

Monitoring Report

Baotou Iron & Steel Coke Dry Quenching #3 and Waste Heat Utilization for Electricity Generation Project

UNFCCC Reference Number: 1668

CER Monitoring Period:

Start Date: 15/01/2009

End Date: 28/10/2009

Version 1

Date of Report: 14/11/2009

CONTENTS

- A. General Project Activity Information
- B. Key Monitoring Activities
- C. Quality Assurance and Quality Control Measures
- D. Calculation of GHG Emission Reductions

SECTION A. General Project Activity Information

A.1. Title of the project activity:

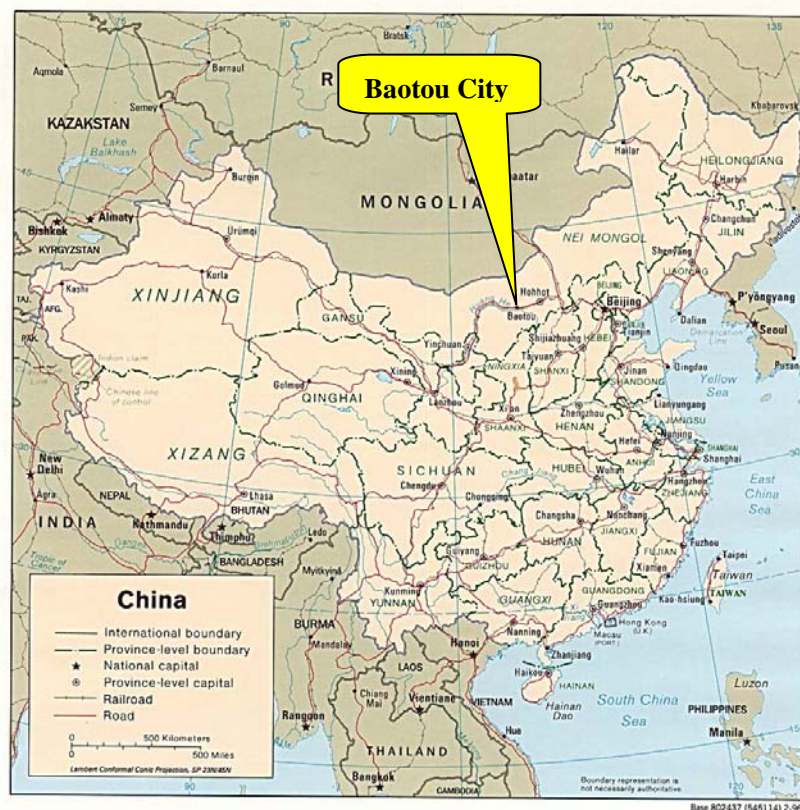
Baotou Iron & Steel Coke Dry Quenching #3 and Waste Heat Utilization for Electricity Generation Project.

A.2. Project Category

Sectoral Scope 1, Energy Industries

A.3. Geographic Location

The project is located in the coke plant of Baotou Iron & Steel Group Co., Ltd. (BISCO), at 109°44' 36"E, 40°51' 58"E. BISCO is in the western Kundulun River Industry Park, with Bao-Lan Railroad to the south, Bao-Bai Railroad to the west, Bao-Lan Road to the north, and Song-Zhao Road to the east. The geographic location of the project is shown below.



