



Voluntary Carbon Standard Version 2007 Verification Report

19 November 2007

Verification Report: 600500213

Name of Verification company:	Date of the issue:
TÜV SÜD Industrie Service GmbH	26-02-2010
Report Title:	Approved by:
Verification Report: Of "Zhang Jiagang waste heat recovery from sulphuric acid production for electricity generation project".	Thomas Kleiser
Client:	Project Title:
Twolions (Zhang Jiagang) fine chemicals Co., Ltd.	"Zhang Jiagang waste heat recovery from sulphuric acid production for electricity generation project".
Summary:	
TÜV SÜD Industrie Service GmbH has performed the Initial and First periodic verification of the registered CDM project: "Zhang Jiagang waste heat recovery from sulphuric acid production for electricity generation project". The project is designed based on waste heat recovery from Sulphuric acid production to produce electricity. The total installed capacity of the project is 50 MW and is expected to generate 302,120MWh annually. This generated power is use to displace the part of electricity imported from the East China Power Grid. The management of Twolions (Zhang Jiagang) fine chemicals Co., Ltd. is responsible for the preparation of the GHG emissions data and the reported GHG emission reductions. The verification was performed following the guidance and criteria of the VCS 2007 Standard as well as the approved baseline and monitoring methodologies ACM0002, Version 06	

"Consolidated methodology for Grid-Connected electricity generation from renewable sources", and ACM0004, Version 02 "Consolidated methodology for waste gas and/or heat for power generation".

A document review, followed by a site visit was conducted to verify the information submitted by the project participant regarding the present verification period. Based on the assessment carried out, the verifier confirms:

- That the project has been implemented and operated in accordance with the description given in the registered PDD (version 05, 11-11-2008, registration date 19-12-2008).
- That the project is completely implemented as described in registered PDD.
- That the monitoring plan complies with the applied methodologies (Consolidated methodology for Grid-connected electricity generation from renewable ACM0002, Ver. 06 and consolidated methodology for waste gas and/or heat for power generation ACM0004, Ver. 02) and the monitoring has been carried out as exactly following the monitoring plan.

Installed equipments essential for generating emission reductions run reliably and the meters are calibrated appropriately. The project is generating emission reductions as a VCS project.

The verifier can confirm that the GHG emission reductions are calculated without material misstatements. Our opinion refers to the project's GHG emissions and resulting GHG emission reductions reported, both determined due to the valid and registered project's baseline, its monitoring plan and its associated documents.

During verification activities, the audit team has validated the VCS specific requirements necessary for pre-CDM VCS projects (described under point 3.7 of the verification report).

Based on the information seen and evaluated we can confirm that the implementation of the project resulted in 729,295 tCO₂e of emission reductions during the verification period 28-03-2006 to 18-12-2008.

Split in annual vintages:

Year 2006:	179,022	tCO ₂ equivalents
Year 2007:	297,295	tCO ₂ equivalents
Year 2008:	252,978	tCO ₂ equivalents

Work carried out by:	Number of pages:
Dr. Sven Kolmetz Sun Baoqi Bhai Raja Maharjan	16 (Excluding annexes)

Abbreviations

ACM	<i>Approved Consolidated Methodology</i>
BM	<i>Build Margin</i>
CAR	<i>Corrective Action Request</i>
CDM	<i>Clean Development Mechanism</i>
VCU	<i>Voluntary Carbon Unit</i>
CM	<i>Combined Margin</i>
CO₂e	<i>Carbon dioxide equivalent</i>
CR / CL	<i>Clarification Request</i>
DNA	<i>Designated National Authority</i>
DOE	<i>Designated Operational Entity</i>
EF	<i>Emission Factor</i>
EIA / EA	<i>Environmental Impact Assessment / Environmental Assessment</i>
ER	<i>Emission Reduction</i>
FAR	<i>Forward Action Request</i>
FSR	<i>Feasibility Study Report</i>
GHG	<i>Greenhouse Gas (es)</i>
IPCC	<i>Intergovernmental Panel on Climate Change</i>
IRL	<i>Information Reference List</i>
MP	<i>Monitoring Plan</i>
MR	<i>Monitoring Report</i>
NGO	<i>Non-Governmental Organisation</i>
OM	<i>Operational Margin</i>
PDD	<i>Project Design Document</i>
PP	<i>Project Participant</i>
TÜV SÜD	<i>TÜV SÜD Industrie Service GmbH</i>

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1 Introduction

1.1 Objective

Twolions (Zhang Jiagang) fine chemicals Co., Ltd. has commissioned an independent verification by TÜV SÜD Industrie Service GmbH (TÜV SÜD) of its registered CDM project: "Zhang Jiagang waste heat recovery from sulphuric acid production for electricity generation project".

The objective of the verification work is to comply with the requirements of the Voluntary Carbon Standard (VCS) 2007. According to this assessment TÜV SÜD shall:

- Ensure that the project activity has been implemented and operated as per the registered PDD "Zhang Jiagang waste heat recovery from sulphuric acid production for electricity generation project" Version 05, dated on 11-11-2008, and that all physical features (technology, project equipment, monitoring and metering equipment) of the project are in place;
- Ensure that the published MR and other supporting documents provided are complete and verifiable and in accordance with applicable VCS requirements;
- Ensure that actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan and the approved methodology;
- Evaluate the data recorded and stored as per the approved baseline and monitoring methodologies "Consolidated methodology for Grid-Connected electricity generation from renewable sources", ACM0002, Version 06 and "Consolidated methodology for waste gas and/or heat for power generation", ACM0004, version 02."

1.2 Scope and Criteria

The verification scope is defined as an independent and objective review of the Monitoring Report for VCU claim. The verification is based on the submitted monitoring report, the validated Project Design Documents including its monitoring plan and validation report, the applied monitoring methodologies (ACM0002, Version 06 and ACM0004, version 02), relevant decisions, clarifications and guidance from the VCS and any other information and references relevant to the project activity's resulting emission reductions. These documents are reviewed against the requirements of the VCS 2007 and related rules and guidance. TÜV SÜD has applied a rule-based approach. The principles of accuracy and completeness, relevance,

reliability and credibility were combined with a conservative approach to establish a traceable and transparent verification opinion. The verification considers both quantitative and qualitative information on emission reductions

1.3 VCS Project Description

Project activity: "Zhang Jiagang waste heat recovery from sulphuric acid production for electricity generation project"

According to PDD, the proposed Zhang Jiagang waste heat recovery from sulphuric acid production for electricity generation project is a waste heat recovery project that utilized the waste heat produce by existing sulphuric acid production company to produce electricity. A total installed capacity of the proposed project is 50 MW and expected to generate 302,102MWh energy annually. The main equipments of this propose project are designed and produced in USA. It consists of HRS systems and auxiliary equipments. The main component of the proposed project is a Steam turbine/Generator, model number ENK63/3.2. It is manufacture by Siemens, Germany.

UNFCCC Registration Number: 1685

Project Participants: Twolions (Zhang Jiagang) fine chemicals Co., Ltd.

Location of the project: It is located in the Jiangsu Yangtze River International chemistry part about 20 km far from the Zhang Jiagang, Suzhou city of Jiangsu Province, P.R. China. The address is No.1 Donghua Road, Jiangsu Yangtze River International chemistry park, Zhang Jiangang Free Trade Zone, Suzhou city, Jiangsu province, P.R. China.

The GPS coordinates taken during the on-site visit are:

- East Longitude 120°27'52''
- North Latitude: 32°00'10''

Date of UNFCCC / CDM registration: 19-12-2008

Starting date of the VCS crediting period: 28-03-2006

1.4 Level of Assurance

The level of assurance of this report is defined as limited. Furthermore, TÜV SÜD would like to point out that based on the process and procedures conducted as

part of this verification; there was no evidence that indicates this GHG assertion:

- Is not materially correct and is not a fair representation of the GHG data and information;
- Was not prepared in accordance with the related VCS 2007 Standard on GHG quantification, monitoring and reporting.

2 Methodology

2.1 Verification Process

The verification process is based on the approach depicted in the VCS 2007 Guidelines. Standard auditing techniques have been adopted. The verification team performs first a desk review, followed by an on-site visit which results in a protocol including all the findings. The next step is to close out the findings through direct communication with the PPs and finally prepare the verification report. This verification report and other supporting documents then undergo an internal quality control by the CB "Climate and energy" before submission to the VCS Registry Operator.

