



VCS VERIFICATION / CERTIFICATION REPORT

VOLUNTARY CARBON STANDARD 2007.1



ZHANGJIAGANG NATURE GAS POWER GENERATION PROJECT IN CHINA

Verification Period:
08 June 2005 to 10 September 2009

REPORT No. 2010-0560

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DET NORSKE VERITAS



VCS VERIFICATION / CERTIFICATION REPORT

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Approved by: Michael Lehmann	Organisational unit: Climate Change and Environmental Services
Client: Zhangjiagang Huaxing Power Co., Ltd	Client ref.: Mr. Gong Jiafu

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Summary:

Det Norske Veritas Certification AS (DNV) has performed a verification of emission reductions reported for the 'Zhangjiagang Nature Gas Power Generation Project' in China, managed by Zhangjiagang Huaxing Power Co., Ltd for the period from 08 June 2005 to 10 September 2009.

In our opinion the GHG emissions reductions reported for the project in the monitoring report version 02 dated 02 June 2009 are fairly stated.

The emission reductions are claimed as Voluntary Carbon Units (VCU) under the Voluntary Carbon Standard 2007 (VCS 2007.1) in accordance to the eminent VCS Guidance for projects that are registered in two GHG programs. The project activity is registered as CDM project activity under the UNFCCC with the Registration Ref. No. 2439 and with the CDM crediting period of the project starting on 11 September 2009.

Det Norske Veritas Certification AS is able to verify that the emission reductions from the 'Zhangjiagang Nature Gas Power Generation Project', managed by Zhangjiagang Huaxing Power Co., Ltd, during the period from 08 June 2005 to 10 September 2009 amount to 2 707 872 tonnes of CO₂ equivalent and the yearly emission reductions for 2005, 2006, 2007, 2008 and 2009 are calculated as 87 870 tCO₂e, 642 967 tCO₂e, 759 357 tCO₂e, 667 161 tCO₂e and 550 517 tCO₂e respectively.

DNV does not assume any responsibility towards the issuance and utilization of VCU hereby verified and certified. Request for issuance of VCU shall be made by the project proponent to an approved VCS Program Registry based on the requirements set out under the most recent version of the VCS Program Guidelines clause on VCS Registration.

The verification of reported emission reductions is based on the information made available to us and the engagement conditions detailed in this report. DNV can not guarantee the accuracy or correctness of this information. Hence, DNV cannot be held liable by any party for decisions made or not made based on this report.

Report No.: 2010-0560	Subject Group: Environment
Report title: Pre-CDM VCS Verification of Zhangjiagang Nature Gas Power Generation Project	
Work carried out by: Li Lei, Huang Peng, Tang Zhi Ang	
Work verified by: Hendrik W. Brinks (applicant), Michael Lehmann	
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Abbreviations

BM	Build Margin
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CM	Combined Margin
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CEPG	China Eastern Power Grid
DNV	Det Norske Veritas
EB	Executive Board
EIA	Environmental Impacts Assessment report
FSR	Feasibility Study Report
GCV	Gross calorific value
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IETA	International Emissions Trading Association
IPCC	Intergovernmental Panel on Climate Change
LNG	Liquid Natural Gas
MP	Monitoring Plan
MVP	Monitoring and Verification Plan
NCV	Net calorific value
NG	Natural Gas
NGO	Non-governmental Organisation
ODA	Official Development Assistance
OM	Operating Margin
PD	VCS Project Description
PDD	CDM Project Design Document
PPA	Power Purchase Agreement
UNFCCC	United Nations Framework Convention for Climate Change
VCS	Voluntary Carbon Standard
VCU	Voluntary Carbon Units



1 INTRODUCTION

Zhangjiagang Huaxing Power Co., Ltd has commissioned Det Norske Veritas Certification AS (DNV) to carry out the verification of emission reductions reported for the “Zhangjiagang Nature Gas Power Generation Project” for the period from 08 June 2005 to 10 September 2009. The verification was carried out as per Voluntary Carbon Standard (VCS) version 2007.1 /33/. This report contains the findings from the verification and a statement for the verified emission reductions.

The project activity was registered as CDM project (UNFCCC reference number 2439) on 11 September 2009 with the CDM crediting period starting on 11 September 2009. Additional information regarding the referred project is available at the UNFCCC website: <http://cdm.unfccc.int/Projects/DB/DNV-CUK1237357899.03/view>. The emission reductions occurring prior to the registration date are claimed as Voluntary Carbon Units (VCU) under VCS 2007.1 and in accordance to the VCS Guidance for projects that are registered in two GHG programs. These emission reductions can not be claimed as Certified Emission Reductions (CERs).

1.1 Objective

Verification of “pre-registration” emission reductions from a project activity is the independent review and *ex-post* determination by a Verification Entity or Designated Operational Entity (DOE) of the monitored reductions in GHG emissions that have occurred as a result of the implementation of an already registered CDM project activity during the period from the date when the project started to operate until the date when the project was actually registered as a CDM project activity by the CDM Executive Board (EB) and thus the start date of the CDM project activity.

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

A Certification Entity is defined as an entity which has been accredited as a DOE by the CDM Executive Board for the particular scope into which the project falls or has been accredited as an approved Certification Entity by the VCS Steering Committee. DNV is an accredited DOE for the particular scope into which the project falls.