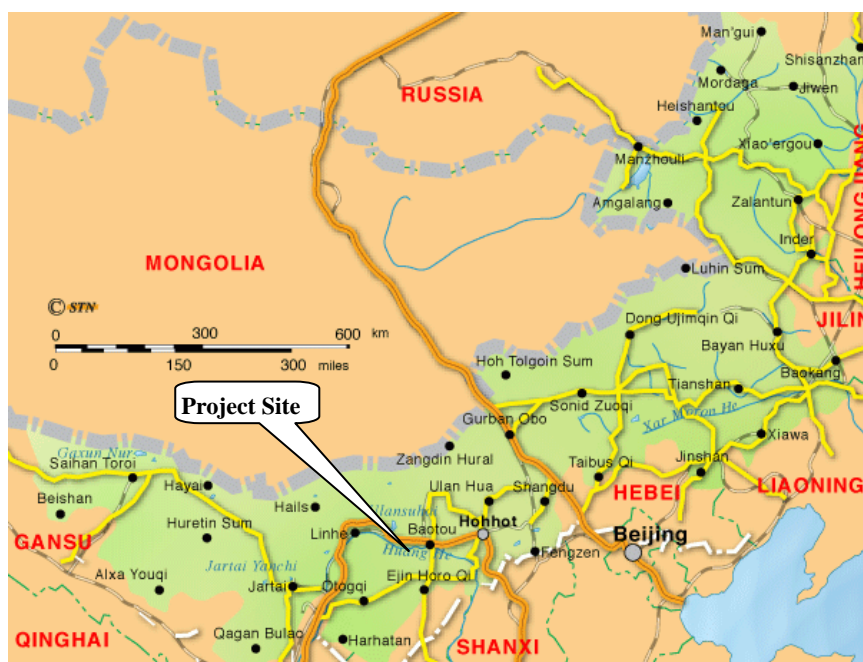


Figure 1: Location of the project

A.4. Description of the project activity

BISCO built one set of coke dry quenching (CDQ) system on coke ovens numbers 9 and 10 and install a set of coke wet quenching process (CWQ) system. The CWQ is constructed as a backup. The CDQ systems recover waste heat from red-hot coke and utilize the sensible heat for electricity generation. The electricity is used to meet the company’s power demand, displacing the electricity mainly purchased by BISCO from the North China Power Grid.

Table 1: The project schedule and related information

CDQ No.	Coke oven No.	Coke oven start date	Coke oven scale	CDQ capacity	Waste heat boiler	Turbine Generator	CDQ starting date of construction	CDQ starting date of commissioning
NO.3	9	2006-3-23	2×50room, height 6m	125t/h	70t/h	15MW	2007-3	2007-11
	10	2006-3-23						

The project adopts Japan Nippon Steel Corporation CDQ technology, which uses inert gas to reclaim sensible heat from the coke quenching process. In the steam-water heat exchanging process, steam is produced in the CDQ boiler, and then enters the turbine for electricity generation. The electricity generated by the project activity replaces the equivalent amount of electricity from the North China Power Grid, and reduces the GHG emissions from the coal-dominated North China Power Grid. In accordance with ACM0004, the ex-ante estimated emission reductions from this project are 84,278 tCO₂e per year.

The project, which recovers waste heat from red-hot coke and then uses the heat for electricity generation, has significant environmental and social benefits. It contributes to sustainable development as follows.

- ✧ The project reduces the waste of energy resources and promotes energy conservation.
- ✧ Electricity generated by this project displaces coal-fired power generation in the North China Power Grid, reducing the environmental pollution generated from burning coal.
- ✧ The project significantly reduces dust from the existing CWQ facility.
- ✧ The project creates 44 employment opportunities for the local community during the construction and operation of the project.

A.5. Project Boundary

The table below illustrates which emission sources and GHG are included in the project boundary:

Table 2: The emission sources and GHG in the project boundary

	Source	Gas	Included?	Justification / Explanation
Baseline	The North China Power Grid	CO ₂	Y	Main emission source
		CH ₄	N	Excluded for simplification. This is conservative
		N ₂ O	N	Excluded for simplification. This is conservative
	Captive Power Plants	CO ₂	N	Not captive electricity will be involved in the baseline scenario
		CH ₄	N	Not captive electricity will be involved in the baseline scenario
		N ₂ O	N	Not captive electricity will be involved in the baseline scenario
Project Activity	Fuel consumption to produce steam for CDQ startup	CO ₂	Y	Main emission source
		CH ₄	N	Excluded for simplification
		N ₂ O	N	Excluded for simplification
	Coke gas firing for CDQ startup	CO ₂	Y	Main emission source
		CH ₄	N	Excluded for simplification
		N ₂ O	N	Excluded for simplification

The project boundary is the project activity, and the spatial extent of the baseline boundary comprises the waste heat sources, CDQ waste heat recovery for electricity generation plant, the equipments used to provide auxiliary heat to the waste heat recovery process, and the power plants connected physically to the electricity grid that the project activity affects.

