Qualification Certification audits
June 2005~February 2009	Guizhou Chutian Environmental Protection Ltd.	Assistant engineer	1.Solution design, process diagram design and preparation of draft design documents, feasibility analysis report, bidding documents and draft budget of waste water treatment (e.g. municipal waste water, coal mine waste water, hospital waste water, industrial waste water treatment, etc.), air pollution control (e.g. flue gas desulphurization, dust removal and etc.) and solid waste treatment (e.g. utilization of phosphogypsum residues, landfills, composting, waste combustion and etc.) 2.Implementation management, operation adjustment, monitoring and acceptance of projects, including preparation of the implementation plan, the operation procedures and monitoring plan 3.Preparation of environmental impact assessment reports 4.Relevant responsibilities for the running, management and maintenance of waste water treating plants, including rational utilization and efficiency improvement of energy consuming equipment like pumps, monitoring and control of various process parameters in every day running 5.Training of environmental management basic knowledge and waste water treating plant operation management 6.Work related to the implementation of ISO9001 and ISO14001 management systems in the organization 7.Quality control and quality management

			activities during the manufacturing of environmental protection equipment (including metals, plastic products etc.) 8. Technical guidance during constructions and installations and project acceptance
--	--	--	--