The objective of this verification was to verify and certify the emissions reductions reported for the Pre-CDM VCS Verification of Zhangjiagang Nature Gas Power Generation Project for the period 08 June 2005 to 10 September 2009

1.2 Scope and Criteria

1.2.1 Scope of the verification

The scope of the verification is:

- Verify whether the reductions generated by the project are in line with the Voluntary Carbon Standard Verification Protocol and the information provided by the project participants contains all the necessary information to evidence the project’s compliance with all criteria in the Voluntary Carbon Standard (VCS 2007.1) /33/;



- Verify that the project was implemented as described in the Project Design Document (PDD) /3/;
- Confirm that the monitoring system was implemented and fully functional;
- By checking the monitoring records and the emissions reduction calculation, express a conclusion whether reported data are accurate, complete, consistent, and transparent, with a reasonable level of assurance and free of material error or misstatement;
- To evaluate the GHG emission reduction data and express a conclusion with a reasonable level of assurance about whether the reported GHG emission reduction data is free from material misstatement;
- Validation of VCS requirements not covered by the CDM validation.

According to the VCS 2007.1 /33/, the verification also includes an independent third party assessment of the project design. In particular, the project baseline, monitoring plan and the project compliance with relevant applicable protocols and criteria (i.e. UNFCCC, VCS, host Party and others) are to be validated in order to confirm that the project design, as documented, is sound and reasonable and meets the applicable criteria.

However, since the project under consideration is already registered under VCS approved GHG program i.e. CDM, the project design, project baseline, monitoring plan and additionality of the project has already been validated and subsequently accepted by UNFCCC (ref no. 2439). This is in accordance with the “Policy announcement by VCS association” dated 19 March 2008. Hence, as the VCS recognizes the CDM as a GHG Programs that meets its VCU Verification Criteria, this verification report thus only addresses VCS specific and unique criteria in terms of project design, applicability to the adopted methodology and additionality that have not been so far addressed in the validation report as per CDM requirements.

1.2.2 Validation Criteria for VCS requirements not covered by the CDM validation

As the project has already been validated under the CDM, a further validation shall be completed only for 1.12, 1.13, 1.14, 8.1 and 8.2 clause of the VCS Project Description template (<http://v-c-s.org/docs/VCS%20PD.doc>) as required by the current VCS 2007.1 “Policy Announcement from the VCS Association - Further Guidance for Projects that are Registered in Two GHG Programs”. This validation was completed as part of the current VCU verification (refer to Appendix A).

1.2.3 Verification Criteria

The verification team has focused on the identification of significant reporting risks and verifying the mitigation measures for these risks. The verification also considered the recommendations in the Validation and Verification Manual /30/, ISEA3000 (Revised) Assurance Engagements other than Audits or Reviews of Historical Financial Information /37/and/or ISO/FDIS 14064-3 “Greenhouse gases – Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions and employed a risk-based approach /38/.



According to the requirements and guidance of VCS 2007.1, the criteria of this verification include the relevant applicable rules and steps for CER verification under the CDM excluding the following:

- The public availability of the VER/VCS Monitoring Report;
- The public availability the Verification Report and VCU Certification Statement.

1.3 VCS Project Description

1.3.1 Project Category

According to the VCS 2007.1 Guidelines and the list of Sectoral Scopes of the UNFCCC, the project is applicable under the following activity categories:

- category 1 – Renewable energy (wind, PV, solar, thermal, biomass, liquid biofuels, geothermal, run-of-river hydro).

According to Annex A of the Kyoto Protocol, the project is applicable under the sectoral scope 1

- Energy Industries (renewable/ non-renewable sources).

1.3.2 Geography Location

The project is located in Donglai Town, Zhangjiagang City, Jiangsu Province of China. The exact location of the project is defined using GPS coordinates: Latitude 31°53'N and longitude 120°39'E /3/.

1.3.3 Project Background

The project is a natural gas for power generation project activity with a rated output of 780 MW (2×390 MW) using natural gas as fuel. The details of the turbines and generators with respect to their numbers, type and model have been verified to be as per details provided in the registered CDM PDD /3/.

The electricity generated is supplied to CEPG under grid connection agreement /9/, which is dominated by coal-fired power plants. The proposed project will not only meet the rising demand of electricity demand of CEPG, but also improve the peak load regulating capability of the grid.

Furthermore, the proposed project is confirmed to bring sustainable development in China based on the approval issued by the National Development and Reform Commission /6/.

The current VCS verification of the project activity for the pre-registration period (commissioning of the project till date of registration of the project) accounts for emission reductions generated by the proposed project from 08 June 2005 to 10 September 2009. The project activity was registered as a CDM project on 11 September 2009. The emission reductions for the verification period are determined as 2 707 872 tCO₂.

Title of the project activity:	Zhangjiagang Nature Gas Power Generation Project
Location of the project activity:	Donglai Town, Zhangjiagang City, Jiangsu Province, China
Project Owner:	Zhangjiagang Huaxing Power Co., Ltd
UNFCCC registration No:	2439
Baseline and Monitoring methodology:	AM0029 version 03



Verification period:

08 June 2005 to 10 September 2009

1.4 Level of assurance

As the VCS 2007.1 only recognizes verified emission reductions, DNV has focused on providing a reasonable level of assurance that the emission reduction calculation methodology used is appropriate and correctly applied, and that emission reductions have been accurately monitored.

In accordance with the recommendation in the “Validation and Verification Manual”, version 1.1 /30/ DNV “discounts verified emission reductions or requests a discount of these by using conservative assumptions for uncertainties in emission reduction calculations that cannot be fully quantified or that cannot give a desired level of assurance”. For verifying/certifying VCUs, the desired level of assurance was based on the combined quantitative assessment of the accuracy of monitoring project performance and the identification of material risks.



2 VERIFICATION METHODOLOGY

The verification of the emission reductions has assessed all factors and issues that constitute the basis for emission reductions from the project according to the applicable consolidated CDM methodology AM0029 version 3, including the net electricity supplied by the project activity to CEPG multiplied by the grid emission factor and deduct the project emissions.