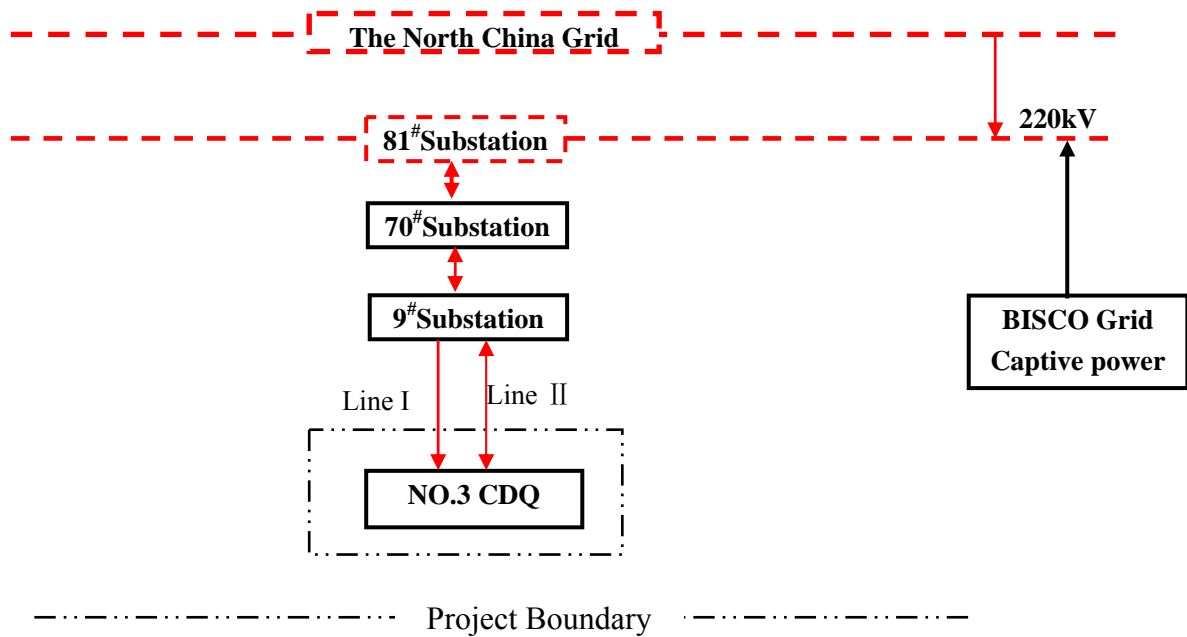


Figure 2: Diagram of the project boundary

A.6. Project Start Date

The construction of the project started from 01/03/2007.

Crediting period: 15/01/2009 – 14/01/2019 (Fixed)

A.7. Current Monitoring Period

15/01/2009 0:00 – 28/10/2009 9:00

A.8. Methodology applied to the project activity for the current period:

A.8.1. Baseline methodology:

The project activity uses the approved CDM baseline methodology ACM0004 titled “Consolidated baseline methodology for waste gas and/or heat and/or pressure for power generation” (Version 2) for establishment of the basis for calculating the baseline emissions and project additionality.