2.2 Verification Team

According to the technical scopes and experiences in the sectoral or national business environment TÜV SÜD has composed a project team in accordance with the appointment rules of the TÜV SÜD certification body "Climate and energy". The composition of an assessment team has to be approved by the Certification Body (CB) ensuring that the required skills are covered by the team. The CB TÜV SÜD operates four qualification levels for team members that are assigned by formal appointment rules:

- Assessment Team Leader (ATL)
- Greenhouse Gas Auditor (GHG-A)
- Greenhouse Gas Auditor Trainee (T)
- Experts (E)

The appointment of the team takes into account the coverage of the technical area(s), sectoral scope(s) and relevant host country experience for verifying the ER achieved by the project activity in the monitoring period for this verification.

The verification team was consisting of the following members:

Name	Qualification	Coverage of technical scope	Coverage of sectoral expertise	Host country experience
Dr. Sven Kolmetz	ATL	☒	☒	☒
Sun Baoqi	GHG-A	☒	☒	☒
Bhai Raja Maharjan	T	☒		

Dr. Sven Kolmetz is physicist and head at the department "TÜV Carbon Management Service" located in the head office of TÜV SÜD Industrie Service GmbH in Munich, Germany. Furthermore he is officially authorized expert in the verification of GHG emissions in the framework of the European Emission Trading Scheme. Before entering TÜV SÜD he worked as energy consultant for industrial companies and as consultant for the German Federal Government on instruments for the reduction of GHG emissions.

Sun Baoqi is an auditor for CDM projects at Jiangsu TÜV Product Service Ltd. He is based in Wuxi. In his position he is implementing validation, verification audits for CDM projects. He has received extensive training in the CDM validation process and participated already in several CDM project assessments as an auditor.

Bhai Raja Maharjan is an auditor trainee for CDM/JI projects at TÜV SÜD Industrie Service GmbH. He has extensive working experience in the field of Renewable Energy Sectors. He holds a Bachelor degree in Electrical Engineering and M.Sc. degree in Renewable Energy. Before joining the TÜV SÜD Industrie Service GmbH he has worked in various multinational companies as an Engineer and later as a Renewable Energy Expert.

2.3 Review of Documents

The Monitoring Report (MR) was submitted by the PP and was made publicly available on TÜV SÜD's netinform webpage (www.netinform.net).

This report and the accompanying documents including the emission reduction calculations were assessed based on all the relevant VCS criteria. A complete list of all documents reviewed is available in Annex 2 of this report.

2.4 On-site Assessment and follow-up Interviews

On 02-03-2009, TÜV SÜD performed a physical inspection and on-site interviews with PP to:

- Confirm the implementation and operation of the project;
- Review the data flow for generating, aggregating and reporting the monitoring parameters;
- Cross-check the information provided in the MR documentation with other sources (raw data);
- Check the monitoring equipment against the requirements of the registered PDD, the approved

- methodology, and the VCS standard, including calibrations, maintenance, etc;
- Review the calculations and assumptions used to obtained the GHG data and ER and,
- Identify whether the quality control and quality assurance procedures are in place to prevent or correct errors or omissions in the reported parameters.

A list of the people interviewed during this verification activity is included in Annex 2.

2.5 Quality of Evidence to Determine Emission Reductions

Among many others, the following relevant and reliable evidences have been used by the audit team during the verification process:

- Agreement of Grid connection and power supply [IRL 9]
- CDM Project manual [IRL 10]
- Records of boiler and generator operation training [IRL 13]
- Calibration certificate of meter [IRL 15]
- Monthly summary sheet of electricity [IRL 19]
- Yearly production summary of sulphuric acid production sheet [IRL 20]
- Daily recorded summary sheet of electricity generation in paper version and electronic version [IRL 21 and 22]
- Daily operation sheet of auxiliary equipments [IRL 26]
- Electricity invoices of back up meter [IRL 30]
- Revised Monitoring report [IRL 31]
- Revised excel spread sheet [IRL 32]
- Main equipment maintenance records [IRL 33]

Sufficient evidence covering the full verification period in the required frequency is available to validate the figures stated in the final MR and the associated Excel calculation file. The source of the evidences will be discussed in chapter 3 of this report. Specific crosschecks have been done in cases where further sources were available. All figures in the monitoring report were cross-checked by the audit team against the raw data. The data collection system meets the requirements of the monitoring plan as per the methodology.

2.6 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the verification process was to resolve any outstanding issues which needed to be clarified for TÜV SÜD's positive conclusion on the GHG emission reduction calculation.

To guarantee the transparency of the verification process, the concerns raised, based on the desk review and subsequent on-site audit assessment and follow up interviews, together with the responses given are documented in Annex 1 (verification protocol).

A Corrective Action Request (CAR) is raised where TÜV SÜD identifies:

- Non-conformities in monitoring and/or reporting with the monitoring plan and/or methodology;
- The evidence provided is not sufficient to prove conformity;
- Mistakes in assumptions, data or calculations that impair the ER;
- FARs stated during validation that are not solved until the on-site visit.

A Clarification Request (CL) is raised where TÜV SÜD does not have enough information or the information is not clear in order to confirm a statement or data.

Information or clarifications provided as a response to a CAR or CL could also lead to a new request.

2.7 Internal Quality Control

As an ultimate step of the verification the final documentation including the verification report and the protocol have to undergo an internal quality control by the Certification Body (CB) "Climate and energy", i.e. each report has to be finally approved either by the Head of the CB or the Deputy. In case one of these two persons is part of the assessment team, the approval can only be given by the other one. Upon approval by the CB, the report will be submitted to the project proponents including a written assurance that the GHG emission reductions and removals have been achieved in accordance with the VCS.

3 Verification Findings

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

There are no remaining issues from the previous validation of this project.

3.2 Project Implementation

The project is fully implemented according to the description presented in the PDD. The verifier confirms, through the visual inspection that all physical features of the proposed VCS project activity including data collecting systems and storage have been implemented in accordance with the registered PDD. The project activity is completely operational and the same has been confirmed on-site.

No data and/or variables presented in the MR differ significantly from the stated in the registered PDD, which would to cause an increment of the ER in this period or in future periods in relation to the estimates in the registered PDD.

3.3 Completeness of Monitoring

As mentioned in section 3.2 of this Verification Report, the implemented monitoring procedures are in line with the requirements of the validated monitoring plan as well as with the applied methodologies ACM0002 (Version 06) and ACM0004 (Version 02).

TÜV SÜD confirms that the implemented monitoring procedures fully satisfy the necessary criteria for a complete monitoring system and that the resulting emission reductions are calculated in a conservative and appropriate manner.

3.4 Accuracy of Emission Reduction Calculations

The ER calculation has been positive verified from the last version of the ER calculation tool "Final Emission Reduction Calculation VCS period 28.03.06 to 18.12.08.xls".

TÜV SÜD checked and reviewed the provided Excel spreadsheet (together with the Final version of the Monitoring Report "VCS Monitoring Report version 04 Period from 28.03.06 to 18.12.08.pdf") for the calculation of all the parameters thoroughly and confirms that the applied spreadsheet formulas and links are correct and in line with the indicated emission reduction calculation in the monitoring plan as well as in the validated PDD and the applied methodology.

TÜV SÜD further confirms that the applied default values are in line with the methodology and the registered monitoring plan and are therefore considered appropriate. Final results were rounded and truncated in a conservative manner. Random spot checks were performed during the verification process as well as during the onsite visit to eliminate possible manual transition errors. Based on the observations made, TÜV SÜD considers the implemented data handling and compiling system as appropriate and reliable.

The calibration records of the installed equipments were checked (See IRL 15 and 16) during the site visit. Based on TÜV SÜD's observations, the installed monitoring equipment can be considered as well maintained and the measured data as accurate within the given range.

In summary, TÜV SÜD considers the calculation of the emission reductions for the given period as accurate and reliable.

3.5 Quality of Evidence to Determine Emission Reductions

The following evidences were used to cross-check on the provided data for the calculation of the emission reductions:

- Technical specifications of the equipments;
- Contracts;
- Quality assurance documents;
- Monthly Invoices;
- Manual records from the raw data;
- External Data;

Spot checks of all sources mentioned above have been performed. No discrepancies were found.

It can be confirmed that the evidence is of sufficient quantity and appropriate quality.

3.6 Management and Operational System

Based on the on-site observations and interviews, as well as the provided documents, TÜV SÜD considers the management and operational system of this project as suitable. Some findings were raised during the on-site visit, but positive closed out by the PPs.

In summary, the quality management and the operational system are well implemented and responsibilities and procedures are clearly defined.

3.7 VCS Validation

The objective of this phase is to validate only the additional aspects required for registered Clean

Development Mechanism projects. These aspects are chapters 3.7.1.1, 3.7.1.2, and 3.7.1.3 from the description of the project; and chapters 3.7.2.1 and 3.7.2.2 from Ownership.