Verification Team:

Role/Qualification	Last Name	First Name	Country	Type of involvement						
				Administrative	Desk review	Site visit / Interviews	Reporting	Supervision of work	Technical review	Expert input
GHG auditor / Project manager	Li	Lei (Kevin)	China	√	√	√	√			
CDM Verifier/ Technical team leader	Huang	Peng (Peter)	China		√	√	√	√		
CDM verifier with sector knowledge	Tang	Zhi Ang (Walter)	China		√		√			√
Technical reviewer (applicant)	Brinks	Hendrik	Norway						√	
Technical reviewer	Lehmann	Michael	Norway						√	

Duration of verification:

Preparation : 10-14 April 2010
 Site visit : 16 April 2010
 Reporting & QA : 18 April 2010 – 25 May 2010

2.1 Review of Documentation

The monitoring report (version 02 dated 02 June 2009) /1/, the monthly electricity generation receipts from Jiangsu Provincial Power Company on behalf of CEPG /22/ and the natural gas receipts from Guangdong Dapeng Natural Gas Development Co., Ltd /23/ were assessed as a part of the verification. In addition the report of GCV of natural gas provided by Chinese National Petroleum Corp. /24/, the VCS Project Description (PD) /2/, the registered CDM-PDD /3/, in particular the monitoring plan contained in the CDM-PDD, the approved CDM baseline and monitoring methodology AM0029 version 3 of 16 May 2008, and the validation report /4/ were also assessed.



2.2 Site Visits

On 16 April 2010, DNV performed a site visit at Zhangjiagang Huaxing Power Co., Ltd. During this visit, DNV verified the actual implementation of the project as described in the monitoring report /1/ and the registered CDM-PDD /3/. This included confirming the operational stages of the project with physical and documented evidence.

The calibration records of the electricity meters /15/ and natural gas flow meters /16/ were checked and found to be in order. As per the calibration records the accuracy of all electricity meters is 0.2s and the accuracy of all gas flow meters is 1 class. The electricity generated is continuously measured, monthly recorded and the net electricity generation is cross checked by the receipt from Jiangsu Provincial Power Company /22/ to be correct. Quantity of natural gas combusted is monitored through the ultrasonic flow meters both by the project owner and natural gas supplier for cross check, which is recorded daily by the computer system /23/.

The persons interviewed during audit are listed in the reference section of this project /39/-/47/.

2.3 Assessment

The analysis of documentation, interviews and site visit allowed the assessment of the following processes and assumptions (including QA/QC related issues):

- The electricity generated, consumed and exported to the grid is continuously monitored. The amount of electricity exported to the grid was assessed with electricity sales receipts issued by Jiangsu Provincial Power Company and cross checked using internal measurement records.
- The consumed NG was continuously monitored and assessed with sales receipts issued by Chinese National Petroleum Corp. and cross checked using internal measurement records.
- The quantity of electric energy exported to the grid is multiplied by the grid emission factor defined *ex-post* according to the methodology.
- The constants and data used for ER calculation were stated in the calculation spreadsheet /21/.

The verification of reported data and information was carried out by means of:

- Checking individual internal measuring records for electricity generation;
- Confirmation of the correct compilation of emission reduction calculation spreadsheets (values included in the spreadsheet were individually checked against the records listed above);
- Verifying the effectiveness of the data quality assurance and control;
- Confirmation that the registered CDM project activity meets the additional VCS 2007.1 /33/ requirements.

2.4 Report of Findings

A corrective action request (CAR) will be issued, where:

- i. The project does not meet requirements of the VCS 2007.1



- ii. Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient;
- iii. Mistakes have been made in applying assumptions, data or calculations of emission reductions which will impair the estimate of emission reductions;
- iv. Issues identified in a FAR during validation to be verified during verification have not been resolved by the project participants.

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

A forward action request (FAR) is issued for actions if the monitoring and reporting require attention and/or adjustment for the next verification period.

DNV was able to verify that the GHG emission reductions reported for the “Zhangjiagang Nature Gas Power Generation Project” in the VCU monitoring report of 02 June 2009 are fairly stated.

There’s a CAR identified during the verification (refer to the Appendix B). No CL and FAR were raised.

3 VERIFICATION FINDINGS

This section summarises the findings from the verification of the emission reductions reported for the “Pre-CDM VCS Verification of Zhangjiagang Nature Gas Power Generation Project” for the period of 08 June 2005 to 10 September 2009.

3.1 Remaining issues, including any material discrepancy, from previous validation

Based on the validation report, the verification team identified no missing steps, open issues or material discrepancy. As per VCS 2007.1, clarification of clauses 1.12, 1.13, 1.14, 8.1 and 8.2 of the VCS PD are in detail verified in Appendix A.

3.2 Compliance with VCS requirements

According to the VCS, the verification also includes an independent third party assessment of the project design. In particular, the project baseline, monitoring plan and the project compliance with relevant applicable protocols and criteria are to be validated in order to confirm that the project design, as documented, is sound and reasonable and meets the applicable criteria.

The project design, its eligibility as CDM project activity and the correct application of the approved CDM baseline and monitoring methodology AM0029 (version 3) were all already validated by DNV and the project was on 11 September 2009 registered as CDM project activity. As the VCS recognizes the CDM as a GHG Program that meets its VCU Verification Criteria, this verification report thus only addresses VCS specific and unique criteria in terms of project design, applicability to the adopted methodology and additionality that have not been so far addressed in the validation report /4/.

The compliance with the requirements set out in the VCS2007 for project validation according to the Policy Announcement from the VCS Association of 19 March 2008 for projects that are registered in two GHG programs is discussed in Appendix A.