A.8.2. Monitoring methodology:

The project has implemented a monitoring methodology developed in compliance with ACM0004 - “Consolidated monitoring methodology for waste gas and/or heat and/or pressure for power generation” for monitoring of CERs. The methodology requires monitoring of the following:

- The amount of steam for CDQ startup;
- The pressure of steam for CDQ startup;
- The temperature of steam for CDQ startup;
- The amount of coke oven gas for CDQ startup;

- The net calorific value of coke oven gas for CDQ startup;
- Gross electricity generation by the project activity;
- Electricity consumption of auxiliary equipment;

The monitoring meters installation site program is as follows:

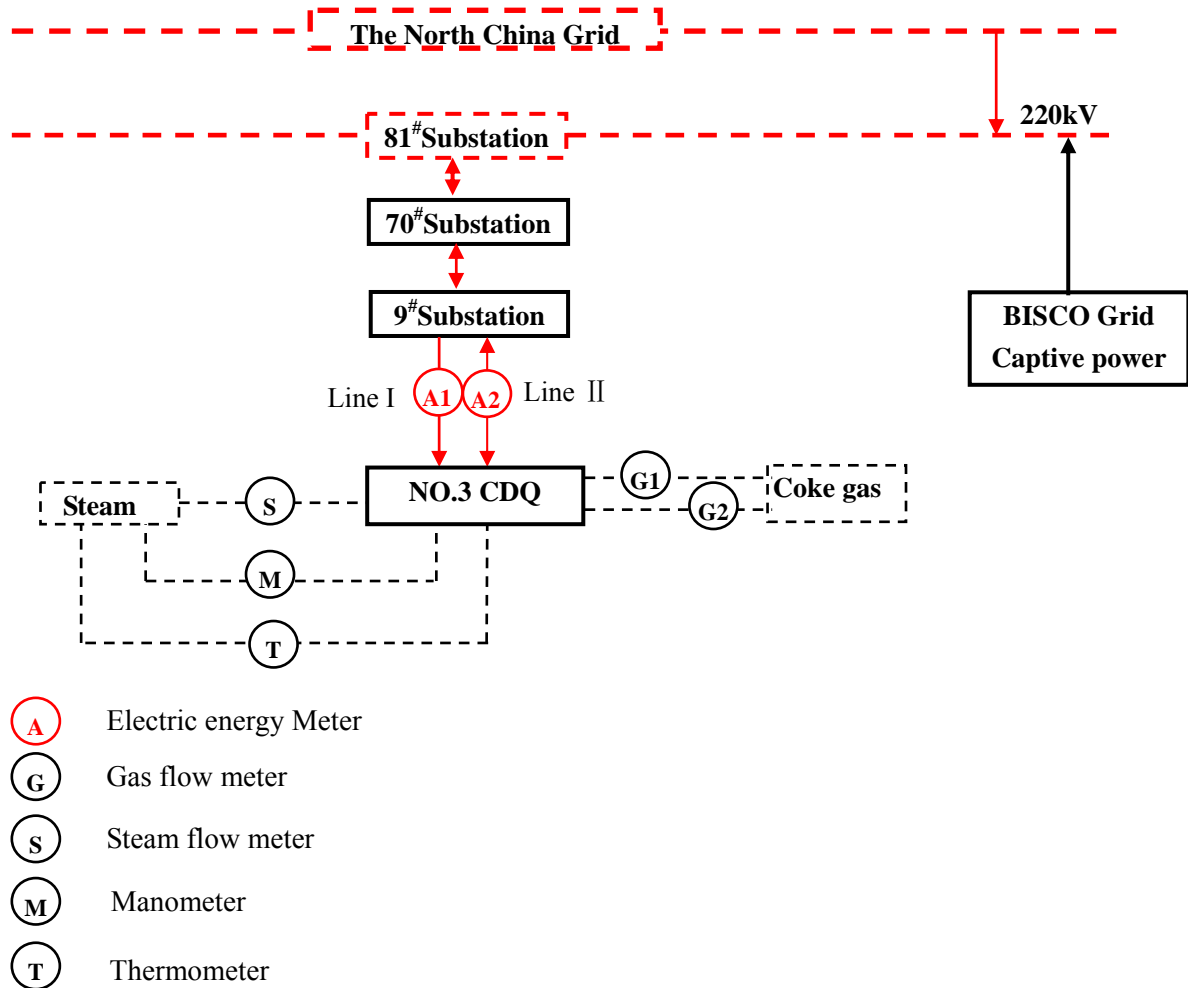


Figure 3: Diagram of monitoring points

Gross electricity generation and consumption by the project activity;