As this project is claiming GHG credits sequentially under the VCS Program and the CDM, the validation of the following five clauses was completed and the statements are given below:

3.7.1 Description of project

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

This project, recovered waste heat from sulphuric acid production process to produce electricity. The producing electricity is used by project itself to meet the internal requirement by displacing part of electricity supplied by the East China Power Grid. East China power Grid is predominately fossil fuel based power plants. Hence with the implementation of this project saves the GHG emissions from the same amount of electricity generation from traditional fossil fuel based power plants [IRL 9].

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

It does not apply because it doesn't exist in China. This was furthermore confirmed in writing by the project participants [IRL 24].

3.7.1.3 Project rejected under other GHG programs (if applicable)

Not applicable and PP has declared that the project has never been rejected by any GHG programs.

3.7.2 Ownership

3.7.2.1 Proof of Title

As a proof of title of the project, the following documents have been submitted to the assessment team:

-A LoA of the DNA confirming that the project belongs to Twolions (Zhang Jiagang) fine chemicals Co., Ltd [IRL 8]. The main Project proponent is: Twolions (Zhang Jiagang) Fine Chemicals Co., Ltd.

The Project is invested and operated by Twolions (Zhang Jiagang) Fine Chemicals Co., Ltd. The project was approved by National Development and Reform Commission of

China on 14 December, 2006. The business license of Twolions (Zhang Jiagang) Fine Chemicals Co., Ltd [IRL 17] and the project approval are provided as the legislative documents to show the ownership of the Project.

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

The CDM project was approved by China's DNA on 14 December, 2006. The Letter of Approval is provided to prove that the GHG emission reductions of the Project are owned by Twolions (Zhang Jiagang) Fine Chemicals Co., Ltd. Twolions (Zhang Jiagang) Fine Chemicals Co., Ltd signed Emission Reduction Purchase Agreement with Emissions Trading PLC, so Emissions Trading PLC is another proponent for the CDM project.

4 Double-Counting and Carbon Ownership

Based on a review of the recognized registries of VER standards and an analysis of internet sources, TÜV SÜD has not detected indications that the same project activity is included into any other standards or schemes intended to generate Voluntary Emission Reductions or renewable energy certificates. This was furthermore confirmed in writing by the project participants [IRL 24]. The ownership of the carbon rights are considered to be held by the project participants. This conclusion has been reached based on the fact that Twolions (Zhang Jiagang) fine chemicals Co., Ltd. is the operator of the plant resulting in the emission reductions. This was sustained by titles of ownership (IRL 24). However, as the holding of carbon rights may be impacted by other legislation or contracts not subject to the audit service, TÜV SÜD refrains from any liabilities related to the legal holding of carbon rights.

5 Verification conclusion

The scope of this verification covers the determination of VCUs according to the VCS standard 2007.1 generated by the following project: "Zhang Jiagang waste heat recovery from sulphuric acid production for electricity generation project".

The management of Two Lions (Zhang Jiagang) Fine Chemicals Co., Ltd. is responsible for the preparation of the GHG data and the reported GHG emission reductions on the basis set out within the project's monitoring plan indicated in the registered CDM PDD and the applied methodologies ACM0002 (Version 06) and ACM0004 (Version 02).

As a result of this verification, TÜV SÜD can confirm that:

- The project is fully implemented and operational;
- The installed monitoring system runs reliably and is calibrated appropriately;
- The installed system is fully capable of recording the necessary data to determine the emission reductions;
- VCUs are calculated without any material misstatements in a conservative and appropriate manner.

Based on the information provided and evaluated, TÜV SÜD confirms the following statement:

Reporting period: From 28/03/2006 to 18/12/2008.

Verified emissions in the above reporting period:

Baseline emissions:	729,295	tCO2 equivalents
Project emissions:	0	tCO2 equivalents
<u>Leakage emissions:</u>	<u>0</u>	<u>tCO2 equivalents</u>
Emission reductions:	729,295	tCO2 equivalents

Annual Emission Reductions is as follow:

Year 2006:	179,022	tCO2 equivalents
Year 2007:	297,295	tCO2 equivalents
Year 2008:	252,978	tCO2 equivalents

Munich, 26/02/2010

Munich, 26/02/2010




Certification body
"Climate and energy"

Assessment Team Leader

Annex 1:
TÜV SÜD's Verification Protocol

Verification Protocol

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1. Project Activity Implementation

1.1. Technology

PDD	Verified Situation	Conclusion
Location (s) add additional sites if necessary		
Description / Address: Zhang Jiagang waste heat recovery from sulphuric acid production for electricity generation project will recover waste heat from sulphuric acid production process to produce electricity, displacing part of electricity supplied by the East China Grid. The proposed install capacity of the power plant is 50MW. It is expected to generate 392,400MWh/yr electricity. It is expected to reduce the GHG emissions about 273,328 tCO₂e annually. Address: No.1 Donghua Road, Jiangsu Yangtze River International chemistry park, Zhang jiagang Free Trade Zone, Suzhou city, Jiangsu Province, P.R.C	Description of the project has been confirmed by the audit team during on site visit. Further following documents have been checked during on-site audit: Approval of FSR Approval of EIA Grid connection agreement Business license The project has installed waste heat boilers and steam turbine-generator unit with capacity of 50MW on site and electricity generated by project was consumed within the company. Project owner, Twolions (Zhang Jiagang) Fine Chemicals Co., Ltd has implemented the project and has the ownership of carbon rights generated by project. <u>Corrective Action Request 1:</u> Please indicate whether it is the first verification or second at the cover page of the MR.	☒
GPS coordinates: 120°27'52" E, 32°00'10"N	The coordinates have been checked via Google Earth.	☒

Checklist is applicable to registered CDM – Project Activity No.: 1685

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PDD	Verified Situation	Conclusion
Technical Equipment – Main Components <i>add additional components if necessary</i>		
<i>Component 1: High Pressure Boiler</i>	The boiler cools 236,208Nm ³ /h of SO ₂ process gas leaving the sulphur burner from 1,135°C to 381°C for admission to the first converter pass. Parameters are as follows: Steam Pressure: 6.62MPa Steam Temperature: 288°C Steam Flow rate: 167t/h Manufacturer: Shanghai Hale Hi-Tech Engineering Co., Ltd	☑
<i>Component 2: Heat Recovery System Boiler</i>	The Monsanto Enviro-Chem boiler is a horizontal type ASME B&PV Section VIII, Division I designed boiler. Total 1,800m ³ /h of strong acid from heat recovery tower pump boot is cooled from 227°C to 200°C in the tube side by generating 63,125kg/h of 0.83MPa steam in kettle drum. Parameters are as follows: Steam Pressure: 0.83MPa Steam Temperature: 185°C Steam Flow rate: 63t/h Manufacturer: Southern Heat Exchanger Corp. U.S.A	☑
<i>Component 3: Steam Turbine</i>	One set of steam turbine-generator unit together with Distribution Control System have been installed on site and electricity generated by it since June 2005. Parameters are as follows: Design Rating: 47,995kW Speed: 3000rpm Steam Pressure Inlet: 6.31MPa Steam Pressure Outlet: 0.0095MPa	☑

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PDD	Verified Situation	Conclusion
	Manufacturer: Siemens AG Power Generation	
<i>Component 4: Generator</i>	One set of steam turbine-generator unit together with Distribution Control System have been installed on site and electricity generated by it since June 2005. Installed capacity: 50MW Power Factor: 0.85 Voltage: 10.5Kv Frequency: 50Hz Manufacturer: Siemens AG Power Generation	☒
<i>Component 5: Step-up transformer No. 3# 10KV-35KV Manufacturer: Nantong Youbang Transformer Co., Ltd</i>	Parameters of the transformer has been verified as follows: Current: 659.8/2199.4A Voltage: 35/10.5kV Capacity: 40000kVA The transformer was employed to increase the voltage of electricity that was generated by the steam turbine-generator unit and send to internal power grid within the company. Main meter and backup meter for electricity generation measurement were installed at high voltage side, i.e. 35kV side.	☒
<i>Component 6: Step-down transformer No. 1# 110 kV-35 kV Manufacturer: Nantong Youbang Transformer Co., Ltd</i>	Parameters of the transformer has been verified as follows: Current: 310.9/983.1A Voltage: 117/37kV Capacity: 63000kVA The transformer was employed to connect the internal power grid within company to the East China Power Grid, and import the electricity from ECPG.	☒

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PDD	Verified Situation	Conclusion
<i>Component 7:</i> <i>Step-down transformer No. 4#</i> <i>35KV-10KV</i> <i>Manufacturer: Nantong Youbang Transformer Co., Ltd</i>	Parameters of the transformer has been verified as follows: Current: 944.8/3464.1A Voltage: 38.5/10.5kV Capacity: 63000kVA The transformer is employed to distribute electricity from internal power grid to different users within the company. Total 6 meters, EGaux1-aux6 for electricity consumption measurement were installed at low voltage side, i.e. 10kV side.	☒
Operation Status during verification <i>add additional sites if necessary</i>		
Approvals / Licenses	The evidences have been verified in validation and this verification: Approval of FSR Approval of EIA Grid connection agreement Business license	☒
Actual Operation Status N/A	Under construction ☐ In operation ☒ Out of operation ☐ Reason (when out of operation):	☒
Remarks to Special Operational Status During the Verification Period	The project has been registered on 19 Dec. 2008, and the starting date of electricity generation is on 24 June, 2005. VCS verification period: 28 Mar. 2006 to 18 Dec. 2008 Monitoring Report has been published on TUV SUD website before site verification. There is no fossil fuel consumption and no equipment and wiring system for that were	☒

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PDD	Verified Situation	Conclusion
	found during site verification. <u>Corrective Action Request 2:</u> 1. As it is indicated in Clause 5.2.1 Project start date in VCS2007, "The earliest credit start date under the VCS 2007 shall be 28 March 2006." Please correct the credit start date in Monitoring Report. 2. Please also correct the total quantity of VCUs accordingly in the calculation sheet as well as in MR.	