3.2.1 Eligible GHGs

The project activity contributes to reductions in the emissions of carbon dioxide (CO₂) by generating electricity using natural gas, thus, displacing electricity generation based on fossil fuels in the CEPG. The reported GHG emission reductions from the project are 2 707 872 tonnes CO₂ equivalent (tCO₂) during the period 08 June 2005 to 10 September 2009, and the yearly emission reductions for 2005, 2006, 2007, 2008 and 2009 are calculated as 87 870 tCO₂e, 642 967 tCO₂e, 759 357 tCO₂e, 667 161 tCO₂e and 550 517 tCO₂e respectively.

3.2.2 Project Start Date and Emission Reduction Start Date

The operation starting date of the project activity and consequently emission reduction was 08 June 2005, coinciding with the start of operation of the plant.

3.2.3 Public Funding and Grants

The validation of the CDM project activity did not reveal any information that indicated that the project received any public funding.

3.2.4 Secondary Effects

Regarding secondary effects, leakage was verified to be negative for 08 June 2005 to 10 September 2009 and hence set to zero /3//4/.

3.2.5 Impacts on sustainable development

The contribution to sustainable development in China was confirmed in the Letter of Approval considered during validation by DNV /28/.

3.3 Project Implementation

The project has been implemented as planned and prior to the CDM registration of the project activity. DNV has verified that three sets of gas-steam combined cycle for power generation units with the total rated output of 780 MW as described in the registered PDD /3/ have been installed.

The electricity generated is supplied to CEPG under the grid connection agreement /8/ /9/.

Since the first set of power generation unit connecting to the grid start to generate electricity on 08 June 2005, the generation details have been considered for the VCU project period of 08 June 2005 to 10 September 2009. This data has been verified with the generation details in the "Power station daily running records" /20/ and the original records in the computer control system, and as verified by the Jiangsu Provincial Power Company for receipts /22/. DNV was able to verify the start-up acceptance report /14/ as well as letter on the checking and accepting completed installations of environmental protection of the proposed project /13/.

The meters test and certificate reports of the project have been verified and found to be in order /15/.

3.4 Completeness of Monitoring

The project design was previously assessed by the Designated Operational Entity (DOE) DNV as part of the CDM validation phase (in particular in terms of the project's baseline, the monitoring plan, and the project's compliance with relevant UNFCCC and host Party criteria) and as the project was registered by the CDM EB as a eligible CDM project activity.



After comparing the monitoring plan with the methodology AM0029 version 3, it is DNV's opinion that the application of the monitoring methodology is transparent and correct. The monitoring report reflects the content of the monitoring plan. The monitoring mechanism is effective and reliable.

Data / Parameter: (as in monitoring plan of PDD):	FCgas Annual natural gas consumption	EGy Electricity supplied to the grid by the project net of any on-site parasitic usage	NCVgas Net calorific value (energy content) per volume unit of natural gas
Measuring frequency:	Continuously	Continuously	Fortnightly
Reporting frequency:	Daily	Daily	Fortnightly
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes	Yes	Yes, being done on a daily basis
Type of monitoring equipment:	Natural gas ultrasonic flow meter	Electricity Meter	Fuel sampling and calculating of the NCV of the gas supplied will be the responsibility of the gas supply company.
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	The accuracy for gas flow meter is 1.	Yes. the accuracy of the electricity monitoring equipment is 0.2s	Not applicable
Calibration frequency /interval:	1-year	1-year	Not applicable
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	The registered PDD does not specify the calibration frequency, but DNV could determine that the calibration frequency for the proposed (once a year) is in line with the local regulation and good monitoring practice.	The registered PDD does not specify the calibration frequency, but DNV could determine that the calibration frequency for the proposed (once a year) is in line with the local regulation and good monitoring practice.	Not applicable
Company performing the calibration:	Chengdu & Nanjing Branch of China National Station of Petroleum and Natural Gas Measurement	Jiangsu Electric Power Research Institute Corporation Limited	Not applicable



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Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes	Yes	Not applicable
Is (are) calibration(s) valid for the whole reporting period?	Yes.	Yes.	Not applicable
How were the values in the monitoring report verified?	Cross checked with the log sheets, monthly reports and purchase receipt. No errors were found.	Cross checked with the log sheets, monthly reports and the sales receipt and no errors were found.	Cross checked with the report which provided by the gas provider. No errors were found.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, all data from the log sheet was crosschecked and deemed to be in order. DNV can determine all data applied in the emission reduction calculation spreadsheet were correct and from the original record.	Yes, all data from the log sheet was crosschecked and deemed to be in order. DNV can determine all data applied in the emission reduction calculation spreadsheet were correct and from the original record.	Yes, all data from the log sheet was crosschecked and deemed to be in order. DNV can determine all data applied in the emission reduction calculation spreadsheet were correct and from the original record.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not applicable	Not applicable	Not applicable



3.5 Accuracy of emission reduction calculations

Electricity meter:

In total 4 electricity meters were installed at the power plant; after the 220 kV gas isolate switch station there were two electricity lines connecting into the CEPG and on each line there were one main and one backup meter installed to measure the electricity supplied to the grid and self consumed at the same time. The two meters were installed and owned by Jiangsu Provincial Power Company and the two backup meters were installed and owned by Zhangjiagang Huaxing Power Co., Ltd. The permissible limit for all meters is 0.2% (0.2S) accuracy class. The responsible person from the Zhangjiagang Huaxing Power Co., Ltd records the data at 24:00 in the every day and the monthly readings are forwarded to Jiangsu Provincial Power Company for verification at the start of every month. The Jiangsu Provincial Power Company will monitor and verify the operating status and data through tele-monitoring system. At the conclusion of each meter monthly reading an appointed representative of the Jiangsu Provincial Power Company and Zhangjiagang Huaxing Power Co., Ltd sign a document indicating the number of kWh indicated by the meter /22/. This document clearly indicates the net electricity exported and this again becomes the basis for emission reduction calculations.