Gross electricity generated by the project activity is measured using one electric energy meter (electric energy meters A2), and the electricity consumption of auxiliary equipment is measured using two electric energy meters (electric energy meter A1 and A2). A2 is bidirectional electric energy meters. The electricity data is read hourly and recorded as the monthly report.

The amount of steam and COG for CDQ drying

According to the CDQ operation situation, the CDQ systems need to be maintained. Drying of COG oven takes place after regular maintenance of the CDQ oven. The amount of steam used for CDQ drying is measured using steam flow meter S, and the amount of COG used for

CDQ drying is measured using COG flow meter G. The steam and COG data is read hourly.

A.9. Calculation Methodology

The amount of CERs that is generated is calculated based on the fundamental CDM equation:

$$\underline{Emission\ reductions\ (ER) = Baseline\ Emissions\ (BE) - Project\ Emissions\ (PE) - Leakage\ (L)}$$

The project specific elements of the equation are described below.

Project Emissions

Project emissions are only applicable if auxiliary fuels are fired for generation startup, or in emergencies to provide additional heat before entering the Waste Heat Recovery Boiler. The steam and coke oven gas are required for CDQ drying.

According to ACM0004, steam and coke oven gas are defined as project emissions, which are given as:

$$PE_y = \sum_i Q_i \times NCV_i \times EF_i \times \frac{44}{12} \times OXID_i$$

Where:

PE_y : Project emissions in year y (tCO₂);

Q_i : Mass or volume unit of fuel i consumed (t or m³);

NCV_i : Net calorific value per mass or volume unit of fuel i (TJ/t or m³);

EF_i : Carbon emissions factor per unit of energy of the fuel i (tC/TJ);

$OXID_i$: Oxidation factor of the fuel i (%)

Baseline Emissions

Baseline emissions are given as:

$$BE_{electricity,y} = EG_y \times EF_{electricity,y}$$

Where:

EG_y : Net quantity of electricity supplied to the manufacturing facility by the project during the year y (MWh),

$EF_{electricity,y}$: CO₂ baseline emission factor for the electricity displaced due to the project activity during the year y (tCO₂/MWh),

Leakage

No leakage is considered, according to ACM0004.

Emission Reduction

The emission reduction ER_y by the project activity during a given year y is the difference between the baseline emissions through substitution of electricity generation with fossil fuels ($BE_{electricity,y}$) and project emissions (PE_y), as follows:

$$ER_y = BE_{electricity,y} - PE_y$$

Where:

ER_y is the emissions reductions of the project activity during the year y (tCO₂);

$BE_{electricity,y}$ is the baseline emissions due to displacement of electricity during the year y (tCO₂);

PE_y are the project emissions during the year y (tCO₂).

A.10. Project Additionality

Refer to section B.3. in the PDD of Baotou Iron & Steel Coke Dry Quenching #3 and Waste Heat Utilization for Electricity Generation Project.

A.11. Person(s) responsible for the preparation and submission of the monitoring report

Responsible entity:

Carbon Finance Unit

The World Bank

1818 H. Street, NW

Washington, DC 20433

USA

Email: IBRD-carbonfinance@worldbank.org

CERI eco Technology Co., Ltd

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E-mail: xingfangfang@ceri.com.cn

CERI eco Technology Co., LTD is not project participant.