1.2. Organization

PDD	Verified Situation	Conclusion
Project Participant (s) add additional participants if necessary		
Entity / Responsible person: Twolions (Zhang Jiagang) Fine Chemicals Co., Ltd Mr. Yuan Yafei Deputy General Manager	It has been verified on site: Project owner is Twolions (Zhang Jiagang) Fine Chemicals Co., Ltd: The consultant company, Shanghai Yangtze Delta Investment Consulting Co., Ltd provided consulting and CDM training service to the project owner.	☑
CDM Project management: Mr. Yuan Yafei Deputy General Manager Mr. Hua Huidong CDM Manager	2 main positions: Mr. Yuan Yafei is responsible for management and operation of the project, review and signs the monthly report and Monitoring Report. Mr. Hua Huidong is responsible for monitoring, CDM training, quality assurance and quality control management, and report preparation.	☑

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1.3. Quality Management System

PDD	Verified Situation	Conclusion
Quality Management System: Electricity generated by project was consumed within the company, it was monitored by main meter operated and maintained by project owner and backup meter sealed and maintained by Zhang Jiagang Power Supply Company (part of ECPG). Electricity provided to auxiliary equipments within project boundary by the project was monitored by 6 meters respectively. All the meters were installed in Central Control Room at project site. ISO Quality Management System Manual and CDM Project Manual were provided to audit team on site and they met the monitoring and management requirement.	ISO Quality Management System Manual and CDM Project Manual have been verified on site. CDM Project Manual include the contents below: Index General management CDM management and calculation Procedure Monitoring methodology and procedure Data recording, archiving, reporting Failure dealing and reporting procedure Electricity generated by project was monitored by main meter and backup meter. Electricity consumed by auxiliary equipments was monitored by six meters marked AUX1-AUX6 respectively in Monitoring Plan. There are 2 additional meters installed as spare meter if any monitoring meter above malfunctioned. Electricity generated by project activity was consumed within the project and this has been confirmed by audit team against wiring diagram (single line diagram) of project activity, electricity purchased invoice from grid company before project and after project and physical inspection by the audit team during onsite audit. The backup meter has been sealed and maintained by Zhang Jiagang Power Supply Company (part of ECPG). This has been checked by audit team during on site audit as	☑

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	well.	
Responsibilities: project owner	Project owner implemented ISO Quality Management System and also CDM Project Management system. A special CDM work team has been established to meet the CDM requirements in monitoring, data recording, archiving, and reporting.	☒
Qualification and Training: CDM training Technical training Qualification of personnel: steam turbine and generation operation	Shanghai Yangtze Delta Investment Consulting Co., Ltd has advised the project owner in management and monitoring procedure relating to CDM project. Training course, participant list, and qualification of trained personnel are verified on site by auditor.	☒
Implementation of QM-system	Documents relating to training have been provided and checked on site by auditor.	☒

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1.4. Remaining FARs from previous Verifications (or forwarded issues of validation report)

Remaining Requests from Previous Verifications	Summary response of project owner	Audit conclusion team
There are no remaining or open issues from previous validation report issued by DNV.	-	-

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2. Data Management System

2.1. Description

Structure of raw data archiving				
Describe all the different data collection systems				
Type	Name	Responsible	Procedures	Comments
1.Electronically	EGgen	Trained employee from project owner who worked in DCS main control room	Measured continuously and automatically.	Data was recorded once per 2 hours and archived in electronic version.
	EGaux1-6	Trained employee from project owner who worked in DCS main control room	Measured continuously and automatically.	Data was recorded once per 2 hours and archived in electronic version.
2.Manual	EGgen EGaux1-6	Trained employee from project owner who worked in DCS main control room.	Daily summary records include readings at 2 Peak segments (8:00-12:00 and 17:00-21:00), 2 Medium segments (12:00-17:00 and 21:00-24:00), 1 Valley segment (24:00-8:00 next day).	Manual records can cross check the data recorded automatically with the frequency once per 2 hours.
3.External data	EF _{OM} , EF _{BM} , EF _{CM}	Default values	List of parameters ex-ante employed has been included in Monitoring Report	It was fixed during crediting period.

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Key Reporting Risks:

Risk Classification: low/ the electronic and manual records, invoices, external data were applied as per Monitoring and Management Manual required and rechecked by audit team.

Further Remarks: The 220kV transformer station of East China Power Grid was also visited by audit team. Electricity provided by East China Power Grid to project owner was recorded by gateway meter and data from this meter can also demonstrate that electricity generated by the project was consumed totally by project owner.

2.2. Raw Data Archiving and Protection measures

Name	Description of data archiving and protection measures	Risks and comments	Concl.
EGgen	Electricity generated by project was measured continuously by main meter EGgen and recorded once per 2 hours by DCS in electronic version, i.e. real time monitoring and compact disk. Daily manual recording were carried out by trained employee 5 times per day including 2 peak segments, 2 medium segments and 1 valley segment. Monthly recording were summarized by trained employee. All the documents were archived and managed by CDM project manager.	Priority sequence of data was specified in monitoring plan and procedure, data from main meter would take the first, then that from backup meter. If both meters failed to record correct reading, the emergency procedure would be initiated, and start time and end time of meter failure would be recorded, lowest value from normal working days would be substitute for the data which is not available during mal-function period. The spare calibrated meter would be put into service at once.	☒
EGgen	Electricity generated by project was measured continuously by	Electricity amount in every month was	☒

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	backup meter and recorded once per month manually.	sent to grid company as requested, and grid company issued invoice against amounts in every 3 months.	
EGaux1-6	Electricity consumed by auxiliary equipments were measured continuously by meters Aux1-Aux6, and recorded once per 2 hours by DCS in electronic version, i.e. real time monitoring and compact disk. Daily manual recording were carried out by trained employee 5 times per day including 2 peak segments, 2 medium segments and 1 valley segment. Monthly recording were summarized by trained employee. All the documents were archived and managed by CDM project manager.	If any meter failed to record correct reading, the emergency procedure would be initiated, and start time and end time of meter failure would be recorded, highest value from normal working days would be substitute for the data which is not available during malfunction period. The spare calibrated meter would be put into service at once.	☒
Invoice	As the project activity will generate and provide electricity to equipments within the company and it is the captive power project, there is no invoice of electricity sale available.		☒
Key Reporting Risks: N/A Risk Classification: low daily and monthly records of electricity generation (EGgen) and consumption (EGaux 1-6) will be checked. Amount of electricity purchased from the Grid company and consumed within project owner company also cross-check against the each other. Hence the risk is low. Further Remarks: N/A			

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2.3. Data transfer

Description of data transfer from raw data archiving to calculation tool			
Name	Description and responsibilities	Risks and comments	Concl.
EGgen/EGaux1-6.	Reading of main meter and meter aux1-6 has been monitored by DCS system continuously, automatically and recorded once per 2 hours via measurement circuits connected to the respective meters. Monthly summary of electricity generated and consumed by project will be prepared by trained employee and submitted to CDM manager for review and to General Manager for approval. Protection measures in the calculation tool was adopted to avoid unintentional errors or data losses	No further comments	☒
EGgen	Reading of backup meter was recorded by trained employee from project owner monthly and sent to grid company for confirmation. Monthly records were reviewed and archived by CDM manager.	No further comments	☒
Invoice	As the project activity will generate and provide electricity to equipments within the company and it is the captive power project, there is no invoice of electricity sale available.	No further comments	☒
Key Reporting Risks: Risk Classification: low/ records were double confirmed by both grid company and project owner. Further Remarks:			