The meter is jointly inspected and sealed on behalf of the parties and is not interfered with by either party except in the presence of either parties or their accredited representatives. The general conditions set out for metering, recording, meter readings, meter inspections, test & checking and communication are as per the PPA (power purchase agreement) /8/ between Zhangjiagang Huaxing Power Co., Ltd and Jiangsu Provincial Power Company. Calibrations have been carried out annually by Jiangsu Electric Power Research Institute Corporation Limited and all calibration reports have been provided by the project owner /15/.

Gas flow meter:

In two gas flows meters were installed for the power plant; one is the main meter directly installed by the Chinese National Petroleum Corp., which can measure the natural gas consumed by the project activity, and the other one is a backup meter installed by the project owner. The ownership of the main meter is Chinese National Petroleum Corp. as well as the maintenance. The responsible person from the Chinese National Petroleum Corp. records the data from the main meter at 8:00 in the every day, which will be cross checked by the project owner. At the conclusion of each meter daily reading an appointed representative of the Chinese National Petroleum Corp. and the project owner sign a document showing the quantity of the natural gas indicated by the meter /23/. This document clearly indicates the natural gas combusted by the project activity and this again becomes the basis for emission reduction calculations.

The gas flow meters are jointly inspected and sealed by the two parties and are not interfered with by either party except in the presence of the other party or its accredited representatives. The general conditions set out for metering, recording, meter readings, meter inspections, test & checking and communication are as per the natural gas purchase agreement /10/. The permissible limit for all meters is 1 accuracy class, which is in compliance with China industry practice. Calibrations have been carried out annually by Chengdu & Nanjing Branch of China National Station of Petroleum and Natural Gas Measurement and all calibration reports have been provided by the project owner /16/.



3.6 Quality of evidence to determine emission reductions

The emission reductions ER_y by the project activity during the crediting period is the difference between baseline emissions (BE_y), project emissions (PE_y) and emissions due to leakage (LE_y), as follows:

1) Baseline emissions (BE_y):

Baseline emissions (BE_y in tCO_2) are the product of the baseline emissions factor (EF_y in tCO_2/MWh) times the electricity supplied by the project activity to the grid (EG_y in MWh).

As per the methodology AM0029 version 03 /31/, in the registered PDD the lowest emission factor among the following three options were used:

Option 1: The build margin, calculated according to "Tool to calculate emission factor for an electricity system";

Option 2: The combined margin, calculated according to "Tool to calculate emission factor for an electricity system", using a 50/50 OM/BM weight.

Option 3: The emission factor of the technology (and fuel) identified as the most likely baseline scenario under "Identification of the baseline scenario" above, and calculated as follows:

$$EF_{BL,CO_2}(tCO_2 / MWh) = \frac{COEF_{BL}}{\eta_{BL}} * 3.6GJ / MWh$$

According to the tool and calculation steps described above, the baseline emission reductions can be *ex-post* calculated as follows:

- $EF_{BM}=0.8672 tCO_2/MWh$
- $EF_{OM}=0.9421 tCO_2/MWh$ and hence $EF_{BL,CM} = 0.5 \times EF_{BL,BM} + 0.5 \times EF_{BL,OM} = 0.90465 tCO_2/MWh$
- $EF_{BL,CO_2}; COEF_{coal} \times PGCC \tilde{BL}(1 - r_{selfuse}) = 0.9508 tCO_2/MWh$.

Then in the registered PDD $EF = \min(EF_{BM}, EF_{CM}, EF_{BL,CO_2,Option3}) = 0.8672 tCO_2/MWh$. Thus based on the registered PDD and validation report, Option 1 (BM) was selected as the baseline emission factor and will be estimated ex post annually during the crediting period. 2005 values are available based on the yearbooks of 2006 giving a BM emission factor of $0.8672 tCO_2/MWh$, and similarly 2006 has a BM emission factor of $0.8236 tCO_2/MWh$ and the latest available date, i.e. for 2007, is a BM emission factor of $0.7555 tCO_2/MWh$ when calculated with IPCC2006 values and $0.6826 tCO_2/MWh$ with the use of the conservative limit of the 95% confidence interval for the fuel emission factor. The most conservative value of $0.6826 tCO_2/MWh$ was used for the entire verification period and accepted by DNV.

The GHG calculations are complete and transparent, and their accuracy has been verified.

For the period 08 June 2005 to 10 September 2009, the net amount of electricity is 8 852 514.850 MWh and the baseline emission of 6 042 467 tCO_2 based on the baseline emission factor $0.6826 tCO_2/MWh$, which was verified by cross checking the receipts of Jiangsu Provincial Power Company and the records of the project owner /21//22/.

The emission reductions are less than anticipated during validation. This is due to a more conservative baseline grid emission factor and also to a lower load factor, which has been 26-36% for the years 2006-2009 compared to an estimated average of 40% in the validation.



2) Project emissions (PE_y):

During the on-site visit, DNV was able to verify that there are no fuels consumed in the proposed project other than natural gas to generate electricity. The CO₂ emissions from electricity generation (PE_y) are calculated as follows:

$$PE_y = \sum_f FC_{f,y} * COEF_{f,y}$$

The net calorific value (NCV) of the natural gas was derived from the reports of gross calorific value (GCV) for natural gas combusted issued by Chinese National Petroleum Corp. /24/. According to the Energy Statistic Manual /26/, NCV = 0.9*GCV.

IPCC 2006 default values for EF_{CO2} (56.1 tCO₂/TJ) of natural gas and for the oxidation rate (100%) of the natural gas are used. The IPCC default value for EF_{CO2} is more conservative than the local value for China (54.3 tCO₂/TJ) /27/.

The calculations are complete and transparent, and their accuracy has been verified.