SECTION B. Key monitoring activities according to the monitoring plan for the monitoring period

B.1. Parameters Monitored

Table 3: Parameters Monitored (PDD Version)

ID Number	Data Type	Monitoring Meter	Data Unit	Measured(m) Calculated(c) or estimated (e)	Recording Frequency	Cross-checking Frequency	How will the data be archived	Comment
E1+E2	Auxiliary electricity consumption	A1 and A2	$\times 10^4$ kwh	m	Hourly reading	Yearly	Paper	
E2'	Gross electricity generation	A2	$\times 10^4$ kwh	m	Hourly reading	Yearly	Paper	
S	The amount of steam for No.3 CDQ start up	S	T	m	When the CDQ startup needed	Yearly	Paper	
G	The amount of coke oven gas for No.3 CDQ start up	G1 and G2	m ³	m	When the CDQ startup needed	Yearly	Paper	
enthalpy	The pressure of steam for No.3 CDQ start up	M	MPa	m	When the CDQ startup needed	Yearly	Paper	
	The temperature of steam for No.3 CDQ start up	T	°C		When the CDQ startup needed	Yearly	Paper	

B.2. Data Collection (accumulated data for the whole monitoring period):**B.2.1. Fixed Values and Variables**

Table 4: List of Fixed Default Values

Parameter	Description	Value	Data unit	Source of data used
EF_y	Baseline Emission Factor	1.0300	tCO ₂ /MWh	Calculated (see CDM PDD)
$EF_{\text{coke oven gas}}$	CO ₂ emissions factor of coke oven gas	44,400	kgCO ₂ /TJ	2006 IPCC Guidelines for National Greenhouse Gas Inventories
$OXID_{\text{coke oven gas}}$	Oxidation factor of coke oven gas	100	%	2006 IPCC Guidelines for National Greenhouse Gas Inventories
$OXID_{\text{BF gas}}$	Oxidation factor of BF gas	100	%	2006 IPCC Guidelines for National Greenhouse Gas Inventories
η_{boiler}	The minimum heat efficiency of the boiler	70	%	The National Standard for Boiler Efficiency (GB/T 17954) stipulated that fossil fuel-burning boiler with capacity of over 2.8MW has minimum heat efficiency of 70% (GB-T17954 National Standard for Boiler Efficiency. Table 1, minimum thermal efficiency of boilers). BISCO's boilers have capacity of 130t/hour and 90MW. 70% is very conservative estimate of the actual boiler efficiency.

B.2.2. Data concerning GHG emissions by sources of the project activity

From the registration date 15/01/2009 to 28/10/2009, there is no maintenance of 3# CDQ oven.

B.2.3. Data concerning GHG emissions by sources of the baseline:

Table 5: Net Electricity Generation of 3#CDQ (Unit: kWh)

Date	Generation (E2')	Consumption		Net Electricity Generation (E _{net,1} = E2'-E2-E1)
		Line I (E1)	Line II (E2)	
15/01/2009 0:00 - 28/01/2009 9:00	3257400	87600	27900	3,141,900
28/01/2009 9:00 - 25/02/2009 9:00	6698400	544800	62700	6,090,900
25/02/2009 9:00 - 28/03/2009 9:00	8740200	288900	23100	8,428,200
28/03/2009 9:00 - 27/04/2009 9:00	8667000	163500	5700	8,497,800
27/04/2009 9:00 - 28/05/2009 9:00	8327100	167100	40200	8,119,800
28/05/2009 9:00 - 27/06/2009 9:00	7827600	166500	9900	7,651,200
27/06/2009 9:00 - 28/07/2009 9:00	6184200	193800	138000	5,852,400
28/07/2009 9:00 - 28/08/2009 9:00	6743700	250800	59700	6,433,200

28/08/2009 9:00 - 27/09/2009 9:00	6400200	168600	91500	6,140,100
27/09/2009 9:00 - 28/10/2009 9:00	8013300	342900	10500	7,659,900
Total	70859100	2374500	469,200	68,015,400

B.2.4. Data concerning leakage

No leakage needs to be considered.

B.2.5. Data processing and archiving

Data will be archived using both electronic and paper records for 2 years following the end of the monitoring period.