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2.4. Data Processing

Description of data processing from transferred data to final results in the calculation tool			
Step	Description	Risks and comments	Concl.
Consistency	Yes, all abbreviations(EGgen, EGaux1-6,) and units(MWh) are consistent with Monitoring Report and Methodology and traceable to the raw data	No further comments.	☒
Calculation description	Tool The process of VCU's calculation was clearly described in chapter 4.5 of monitoring report. The formulae, steps, and constant are in compliance with methodology and PDD. Leakage: In accordance with ACM0004 , no leakage is considered. The VCUs $ER_y = BE_y - PE_y$ Project emission: there is no auxiliary fuel consumed in project, therefore project does not have GHG emission , $PE_y = 0$ Baseline emission of project is given as: $BE_y = EG_y \times EF_y$ EF_y is ex-ante calculated value and it remains same for the first crediting period. $EG_y = EG_{gen} - EG_{aux}$ The net electricity generated by project has been verified on site, it was calculated again according to raw data from electricity monthly summary.	No further comments.	☒
Transformation from transferred data to useable data	The raw data has been confirmed by data readers form project owner and grid company, and also verified by personnel in charge in every steps of transformation.	No further comments.	☒

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	There is no negative figure during monitoring period.		
Elimination of not plausible data	Non-plausible data was not found during monitoring period.	No further comments.	☒
Transformation from useable data to input data for further calculation	EGgen is total electricity generated by project, difference between it and self consumption EGaux is the net electricity that project generated. Both EGgen and self consumption EGaux were rechecked and recalculated by audit team, and the result is acceptable.	No further comments.	☒
Ex-ante data	EFy is calculated and keep unchanged during fixed credit period. EFy applied in Monitoring Report is consistent with that in PDD.	No further comments.	☒
Default parameter	List of parameters ex-ante employed has been included in Monitoring Report	No further comments.	☒
Formulae check	Formulae for VCUs calculation included in the calculation tool and also other formulae are in compliance with the description of the calculation tool and monitoring plan.	No further comments.	
Rounding functions	VCU data has been rounded down to the lower value for conservative.		☒
Calculation tool changes and protection measures	CDM Manager was assigned to calculate the VCUs and the Monitoring Report will be submitted to General Manager for review and approval, so unauthorized changes on calculation tool is not permitted.	No further comments.	☒
Key Reporting Risks: Risk Classification: low/ requirements in Monitoring and Management Manual were strictly obeyed by the staffs; data and report were checked and supervised by authorized manager. Further Remarks:			

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3. Monitoring Plan Implementation

3.1. List of Parameter to be monitored

ID-PDD	ID-Meth.	ID-Internal	Description	Conclusion
<i>Instrumentation insert all components that are metered by instruments as necessary due to PDD and applied methodology version</i>				
EGgen	EGgen	EGgen	Total Electricity generated by project	see 2.1.1.
EGaux1-6	EGaux	EGaux1-6	Electricity consumed by project	see 2.1.2.
<i>Accounting insert all components that are accounted as necessary due to PDD and applied methodology version</i>				
EGgen	EGgen	EGgen	Total Electricity generated by project	see 2.1.3
EGaux1-6	EGaux	EGaux1-6	Electricity consumed by project	see 2.1.3.
<i>External Data insert all components that are coming from external data sources as necessary due to PDD and applied methodology version</i>				
EF _{OM}	EF _{OM}	EF _{OM}	EF _{OM}	see 2.1.4
EF _{BM}	EF _{BM}	EF _{BM}	EF _{BM}	see 2.1.4
Weight W _{OM}	Weight W _{OM}	Weight W _{OM}	Weight W _{OM}	see 2.1.4
Weight W _{BM}	Weight W _{BM}	Weight W _{BM}	Weight W _{BM}	see 2.1.4
<i>Others insert all miscellaneous components as necessary due to PDD and applied methodology version</i>				

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3.2. Monitoring Instrumentation

3.2.1. Instrument i

Back to 3.1. List of Parameter to be monitored

PDD	Verified Situation	Conclusion
Instrumentation Information <i>list all different instruments which have been used during the monitoring period; use a separate table for each single instrument</i>		
ID-PDD: EGgen	Electricity measured at project site by main meter	☒
ID-Internal: EGgen	Electricity measured at project site by main meter	☒
Data to be Measured:	Photo here  Meter for electricity measurement at project site. Right: main meter	☒

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Data Logging:	Continual measurement and recording once per 2 hours	☒
Archiving of Raw Data:	Electronic and paper copy(electricity measurement sheet)	☒
Measurement Principle:	continuously	☒
Period of Operating Time:	Installed on 20/03/2005	☒
Instrument Type:	bi-directional	☒
Serial Number:	200407518A0046	☒
Manufacturer Model Nr.:	DSSD331	☒
Specific Location:	Meter was installed in switch board room. (Transformer station)	☒
Measurement Range:	I: 1.5(6)A, U: 3*100V	☒
Measurement Unit:	kWh	☒
Calibration:	dated on 20/03/2005, 20/03/2006, 20/03/2007, 20/03/2008, valid till 19/03/2009	☒
Required Calibration Frequency:	Once a year	☒
Uncertainty Level:	1%	☒
Monitoring & Calculation		
Reading Frequency:	Continuous measurement	☒
Recording Frequency:	Once per 2 hours by DCS.	☒
Trouble Shooting:	No trouble shooting occurred.	☒

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Inspection Results During Verification			
Operation of Instrumentation	Method of Verification	Verification Results	Conclusion
Measuring Principle:	if it is in compliance with methodology/PDD Checking the electronic records and statistic sheet daily and monthly.	It is in compliance with methodology/PDD.	☒
Installation: Manner of execution	Check installation records, meter specification.	Meter was installed in main control room.	☒
Functionality:	Check operating situation and readings on meter	normal	☒
Quality assurance:	Check the calibration records and qualification of the institution	Metering equipment was regularly calibrated and checked by qualified testing institution.	☒
Maintenance:	Check maintenance records	Daily plausibility was checked by operational staff in main control room.	☒
Key Reporting Risks: Risk Classification: low/ daily and monthly records were spot checked by audit team, and calibration records were also provided to audit team. Backup meter is available if the main meter malfunctioned. Further Remarks:			

Back to 3.1. List of Parameter to be monitored

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3.2.2. Instrument ii

Back to 3.1. List of Parameter to be monitored

PDD	Verified Situation	Conclusion
Instrumentation Information <i>list all different instruments which have been used during the monitoring period; use a separate table for each single instrument</i>		
ID-PDD: EGaux1-6	Electricity measured at project site	☑
ID-Internal: EGaux1-6	Electricity measured at project site	☑
Data to be Measured:	Electricity consumed by project activity	☑
Data Logging:	Continuous measurement and recording once per 2 hours	☑
Archiving of Raw Data:	Electronic and paper copy(electricity measurement sheet)	☑
Measurement Principle:	automatically	☑
Period of Operating Time:	Installed on 20/03/2005, operating time is 24/06/2005	☑
Instrument Type:	Bi-directional	☑
Serial Number:	EGaux1-200407518A0032; EGaux2-200406515A0242; EGaux3-200406515A0245; EGaux4-200407518A0279; EGaux5-200407518A0276; EGaux6-200407518A0249;	☑
Manufacturer Model Nr.:	DSSD331	☑
Specific Location:	Meter was installed in switch board room (Transformer station)	☑
Measurement Range:	I: 1.5(6)A, U: 3*100V	☑
Measurement Unit:	kWh	☑

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Calibration:	Dated on 20/03/2005, 20/03/2006, 20/03/2007, 20/03/2008, valid till 19/03/2009	☒
Required Calibration Frequency:	Once a year	☒
Uncertainty Level:	1%	☒
Monitoring & Calculation		
Reading Frequency:	Continuous measurement	☒
Recording Frequency:	Recording once per 2 hours by DCS	☒
Trouble Shooting:	No trouble shooting occurred.	☒

Inspection Results During Verification			
Operation of Instrumentation	Method of Verification	Verification Results	Conclusion
Measuring Principle:	It is in compliance with methodology/PDD Checking the electronic records and statistic sheet daily and monthly.	It is in compliance with methodology/PDD.	☒
Installation: Manner of execution	Check installation records, meter specification.	Meter was installed in switch board room	☒
Functionality:	Check operating situation and readings on meter	normal	☒
Quality assurance:	Check the calibration records and qualification of the institution	Metering equipment was regularly calibrated and checked by qualified testing institution.	☒