The period from 08 June 2005 to 10 September 2009, the total natural gas combusted is 1 762 729 420 Nm³ according to the mentioned above, the project emission (PE_y) during the crediting period 08 June 2005 to 10 September 2009 totally was 3 334 595 tCO₂, which was verified by cross checking the receipts of Chinese National Petroleum Corp. and the records of the project owner /23/.

The fuel consumption and NCV was cross-checked with the efficiency of the power plant, i.e. 58% according to the equipment supplier for GE-9F (<http://www.vertinfo.com/vertnew/vertnewsview.asp?id=14580>) and 51% in PDD which pre-calculated based on the FSR data /6/. The actual efficiency for 2006 to 2009 was calculated by DNV to be 53.5% to 54.2% and hence lower than the efficiency of the equipment.

3) Leakage (LE_y):

Since LNG from Chinese National Petroleum Corp. was used in the proposed project, upstream methane leakage emissions from natural gas were considered. The leakage from emissions occurring from fossil fuels used in the absence of the project activity was deducted in a conservative way. CO₂ emissions from liquefaction, transportation etc. of LNG was furthermore taken into account.

DNV was able to verify the analysis and calculation of the leakage emission in the monitoring report /1/, and confirm that the calculations are complete and transparent. The leakage emissions are calculated. According to the methodology AM0029, when the total net leakage effects are negative, the project participants should assume LE = 0, i.e., no leakage has to be considered for the project activity /1/.

4) Emission reductions (ER_y):

$$ER_y = BE_y - PE_y - LE_y = 6\,042\,467 \text{ tCO}_2 - 3\,334\,595 \text{ tCO}_2 = 2\,707\,872 \text{ tCO}_2$$

The energy generated, natural gas consumption and emission reductions claimed for the proposed period were as shown in the following table and also could be found in the ER calculation spreadsheet /1/:



2005		Emission reductions by project activity (tCO ₂ e)			
Start date	End date	BE	PE	Leakage	ER
08/06/2005	31/12/2005	227 253	139 382	0	87 870

2006		Emission reductions by project activity (tCO ₂ e)			
Start date	End date	BE	PE	Leakage	ER
01/01/2006	31/01/2006	1 428 746	785 779	0	642 967

2007		Emission reductions by project activity (tCO ₂ e)			
Start date	End date	BE	PE	Leakage	ER
01/01/2007	31/12/2007	1 672 608	913 252	0	759 357

2008		Emission reductions by project activity (tCO ₂ e)			
Start date	End date	BE	PE	Leakage	ER
01/01/2008	31/12/2008	1 481 499	814 338	0	667 161

2009		Emission reductions by project activity (tCO ₂ e)			
Start date	End date	BE	PE	Leakage	ER
01/01/2009	10/09/2009	1 232 361	681 844	0	550 517

Thus the claimed total emission reductions ER_y of 2 707 872 tCO₂ reported for the period 08 June 2005 to 10 September 2009 /1/, and the yearly emission reductions for 2005, 2006, 2007, 2008 and 2009 are calculated as 87 870 tCO₂e, 642 967 tCO₂e, 759 357 tCO₂e, 667 161 tCO₂e and 550 517 tCO₂e respectively.

Sufficient evidence was presented for the reported parameters.

3.7 Management System and Quality Assurance

Monitoring and reporting of electricity generation is part of normal operations of Zhangjiagang Huaxing Power Co., Ltd. The quality of meter readings is assured through calibration of electricity meters /10/ and through cross checking of readings between the meter and the receipts.



4 VERIFICATION/CERTIFICATION STATEMENT

Det Norske Veritas Certification AS has performed a verification of the emission reductions reported for the “Zhangjiagang Nature Gas Power Generation Project” managed by Zhangjiagang Huaxing Power Co., Ltd for the period 08 June 2005 to 10 September 2009. The project has been registered as CDM project activity (UNFCCC Registration Ref. No. 2439) with the CDM crediting period starting on 22 April 2009. The emission reductions occurring prior to the registration date are thus claimed as Voluntary Carbon Units (VCU) under the Voluntary Carbon Standard (VCS 2007.1) and in accordance with the VCS Guidance for projects that are registered in two GHG programs.

Zhangjiagang Huaxing Power Co., Ltd is responsible for the collection of data in accordance with the validated monitoring plan and the reporting of GHG emissions reductions from the project.

It is DNV’s responsibility to express an independent verification statement on the reported GHG emission reductions from the project.

In DNV’s opinion the GHG emissions reductions reported for the project in the monitoring report of 02 June 2009 are fairly stated and the project design meets all VCU verification criteria.

The GHG emission reductions were calculated correctly on the basis of the baseline and monitoring methodology AM0029 version 1 and the monitoring plan provided in the CDM-PDD. The emission reductions are claimed as Voluntary Carbon Units (VCU) under the Voluntary Carbon Standard (VCS).

Det Norske Veritas Certification AS is able to verify that the emission reductions from the ‘Zhangjiagang Nature Gas Power Generation Project’, managed by Zhangjiagang Huaxing Power Co., Ltd during the period 08 June 2005 to 10 September 2009 amount to 2 707 872 tonnes of CO₂ equivalent.

DNV does not assume any responsibility towards the issuance and utilization of the VCUs hereby verified and certified. Request for issuance of VCUs shall be made by the project proponent to an approved VCS Program Registry based on the requirements set out under the most recent version of the VCS Program Guidelines clause on VCS Registration.

The verification of reported emission reductions is based on the information made available to us and the engagement conditions detailed in this report. DNV cannot guarantee the accuracy or correctness of this information. Hence, DNV cannot be held liable by any party for decisions made or not made based on this report.