SECTION C. Quality assurance and quality control measures

C.1. Allocation of responsibilities

The operational and management structure and the responsibilities of the principals are as follows. Ultimate responsibility for the project rests with Mr. Ning Huidong, the Deputy Director of Production Department. The nominated responsible person for the project is Mr. Du Youlu who will be responsible for monitoring plan implementation.

Table 6: Responsibilities for Monitoring Activities

Activity	Responsible Division	Responsible person
- Overall Management - Preparation of External Reports	Production Department	Ning Huidong Du Youlu Song Wenrong
- On site meter maintenance & calibrations - Meters maintaining Logs - Training in meter reading & error recognition	Measuring Department	Liu Tao Zhang Xiaoxia
- Reading and recording of electricity generation and consumption	Power Supply Plant	Wang Kun Qi Gong
- Reading and recording of steam and COG flow consumed by CDQ oven drying	Coking Plant	Li Xiaoqing
- CDQ Production & maintenance plan	Coking Plant	Lu Peishan

C.2. Meters Calibration

The precision of all the meters used in the monitoring activity meet the national standard, and the accuracy level of the steam flow meter and coke oven gas flow meters is 0.2. The accuracy level of electricity electric energy meter is 0.5. Reading and cross-checking of the meters follows the relevant national rules and standards to ensure the accuracy of the data.

The electric energy meters measuring the electricity consumed and generated by CDQ must be checked once a year, and the flow meters measuring the steam and coke oven gas must be checked once a year. BISCO's Measuring Department is responsible for the meters calibration in accordance with manufacturer's recommendations and sectoral regulation for ensuring reliability of the system. Calibrations are evidenced with certificates of calibration for the relevant meter(s)

issued by The Measuring Department. The Measuring Department is authorized by Inner Mongolia Autonomous Region Quality Technology Supervise Bureau.

From the registration date 15/01/2009 to 28/10/2009, there is no maintenance of 3# CDQ oven. The calibration information of meters listed in the tables below.

Table 7: The calibration information of two Electric energy meters

CDQ No.	Electric energy meters No.	Model	Manufacturer	Accuracy level	Calibration Date	Expiration Date
3#	A1	DSSD51	Kaili Appli-cance	0.5	06/08/2008	05/08/2009
		DTSD178	Weisidun Appli-cance	0.5	03/04/2009	02/04/2011
	A2	DSSD51	Kaili Appli-cance	0.5	06/08/2008	05/08/2009
		DTSD178	Weisidun Appli-cance	0.5	03/04/2009	02/04/2011

Note: The electric energy meters of A1 and A2 were replaced at the same metering locations in May 2009 due to the malfunction of the old ones. The malfunction was detected within the same day as per the operational records shown to the DOE. The new model of the electric energy meters A1 and A2 are DTSD178 with same accuracy level of 0.5.

Table 8: The calibration information of three steam meters

CDQ No.	Electric energy meters No.	Model	Manufacturer	Accuracy level	Calibration Date	Expiration Date
3#	S	V15712-HD1 A1C7E	Shanghai Wei-ertai	0.2	09/01/2009	08/01/2010
	M	2020TG	Shanghai Wei-ertai	0.2	09/01/2009	08/01/2010
	T	WZPK2-348	Shanghai Wei-ertai	0.2	09/01/2009	08/01/2010

Table 9: The calibration information of two COG flow meters

CDQ No.	Electric energy meters No.	Model	Manufacturer	Accuracy level	Calibration Date	Expiration Date
3#	G1	V15712-HB1 A1C7D	Shanghai Wei-ertai	0.2	09/01/2009	08/01/2010
	G2	V15712-HB1 A1C7D	Shanghai Wei-ertai	0.2	09/01/2009	08/01/2010

C.3. Monitoring Staff Training

The Production Department of BISCO takes charge of the training works. Internal training has been made available and followed by monitoring staff to enable them to undertake the tasks. The

training and certification shall be recorded. Initial staff training has been provided before the project starts operating and generating ERs.