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Maintenance:	Check maintenance records	Daily plausibility was checked by operational staff.	☒
Key Reporting Risks: Risk Classification: low/ daily and monthly records were spot checked by audit team, and calibration records were also provided to audit team. Spare meter is available if the meter in use malfunctioned. Further Remarks:			

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3.2.3. Instrument iii

Back to 3.1. List of Parameter to be monitored

PDD	Verified Situation	Conclusion
Instrumentation Information <i>list all different instruments which have been used during the monitoring period; use a separate table for each single instrument</i>		
ID-PDD: EGgen	Electricity measured at project site by backup meter	☒
ID-Internal: EGgen	Electricity measured at project site by backup meter	☒
Data to be Measured:	Meter for electricity measurement at project site	☒

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	 Meter for electricity measurement at project site. Left: backup meter	
Data Logging:	Continuous measurement and recording monthly	☒
Archiving of Raw Data:	Paper copy(electricity measurement sheet)	☒
Measurement Principle:	automatically	☒
Period of Operating Time:	26/09/2006	☒
Instrument Type:	Bi-directional	☒
Serial Number:	101130051	☒
Manufacturer Model Nr.:	DSSD22-SS1	☒
Specific Location:	Meter was installed in switch board room. (Transformer station)	☒

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Measurement Range:	I: 1.5(6)A, U: 3*100V	☒
Measurement Unit:	kWh	☒
Calibration:	dated on 20/03/2005, 20/03/2006, 20/03/2007, 20/03/2008, valid till 19/03/2009	☒
Required Calibration Frequency:	Once a year	☒
Uncertainty Level:	0.5%	☒
Monitoring & Calculation		
Reading Frequency:	Continuous measurement	☒
Recording Frequency:	Monthly recording	☒
Trouble Shooting:	No trouble shooting occurred.	☒

Inspection Results During Verification			
Operation of Instrumentation	Method of Verification	Verification Results	Conclusion
Measuring Principle:	It is in compliance with methodology/PDD Checking the electronic records and statistic sheet daily and monthly.	<u>Clarification Request No. 1</u> As the backup meter was installed in 10/2006, please clarify data source before Oct. 2006?	☒
Installation: Manner of execution	Check installation records, meter specification.	Meter was installed and sealed by grid company at project site.	☒
Functionality:	Check operating situation and readings on meter	normal	☒

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Quality assurance:	Check the calibration records and qualification of the institution	Metering equipment was regularly calibrated and checked by qualified testing institution.	☒
Maintenance:	Check maintenance records	Daily plausibility was checked by operational staff.	☒
Key Reporting Risks: Risk Classification: low/ daily and monthly records were spot checked by audit team, and calibration records were also provided to audit team. Further Remarks:			

3.3. Sampling Information

3.3.1. Sampling Point i

3.4. Accounting information

Back to 3.1. List of Parameter to be monitored

PDD	Verified Situation	Conclusion
Accounting Information <i>list all significant accounted components which have been used during the monitoring period; use a separate table for each single component</i>		
ID-PDD: EGgen	EGgen	☒
ID-Internal: EGgen	EGgen	☒
Description of Accounted Component:	Monthly electricity summary sheets	☒
Accounting Unit:	MWh	☒

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Quality Assurance Measures / System:	The monthly electricity summary sheets for EGgen were used as evidence documents to cross check the electricity measured by main meter. All the evidences have been checked and calculation performed to verify the data by audit team.	☒
Account Archived:	28 Mar 2006- 18 Dec 2008	☒
Account Credible / in Line with PDD:	Account is credible.	☒
Key Reporting Risks: Risk Classification: low/recordings were checked and confirmed by grid company and project owner. Further Remarks:		

3.5. External Data

Back to 3.1. List of Parameter to be monitored

PDD	Verified Situation	Conclusion
<i>External Data list all external data components which have been used during the monitoring period; use a separate table for each single component</i>		
ID-PDD: EF _{OM}	EF _{OM}	☒
ID-Internal: EF _{OM}	EF _{OM}	☒
Description of Data / Data Refers to:	Operation Margin Emission Factor;	☒
Unit of Data (if appropriate):	tCO ₂ e / MWh	☒
Date of Data Income:	09/08/2007	☒
Source of Data:	2006 Revised IPCC Guidelines for Default Values China Energy Statistical Yearbook 2003-2005 China Electric Power Yearbook 2003-2005	☒

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Reliability of Data Source:	N/A	☒
Is the Data up-to-date?	The emission factors have been calculated ex-ante, the value of EF _{OM} calculated ex-ante will be used and won't be updated during the fixed crediting period.	☒
Uncertainty Level:	N/A	☒
Key Reporting Risks: N/A Risk Classification: low/ detail calculation was included in PDD. Further Remarks: N/A		

3.6. External data 2

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PDD	Verified Situation	Conclusion
<i>Others insert all miscellaneous components as necessary due to PDD and applied methodology version; use a separate table for each single component</i>		
ID-PDD: EF _{BM}	EF _{BM}	☒
ID-Internal: EF _{BM}	EF _{BM}	☒
Description of Data / Data Refers to:	Operation Margin Emission Factor;	☒
Unit of Data (if appropriate):	tCO ₂ e / MWh	☒
Date of Data Income:	09/08/2007	☒
Source of Data:	2006 Revised IPCC Guidelines for Default Values China Energy Statistical Yearbook 2003-2005 China Electric Power Yearbook 2003-2005	☒
Reliability of Data Source:	N/A	☒

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Is the Data up-to-date?	The emission factors have been calculated ex-ante. The value of EF_{BM} calculated ex-ante will be used and won't be updated during the fixed crediting period.	☒
Uncertainty Level:	N/A	☒
Key Reporting Risks: N/A Risk Classification: low/ detail calculation was included in PDD. Further Remarks: N/A		

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4 Data Verification (not required for initial verification)

4.1 Internal Review

Description and performance of internal review			
	Description	Comments	Concl.
Procedure	Double check the collection and recording of the daily electricity data and avoid manual error; Exclude the factors affecting the accuracy of data in collaboration with the data reader and the meter supervisor.	The reading of main meter and meters for auxiliary equipment was measured continuously and recorded once per 2 hours by DCS system. Manual record of reading of the meters above was taken 5 times per day. Manual record of reading of backup meter was taken once per month.	☒
Documentation	All documents, including: • Meter recording on DCS system • Manual Records of meters • CD-ROM records of historical data Have been checked and verified on-site	Documents provided by project owner have been reviewed by audit team during on-site visit.	☒
Responsibilities	Mr. Yuan Yafei made the final internal approval of the Monitoring Report.	Monthly summary of electricity and Monitoring report with Mr. Yuan's signature have been reviewed by audit team.	☒
Key Reporting Risks: Risk Classification: low/ the records were double checked by project owner and grid company. Further Remarks:			

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4.2 Usage of default values

Description and performance of internal review			
	Description	Comments and Results	Concl.
Procedure	Emission factor was calculated as below: $EF_y = EF_{OM} \times 0.5 + EF_{BM} \times 0.5$ EF_{OM} and EF_{BM} was calculated according to the official documents which were issued in 2007, calculation process met the requirement of methodology ACM0002, Version 06.	Emission factor was calculated ex-ante and kept unchanged during fixed crediting period.	☒
Documentation	2006 Revised IPCC Guidelines for Default Values China Energy Statistical Yearbook 2003-2005 China Electric Power Yearbook 2003-2005	No further comments.	☒
Responsibilities	As indicated in PDD and Monitoring Report that the value of EF_y will be calculated ex-ante.	No further comments.	☒
Key Reporting Risks: Risk Classification: low/ refer to calculation in PDD. Further Remarks:			

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4.3 Reproducibility

Description and performance of the assessment			
	Description	Comments and Results	Concl.
Procedure	Values in the calculation tool have been cross-checked with the meter readings from the project owner.	Spot check indicated that results are acceptable.	☒
Key Reporting Risks: Risk Classification: Low/ readings were double checked and values were compared by calculation and invoices. Further Remarks:			

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4.4 Peculiarities

Description of Peculiarities and unexpected Daily Events during the verification period			
	Description	Comments and Results	Concl.
Performance	Monitoring results analysis: Compared the total amounts of generation and consumption in table with that in Annex 4 in PDD, audit team found that: 1. EGgen in the MR is more than that in PDD. 2. EGaux in the MR is less than that in PDD. 3. Exception of EGaux4: value in MR is more than that in PDD. 4. Some values in EGaux2 and EGaux3 are extremely low.	Clarification from client: 1. Accumulated operation hour from Production Summary () is 8748h, 8728h and 8685h in 2006, 2007, 2008 respectively, they are more than 7848h in PDD. Instantaneous output of generator during spot checked by audit team was 47.55MW. 2. Operating power of auxiliary equipments from Equipment Operation Daily Sheet is lower than the rated power in PDD. Though operation hour is more than that in PDD, the production of operation power and hour is still lower than that in Annex 4. 3. According to Electric Wiring Diagram, pump for desalted water was not contained within EGaux4 equipments in Annex 4 in PDD. 4. In Annex 4 in PDD, feed water pump A (EGaux2) is backed-up with feed water pump B (EGaux3), so	☒