Beijing, 2010-06-28

Huang Peng
CDM Verifier

Beijing, 2010-06-28

Li Lei
GHG Auditor

Oslo, 2010-06-28

Michael Lehmann
Technical Director



5 REFERENCES

- /1/ The Pre-CDM Monitoring Report and Emission Reduction Calculation Spreadsheet of Zhangjiagang Nature Gas Power Generation Project, version 01 dated 6 April 2010, and revised version 02 dated 02 June 2009.
- /2/ VCS PD of Zhangjiagang Nature Gas Power Generation Project: Clarification of clauses 1.12, 1.13, 1.14, 8.1 and 8.2s
- /3/ PDD for Zhangjiagang Nature Gas Power Generation Project, version 5 of 12 February 2009
- /4/ Validation Report for “Zhangjiagang Nature Gas Power Generation Project”, Report No.: 2008-0488, version 01 of 11 March 2009, DNV.
- /5/ Business License of the project owner issued by Zhangjiagang Administration for Industry and Commerce, Registered No.: 3205821105388
- /6/ Feasibility Study Report of the Zhangjiagang Nature Gas Power Generation Project, dated October 2001;
FSR approval letter issued by National Development and Reform Commission, dated 20 October 2003.
- /7/ Environmental impacts assessment report of the Zhangjiagang Nature Gas Power Generation Project, dated May 2002;
EIA approval letter issued by National Environment Protection Bureau 24 August 2002
- /8/ Power Purchase Agreement between Zhangjiagang Huaxing Power Co., Ltd and Jiangsu Provincial Power Company on behalf of CEPG, dated 12 August 2006.
- /9/ Grid Connection Agreement between Zhangjiagang Huaxing Power Co., Ltd and Jiangsu Provincial Power Company on behalf of CEPG, dated May 2005.
- /10/ Natural Gas Purchase Agreement between Zhangjiagang Huaxing Power Co., Ltd and Chinese National Petroleum Corp., dated 29 December 2004.
- /11/ Contract for Equipment Procurement under Zhangjiagang Huaxing Power Co., Ltd and Jiangsu Province Grid Company, dated May 2005.
- /12/ Application of Grid Connection of Electricity Generation and Notification of Grid Tariff, compiled in June 2005.
- /13/ Letter on the checking and accepting completed installations of environmental protection of the proposed project issued by the Ministry of Environmental Protection of China, dated 08 October 2006.
- /14/ Start-up acceptance of the proposed project issued by Construction Bureau of Jiangsu Province, dated 24 January 2007
- /15/ Calibration and certificate report of main and back-up meters issued by Jiangsu Electric Power Research Institute Corporation Limited, dated 16 February 2005, 21 February 2006, 11 February 2007, 27 November 2007, and 22 October 2008.



- /16/ Calibration and certificate report of main and back-up Ultrasonic flow meters issued by Chengdu & Nanjing Branch of China National Station of Petroleum and Natural Gas Measurement, dated 18 May 2005, 22 May 2006, 30 May 2007, and 12 June 2008.
- /17/ The personnel training schedule and record for the proposed project.
- /18/ Competence certificate of CDM personnel of the proposed project.
- /19/ CDM Project Management Manual issued by Zhangjiagang Huaxing Power Co., Ltd, dated 1 September 2009,
- /20/ Power station daily running records of the proposed project from June 2005 to October 2009
- /21/ Emission Reduction calculation spreadsheet dated 02 June 2009
- /22/ Electricity purchase receipts issued by Jiangsu Provincial Power Company from 08 June 2005 to 10 September 2009
Electricity sale records issued by Zhangjiagang Huaxing Power Co., Ltd from 08 June 2005 to 10 September 2009
- /23/ Natural gas sale receipts issued by Chinese National Petroleum Corp. from 08 June 2005 to 10 September 2009
Natural gas purchase records issued by Zhangjiagang Huaxing Power Co., Ltd from 08 June 2005 to 10 September 2009
- /24/ The report of Gross Calorific Value for natural gas combusted issued by Chinese National Petroleum Corp. from October 2008 to April 2009.
- /25/ China Electric Power Yearbook, 2006~2008
- /26/ Energy Statistics Manual, IEA publication, September 2004
- /27/ China NDRC, the national value for emission factor calculation for each power grid of China, published on 02 July 2009, NDRC official website: http://qhs.ndrc.gov.cn/qjzjz/t20090703_289357.htm.
- /28/ Letter of Approval issued by China DNA, dated January December 2008.
- /29/ The declaration letter from the project owner announces that all carbon credits for the period from 08 June 2005 to 10 September 2009 will only sell it once as VCS credits, dated 08 April 2010.
- /30/ CDM Executive Board: "*Clean Development Mechanism Validation and Verification Manual*" version 1.1, dated 04 December 2009, http://cdm.unfccc.int/EB/051/eb51_repan03.pdf
- /31/ AM0029 - Approved methodology "Baseline Methodology for Grid Connected Electricity Generation Plants using Natural Gas", version 3, EB39 Annex 3, date 16 May 2008.
- /32/ ACM0002 - Approved methodology "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", version 6, date 19 May 2006
And
"Tool to calculate emission factor for an electricity system" version 2, EB50, Annex 14, 16 October 2009.
- /33/ Voluntary Carbon Standard (VCS) version 2007.1.
http://www.v-c-s.org/docs/Voluntary%20Carbon%20Standard%202007_1.pdf



- /34/ State Power Corporation of China. Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects. Beijing: China Electric Power Press, 2003
- /35/ The guidance for deviation in use of methodology AM0005 by several project activities in China by EB. <http://cdm.unfccc.int/Projects/Deviations>
- /36/ The statistics by State Electricity Regulatory Commission (SERC) on newly built thermal plants in 10th "Five-Year Plan" period 2000-2005, and NDRC official website <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/2006/20061215144747182.pdf>
- /37/ ISEA3000 (Revised) Assurance Engagements other than Audits or Reviews of Historical Financial Information:
<http://www.ifac.org/IAASB/ProjectHistory.php?ProjID=0008>.
- /38/ ISO14064-2:2006 "Guidance for project level quantification, monitoring and reporting of GHG emission reductions or removals":
http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=38382;
ISO 14064-3:2006 "Greenhouse gases – Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions":
http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=38700.