C.4. Internal audits and control measures

Internal audits are taken to ensure the veracity and completeness of data. Auditing contents including:

- the statistical results of monitoring data;
- the calibration and verification report of the meters;
- the checkup of monthly-report and daily-report;
- the training of relative staff;
- the maintenance and regular running repairs of equipments.

C.5. Troubleshooting procedures:

In case there are errors found in calibration or during the regular checks of meters, the malfunctioning meter or component is repaired or replaced immediately in accordance with the manufacturer's instructions.

The CDM responsible person and specialists are informed of the error and ensure that the necessary corrective actions are taken to resolve the problem and appropriate steps taken and to re-calibrate the malfunctioning meter at the earliest opportunity. The error is recorded in the internal audit forms giving date and time of error discovery, nature of error and corrective action taken.

SECTION D. Calculation of GHG emission reductions

D.1. Table providing the formulas used:

See section A.9. above.

D.2. Description and consideration of measurement uncertainties and error propagation:

Table 10: Consideration of Measurement Uncertainties

Data	Uncertainty level of data (High/Medium/Low)	Comments
S,G	Low	These data will be required for the calculation of project emissions and will be recorded for subsequent verification as well as plant records.
NCV _{coke oven gas}	Low	The data will be referred published national sources annually
EF _{coke oven gas}	Low	The data is referred “2006 IPCC Guidelines for National Greenhouse Gas Inventories” and will be updated according to IPCC published guidelines.
OXID _{coke oven gas} , OXID _{BF gas}	Low	The data is referred “2006 IPCC Guidelines for National Greenhouse Gas Inventories” and will be updated according to IPCC published guidelines.
E1,E2,E2'	Low	These data will be required for the calculation of project emissions and will be recorded for subsequent verification as well as plant records.
EF _y	Low	This is calculated ex-ante and is based upon published data for the electric power sector from the annual Electric Power Yearbooks.

D.3. GHG emission reductions:

D.3.1 Project Emission

From the registration date 15/01/2009 to 28/10/2009, there is no maintenance of 3# CDQ oven. Therefore, the steam and coke oven gas for startup is zero, and the project emission in current monitoring period is zero.

D.3.2 Baseline Emission

Table 11: The calculation of baseline emission

Electricity Generation (E2')	70,859,100	kWh
Electricity consumed by auxiliary equipment (E1+E2)	2,843,700	kWh
Net electricity supply ($E_{net} = E2' - E1 - E2$)	68,015,400	kWh
Emission Factor (Ex-ante)	1.0300	tCO _{2e} /MWh
Baseline Emission	70,055	tCO _{2e}

D.3.3. Leakage

No leakage needs to be considered (see Section B.2.5.)

D.3.4. Emission Reductions Calculation Table

Table 12: The calculation of emission reduction

	Reference to ACM0004	Units	From 15/01/2009 to 28/10/2009	Sources
Baseline Emission	BEy	tCO ₂ e	70,055	See D.3.2
Total project emission	PEy	tCO ₂ e	0	See D.3.1
Leakage	Ly	tCO ₂ e	0	Fixed in the PDD
Total emission reductions		tCO₂e	70,055	Calculated

Comparison of the actual emission reduction claimed in current monitoring period with the estimated in the registered PDD

As per Section 6.3 in the registered PDD, the project emissions could result from using steam and burning coke oven gas to dry CDQ oven. However, whether the drying process is required each time after annual maintenance depends on the temperature of the CDQ oven. Heating the CDQ oven is not necessarily required if the temperature of the CDQ oven is very high.

The ex-post monitoring record shows that no annual maintenance had been taken place during the first crediting period from January 15th 2009 to October 28 2009 given the fact that the CDQ system has been performing stably and no closedown of CDQ system was required for annual maintenance.

Thus no steam and burning coke oven gas was consumed for CDQ drying process during the reported monitoring period.