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		the amount is lower.	
Documentation	Electricity generation and consumption have been confirmed with documents provided by project owner.		☒
Measures	Electricity measured by grid company and project owner was in consistent with each other.		☒
Key Reporting Risks: Risk Classification: low/ Question of data difference in PDD and Monitoring Report has been raised by audit team and clarification from project owner was provided and after calculation, the results were treated as acceptable. Further Remarks:			

4.5 Reliability and Plausibility

Description of crosschecks and plausibility checks			
	Description	Comments and Results	Concl.
Performance	All data in the calculation are plausible. A cross-check was done with the Meter reading by the Project Owner and the Grid Company. No material inconsistencies appeared.	Results are acceptable.	☒
Key Reporting Risks: Risk Classification: low/the data was crosschecked by 2 independent entities and supported by invoices. Further Remarks:			

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4.6 Completeness and Correctness

Description of completeness and correctness			
	Description	Comments and Results	Concl.
Correctness	All data that has been provided was cross-checked. No material inconsistencies occurred.	See CR1	☒
Completeness	Data covering this monitoring period (28/03/2006 – 18/12/2008) has been provided. There were no gaps in data reporting.	See CAR1.	☒
Further Remarks:			

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5 Additional requirements (not required for initial verification)

Description of additional requirements to be checked			
	Description	Comments and Results	Concl.
	<u>Corrective Action Request 3:</u> 1. Please include main meter and backup meter in Figure 1 in Monitoring Report. 2. Please change the “stand-by” meter to “back up” meter to keep consistent with Monitoring Plan. 3. Please specify “source of data to be used” in EGgen table in details. 4. EGaux table, Description of measurement, “electricity meter is used to measure electricity generated” should be “consumed”. 5. Clause 4.5, parameter table, EFelectricity,y, “is the baseline emission during the year in tCO2” should be “baseline emission factor ex-ante in tCO2/MWh”. Clause 5.1.3, “they form 4 teams and operate the cogeneration”. Please correct it as it is not cogeneration project. <u>Clarification Request 2:</u> Clause 5.1.3 (1) HRS operating team: Please clarify what variable is measured by flow meter.		☑
Key Reporting Risks: Risk Classification: low/ Further Remarks:			

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6 Data Reporting (not required for initial verification)

Description of the Monitoring Report		
	Comments and Results	Concl.
Compliance with UNFCCC regulations	The verification period is 28 March, 2006 to 18 Dec, 2008. Also it is compliance with VCS regulations.	☒
Completeness and Transparency	Data were provided in Monitoring Report completely and transparently. They are also verified by audit team on site.	☒
Correctness	As verified, the values provide are correctly transferred in the calculation process.	☒
Key Reporting Risks: Risk Classification: low/data in report has been crosschecked internally and also by audit team. Further Remarks:		

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7 Compilation and Resolutions of CARs, CRs and FARs

Corrective Action Requests by audit team	Summary of project owner response	Audit conclusion team
<u>Corrective Action Request 1:</u> Please indicate whether it is the first verification or second at the cover page of the MR.	It is the first verification of the project activity, and it was indicated at the cover page of the MR.	It has been revised in cover page.
<u>Corrective Action Request 2:</u> 1. As it is indicated in Clause 5.2.1 Project start date in VCS2007, "The earliest credit start date under the VCS 2007 shall be 28 March 2006." Please correct the credit start date in Monitoring Report. 2. Please also correct the amounts of VCUs accordingly.	The credit start date has been revised from 28 March 2006 in the MR. and the amounts of VCUs have been revised consequently.	Credit starting date has been corrected and amounts of VCUs revised accordingly in Monitoring Report.
<u>Corrective Action Request 3:</u> 1. Please include main meter and backup meter in Figure 1 in Monitoring Report. 2. Please change the "stand-by" meter to "back up" meter to keep consistent with Monitoring Plan. 3. Please specify "source of data to be used" in EGgen table in details. 4. EGaux table, description of measurement, "electricity meter is used to measure electricity generated" should be "consumed". 5. Clause 4.5, parameter table, EFelectric-	1.The main meter and back up meter has been added in Figure 1 in MR. 2.The "stand-by" meter has been changed to the "back up" meter in MR 3.Source of EGgen is Electronic record on DCS 4."Electricity meter is used to measure electricity consumed " has been revised in MR 5. EFelectricity,y, "is the baseline emission factor ex-ante in tCO2/MWh ".has been revised in MR 6. "they form 4 teams and operate the genera-	1. Two meters have been added in Figure 1 in revised MR. 2. Name of backup meter has been changed. 3. It has been revised in the EGgen table. 4. It has been corrected in EGaux table. 5. Explanation of EFelectricity has been corrected. 6. Clause 5.1.3: typo error has been corrected.

Checklist is applicable to registered CDM – Project Activity No.: 1685

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Corrective Action Requests by audit team	Summary of project owner response	Audit conclusion team
ity,y, "is the baseline emission during the year in tCO ₂ " should be "baseline emission factor ex-ante in tCO ₂ /MWh ". 6. Clause 5.1.3, "they form 4 teams and operate the cogeneration ". Please correct it as it is not cogeneration project.	tion".has been revised in MR.	
Corrective Action Request 4: Please clarify why the claimed, VCUs is more than the estimated in the PDD?	The actual electricity generated is more than the estimated in the PDD in 2006 and 2007, but the actual electricity generated is less than the estimated in the PDD in 2008. The actual electricity generated is determined by the actual operating hour and the actual operating power load. The actual operating hour can be confirmed by the Production Summary for 2006, 2007 and 2008, and it is calculated based on the Daily Production Sheet of the project activity. The operation rate is 99.86%, 99.64% and 99.15% in 2006, 2007 and 2008 respectively (noted in the Production Summary). On the site verification, the project auditor of the DOE had done a sampling check of the Daily Production Sheet. Moreover, the electricity generated by the project activity is also determined by the sulphuric acid production, and the sulphuric acid production is determined by the market demand. If the market demand is stable, the sulphuric	Yearly Production Summary (IRL-19) was provided in English as evidence of operation hours in 3 years. Operating hour was calculated as 8760h/year multiplied by operating rate. Daily Operation sheet of auxiliary equipments (IRL-25) were evidence of operating hour and operating parameters which have been spot checked during on-site audit. Accumulated operation hour from Production Summary (IRL 19) is 8748h, 8728h and 8685h in 2006, 2007, 2008 respectively, they are more than 7848h in PDD. Instantaneous output of generator spot checked by audit team is 47.55MW. so the yearly electricity generation which was product of operation hour and power of generator is more than that indicated in PDD. As the operation hour in PDD (7848h) was calculated assuming generator has full load

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Corrective Action Requests by audit team	Summary of project owner response	Audit conclusion team
	acid production will be stable accordingly, and electricity generated will be stable accordingly, and the ER will be stable too. Above all cause the actual VCUs in the MR more or less than the estimated in the PDD. In addition, the biggest difference of the VCUs in the MR and in the PDD is about 8.76% (in year 2007) of the estimated VCUs in the PDD, however smallest difference of the VCUs in the MR and in the PDD is about -7.04% (in year 2008) of the estimated VCUs in the PDD. And we analyze the change of VCUs is possible and suitable.	50MW, it was divided by expected electricity generation. But actually the output of generator is from 42-47MW, and never reach the full load, after it was divided by the same amount of electricity generation, the operation hour would be higher than that in PDD. Another reason from project owner is the main equipment was imported from Siemens company and newly installed, till now there is no periodic maintenance, so operation hour is comparably higher.
Corrective Action Request 5: Please also check the PDD. In PDD (Page no 11), the mentioned power is lesser than in the excel sheet, why?	The EGgen given in the excel sheet is monitored by the main electricity meter and recorded automatically by DCS, and the starting time and ending time of the DCS automatic record is fixed monthly. However the EGgen mentioned in the PDD (page no 11) is monitored by the backup electricity meter recorded in hand by Zhang jiagang Grid company, and the starting time and ending time of the hand record is not fixed monthly. And it is impossible for them to record the electricity data at the same time. So we analyze that the error is caused by the different record time. The difference of the EGgen given in the excel	After analysis of the data, main reason of electricity difference is difference of recording time. Data error is about one day amount of electricity per year. Response from client is reasonable.