Persons interviewed during the verification, or persons who contributed with other information that are not included in the documents listed above.

- /39/ Mr. Gong Jiafu, General Manager, Zhangjiagang Huaxing Power Co., Ltd
- /40/ Mr. Yu Shaoai, Deputy General Manager, Zhangjiagang Huaxing Power Co., Ltd
- /41/ Mr. Yang Zhenyan, Assistant of General Manager, Zhangjiagang Huaxing Power Co., Ltd
- /42/ Mr. Zhang Xiaoming, Operation Supervisor, Zhangjiagang Huaxing Power Co., Ltd
- /43/ Mr. Xiang Zhijian, Operator, Zhangjiagang Huaxing Power Co., Ltd
- /44/ Mr. Li Xiaodong, Operator, Zhangjiagang Huaxing Power Co., Ltd
- /45/ Mr. Sun Guoguo, Operator, Zhangjiagang Huaxing Power Co., Ltd
- /46/ Mr. Guo Jiangang, Chief Accountant, Zhangjiagang Huaxing Power Co., Ltd
- /47/ Ms. Cao Xinyan, Accountant, Zhangjiagang Huaxing Power Co., Ltd
- /48/ Mr. Ding Zhaoming, Technical Director, Eastern Fortune Investment Co., Ltd

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APPENDIX A

ASSESSMENT OF CLAUSES 1.12, 1.13, 1.14, 8.1 AND 8.2 OF THE VCS PD

The proposed project has been registered as a CDM project on 11 September 2009 with the Registration Ref. No.2439. As the VCS came into force on 19 November 2007, this monitoring period shall be verified against the VCS 2007.1 in terms of the VCS 2007.1. This appendix covers all the requirements set out in the VCS 2007.1 for project validation together with the validated PDD (version version 5, dated 12 February 2009), according to the Policy Announcement from the VCS Association (<http://www.v-c-s.org/documents.html>).

1.12 Demonstration to confirm that the project was not implemented to create GHG emissions primarily for the purpose of its subsequent removal or destruction.

As a new grid-connected nature gas power generation project, the proposed project will produce cleaner electricity using natural gas instead of coal and will generate GHG emission reductions by avoiding CO₂ emissions from electricity generation of fossil fuel fired power with larger emission factors. Operation of this project can reduce GHG emissions. It is confirmed that the project was not implemented to create GHG emissions primarily for the purpose of its subsequent removal or destruction.

1.13 Demonstration that the project has not created another form of environmental credit (for example renewable energy certificates).

The project is located in China and is developed and operated by Zhangjiagang Huaxing Power Co., Ltd, which is a Chinese Investment Enterprise. There is no other environmental credit (for example renewable energy certificate) which has or will be produced by or obtained for the project /29/.

1.14 Project rejected under other GHG programs (if applicable):

The proposed project is a registered CDM project and was not rejected under any other GHG program.

8.1 Proof of Title:

Evidence of proof of title has been demonstrated via documentation proving ownership of the plant and equipment through the on-site visit. The owner has also obtained all relevant permits for to the proposed project including a Business License /5/, FSR (Feasibility Study Report) approval /6/, EIA (Environmental Impacts Assessment Report) approval /7/ and PPA (Power Purchase Agreement) /8/. The project's design and implementation has been carried out in compliance with all relevant and national legislation in China. The declaration letter from the project owner has been obtained. It has been confirmed that the project owner will not apply for other VERs (VER+, GS etc.) and that all credits are transferred to the buyer. It also has been confirmed that the buyer will only sell the VCUs once /29/.

8.2 Projects that reduce GHG emissions from activities that participate in an emissions trading program (if applicable):

The proposed project has been registered as a CDM project on 11 September 2009 and the reference number is 2439, for which a renewable crediting period of 3×7 years will be used under the CDM GHG Program and the first crediting period is from 11 September 2009 to 11 September 2016. Therefore, GHG emission reductions generated by the proposed project during the CDM crediting period will be verified as unique CERs during the CDM crediting

period. Only GHG emission reductions achieved from 08 June 2005 to 10 September 2009 will be considered as VCUs under the VCS 2007.1.

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APPENDIX B

CORRECTIVE ACTION REQUESTS, CLARIFICATION REQUESTS AND FORWARD ACTION REQUESTS

Corrective action requests

CAR ID	Corrective action request	Response by Project Participants	DNV's assessment of response by Project Participants
CAR 1	The value (54.3 tCO ₂ /TJ) for EF _{CO2} of natural gas in the pre-CDM monitoring report version 1 of 6 April 2010 is not in line with the registered PDD. According to the registered PDD, IPCC 2006 default value needs to be applied for the EF calculation. The MR and the ER calculation sheet need to be corrected.	OK, the default value (56.1 tCO ₂ /TJ) has been used for ER calculation, and the MR and the ER calculation spreadsheet have been revised accordingly.	Yes. The IPCC default value (56.1 tCO ₂ /TJ) was applied in the MR version 2, which is in line with the registered PDD. Because the IPCC default value for EF _{CO2} is more conservative than the local value for China (54.3 tCO ₂ /TJ), DNV considered it acceptable. CAR 1 is closed.

Clarification requests

CL ID	Clarification request	Response by Project Participants	DNV's assessment of response by Project Participants
	<i>No CL was issued.</i>	N/A	N/A

Forward action requests

FAR ID	Forward action request	Response by Project Participants	DNV's assessment of response by Project Participants
	<i>No FAR was issued.</i>	N/A	N/A