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Corrective Action Requests by audit team	Summary of project owner response	Audit conclusion team
	sheet and the EGgen mentioned in the PDD (page no 11) is 1321MWh, 7.6MWh and 873.2MWh respectively, and the difference is about 0.3% of the annual electricity generated or lower. Furthermore, the daily electricity generated is about 1200MWh in a rated power, and the actual daily electricity generated is 1141MWh generally. It is concluded that the variation of the EGgen given in the excel sheet and the EGgen mentioned in the PDD is only about a day's electricity generated, and the error is in allowed limits within a year.	

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Clarification Requests by audit team	Summary of project owner response	Audit conclusion team
Clarification Request 1: As the backup meter was installed in 10/2006, please clarify data source before Oct. 2006?	Firstly, the electricity generated is monitored by the main electricity meter, which is calibrated by the Suzhou Institute of Measurement and Testing Technology every year and the electricity generated is recorded by the DCS automatically. Therefore, the data of the main meter is in quality assurance. If the main meter is out of work, the data in the malfunction period is measured by backup meter, which is used to calculate the VCUs. Secondly, the electricity generated is also monitored by the backup meter, which is installed and sealed by Zhangjiagang Power Supply Company, and it serves as a cross-check of the accuracy. If the backup meter is out of work, a new meter will be replaced it. Thirdly, if erroneous measurements take place, or there is no data can be used for cross-checking, the electricity generated will be replaced by the lowest value, which is for conservative. Since there is only 28 days in February in 2006, and the actual electricity generated in Feb. 2006 is 25785.48MWh, which is the smallest value before Oct. 2006. So the elec-	The data recording and archiving process is consistent with that in PDD. The records of main meter before 10/2006 in electronic and paper copy have been reviewed during on site audit, DCS automatic recording system was also witnessed and in normal working situation, yearly calibration certificates of main meter have been checked and provided to audit team. So the electricity record of main meter during 01/2006-10/2006 is authentic.

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Clarification Requests by audit team	Summary of project owner response	Audit conclusion team
	tricity generated in Feb. 2006 will replace the actual electricity generated in each month before Oct. 2006, and it is conservative. The VCUs has been updated in the MR accordingly.	
Clarification Request 2: Clause 5.1.3 (1) HRS operating team: Please clarify what variable is measured by flow meter.	According to ACM0004, there is no need to monitor the waste heat the project activity used, so this clause has been deleted in the revised MR.	It has been revised in updated MR.
Clarification Request 3: Please clarify the reason of higher operating hour than predicted in PDD? Please refer to protocol 4.4 peculiarities.	The operating hour mentioned in the protocol (4.4 peculiarities) 8748, 8728 and 8685 (for 2006, 2007 and 2008) is comes from the Production Summary for 2006, 2007 and 2008 (see Annex 1 Production Summary). And it is calculated value based on the Daily Production Sheet of the project activity. The operation rate is 99.86%, 99.64% and 99.15% in 2006, 2007 and 2008 respectively. On the site verification, the project auditor had done a sampling check of the Daily Production Sheet. The project owner can scan a part of Daily Production Sheet to the DOE if necessary.	It was checked by audit team during on-site audit. Furthermore, Pp has also provided the evidences to audit team.
Forward Action Requests by audit team	Summary of project owner response	Audit conclusion team
Forward Action Request 1:	N/A	N/A

Annex 2:
Information Reference List

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Ref. No.	Issuance and/or submission date	Title/Type of Document	Author/Editor/ Issuer	Additional Information (Relevance in CDM Context)
1.	11/11/2008	PDD "Zhang Jiagang waste heat recovery from sulphuric acid production for electricity generation project", version 05	Shanghai Yangtze Delta Investment Consulting Co., Ltd.	PDD for Registration
2.	03/03/2006	ACM0004 "Consolidated baseline methodology for waste gas and/or heat and/or pressure for power generation", Version 02,	UNFCCC	Sectoral Scope 1 & 4
3.		Validation report details	DNV	
4.	02/03/2009	Participant list of on-site interviews	TÜV SÜD	
5.	02/03/2009	On-site interviews conducted by TÜV SÜD. Verification Team: Sun Baoqi Jiangsu TÜV Product Service, Wuxi Branch Interviewed Persons: Mr. Yuan Yafei Twolions (Zhang Jiagang) Fine Chemicals Co., Ltd Mr. Yuan Dong Twolions (Zhang Jiagang) Fine Chemicals Co., Ltd Mr. Hua Huidong Twolions (Zhang Jiagang) Fine Chemicals Co., Ltd Mr. Chen Ziling Twolions (Zhang Jiagang) Fine Chemicals Co., Ltd Mr. Tao Kanghua Shanghai Yangtze Delta Investment Consulting Co., Ltd Mr. Ni Jun Shanghai Yangtze Delta Investment Consulting Co., Ltd Mr. Gu Yu Shanghai Yangtze Delta Investment Consulting Co., Ltd Mr. Li Lu Shanghai Yangtze Delta Investment Consulting Co., Ltd Mr. Gu Jiujun China Carbon N.V.	TÜV SÜD	
6.	07/08/2003	Approval of Feasibility Study Report	Free Trade Zone Management	

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Ref. No.	Issuance and/or submission date	Title/Type of Document	Author/Editor/ Issuer	Additional Information (Relevance in CDM Context)
			Commission, Zhang Jiagang City, Jiangsu province	
7.	02/11/2004	Approval of EIA	Environment Protection Bureau, Jiangsu province	
8.	14/12/2006	Letter of Approval	National Development and Reform Commission of China	
9.	01/2005	Agreement of Grid connection and power supply	Twolions (Zhang Jiagang) Fine Chemicals Co., Ltd & Jiangsu province power supply company	
10.	08/2006	CDM project manual	Twolions (Zhang Jiagang) Fine Chemicals Co., Ltd	
11.	25/04/2006	ISO 9001: Quality system manual	Twolions (Zhang Jiagang) Fine Chemicals Co., Ltd	
12.	18/08/2006	CDM training plan	Shanghai Yangtze Delta Investment Consulting Co., Ltd	
13.	11/2006	Records of boiler and generator operation training	Twolions (Zhang Jiagang) Fine Chemicals Co., Ltd	
14.	10/2008-09/2011	Certificate of operation post	Twolions (Zhang	

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Ref. No.	Issuance and/or submission date	Title/Type of Document	Author/Editor/ Issuer	Additional Information (Relevance in CDM Context)
			Jiagang) Fine Chemicals Co., Ltd	
15.	20/03/2008	Calibration certificate of meter	Suzhou Institute of Measurement and Testing Technology	
16.	30/06/2008	Certificate of Metrological Authorization for Suzhou Institute of Measurement and Testing Technology	Bureau of Quality, Technology Supervision, Jiangsu province	
17.	19/06/2003	Business license of Twolions (Zhang Jiagang) Fine Chemicals Co., Ltd.	Jiangsu province Industrial and Commercial Bureau	
18.	07/2006	Data management and emergency disposal program of CDM project	Twolions (Zhang Jiagang) Fine Chemicals Co., Ltd	
19.		Monthly summary sheet of Electricity	Twolions (Zhang Jiagang) Fine Chemicals Co., Ltd	
20.		Yearly production summary of sulphuric acid production line	Twolions (Zhang Jiagang) Fine Chemicals Co., Ltd	
21.	03/03/2009	Daily segment summary sheet of electricity in paper version	Twolions (Zhang Jiagang) Fine Chemicals Co., Ltd	
22.	03/03/2009	Daily segment summary sheet of electricity in electronic version	Twolions (Zhang Jiagang) Fine Chemicals Co., Ltd	
23.	18/10/2004	Test report for transformer	Nantong Youbang	

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Ref. No.	Issuance and/or submission date	Title/Type of Document	Author/Editor/ Issuer	Additional Information (Relevance in CDM Context)
			transformer Co., Ltd	
24.	02/03/2009	Confirmation of Carbon credit ownership	Twolions (Zhang Jiagang) Fine Chemicals Co., Ltd	
25.	02/03/2009	Electric wire diagram	Twolions (Zhang Jiagang) Fine Chemicals Co., Ltd	
26.	02/03/2009	Daily operation sheet of auxiliary equipments	Twolions (Zhang Jiagang) Fine Chemicals Co., Ltd	
27.	02/03/2009	Technical specification of waste heat boiler	Monsanto Enviro-chem System Co., Ltd	
28.	02/03/2009	Technical specification of steam turbine	Siemens AG	
29.	02/03/2009	Technical specification of generator	Siemens AG	
30.	02/03/2009	Electricity Invoices of back up meter	Zhang Jiagang power supply company	