CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 03 - in effect as of: 28 July 2006

CONTENTS

Annexes

SECTION A. General description of project activity

A.1 Title of the project activity:

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Title of the project activity is “Shaqu Power Generation Project Using Coal Mine Methane” possessed by Huajin Coking Coal Co., Ltd.

A.2. Description of the project activity:

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The Shaqu Power Generation Project using Coal Mine Methane(CMM) will take place in Shaqu coalmine in Ryulin hsien, Shanxi province, People’s Republic of China. The project area is located 5km away from Ryulin hsien, and 190km to the west of Taiyuan, a capital of Shanxi province。

The proposed project activity aims to capture the CMM currently emitted to the air in order to ensure the safe working environment in Shaqu coalmine and utilize as fuel for power generation. Produced electricity will be supplied to the local power grid. In addition, boiler will be installed to utilize the waste heat energy produced from power generator. The boiler will replace the coal-fired boiler, which has been used to supply heat to household living in the coalmine. The open flare will also be installed to destroy excess CMM.

Shaqu area is a coal-rich field whose total area extends to 135km^2 and the total coal reserve is estimated to be 2252.28million tones. Shaqu coalmine in Shaqu coalfield is currently producing 3million tons of coal per year. According to the project development plan of Huajin Coking Coal Co., Ltd., an owner of Shaqu coalmine, the productivity of the coalmine will ultimately rise to 8million tons per year. As Shaqu is gas-rich coalmine, gas extraction system has been installed in 2004 to ensure the safe working environment in coalmine. This gas extraction system is designed to carry out the extraction of CMM and VAM (Ventilation Air Methane) simultaneously, and discharge into the air for safety reasons prior to the mining activity. Shaqu currently emits about 50million m^3 of gas (as methane gas), however, as the coal production increases in the future, gas emission will also increase. The amount of gas emitted is expected to rise to 65million m^3 by 2010 and ultimately reach 75million m^3. At the moment, all CMM is emitted to the air with no utilization.

The gases utilized for power generation in the proposed project are CMM, which is currently extracted from the coalmine for the purpose of keeping working environment safe and emitted to the air, and VAM, which is circulating in the air of coalmine. CBM (Coal Bed Methane) will not be used in this project. The total capacity of generator is 14,000kW, consisted of twenty generators of 700kW. The boilers that utilize waste heat from generator will not require fossil fuel so that no greenhouse gas will be produced. Four waste heat boilers will be installed. Under normal condition, three boilers will operate and one boiler will be back-up. The maximum amount of heat supply of this boiler system will be 33.12GJ/hour. At the moment, coal-fired boiler supplies heat to households living in the coalmine. The amount of heat needed for household in coalmine is 22.925 GJ/h at the most, and therefore, the waste heat boiler will sufficiently supply the heat required in the coalmine.

A.3. Project participants:

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Name of Party Involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party Involved wishes to be Considered as project Participant (Yes/No)
Huajin Coking Coal Co., Ltd.		

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

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A.4.1.1. Host Party(ies):

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People's Republic of China

A.4.1.2. Region/State/Province etc.:

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Shanxi province

A.4.1.3. City/Town/Community etc:

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Ryulin hsien

A.4.1.4. Detail of physical location, including information allowing the unique identification of this project activity (maximum one page):

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Shaqu coalmine in which the proposed project activity will take place is owned by Huajin Coking Coal Co.,Ltd. Shaqu coalmine is located in Ryulin hsien, Shanxi province and specifically in Qinglongcheng investigation block of Liryu coal mining area, which is approximately 5km away from the local government building of Ryulin hsien in Shanzi province. From Taiyuan, a capital of Shanxi province, Shanqu is located 190km to the west. The project area is located at the coordinates of 37° 08' 53" - 37° 37'28" north latitude and 111° 39'45" - 112° 05'33" longitude. FigureA-1 and figure A-2 shows the geographical location of proposed project area.

Figure A-1 Location of the project area in China

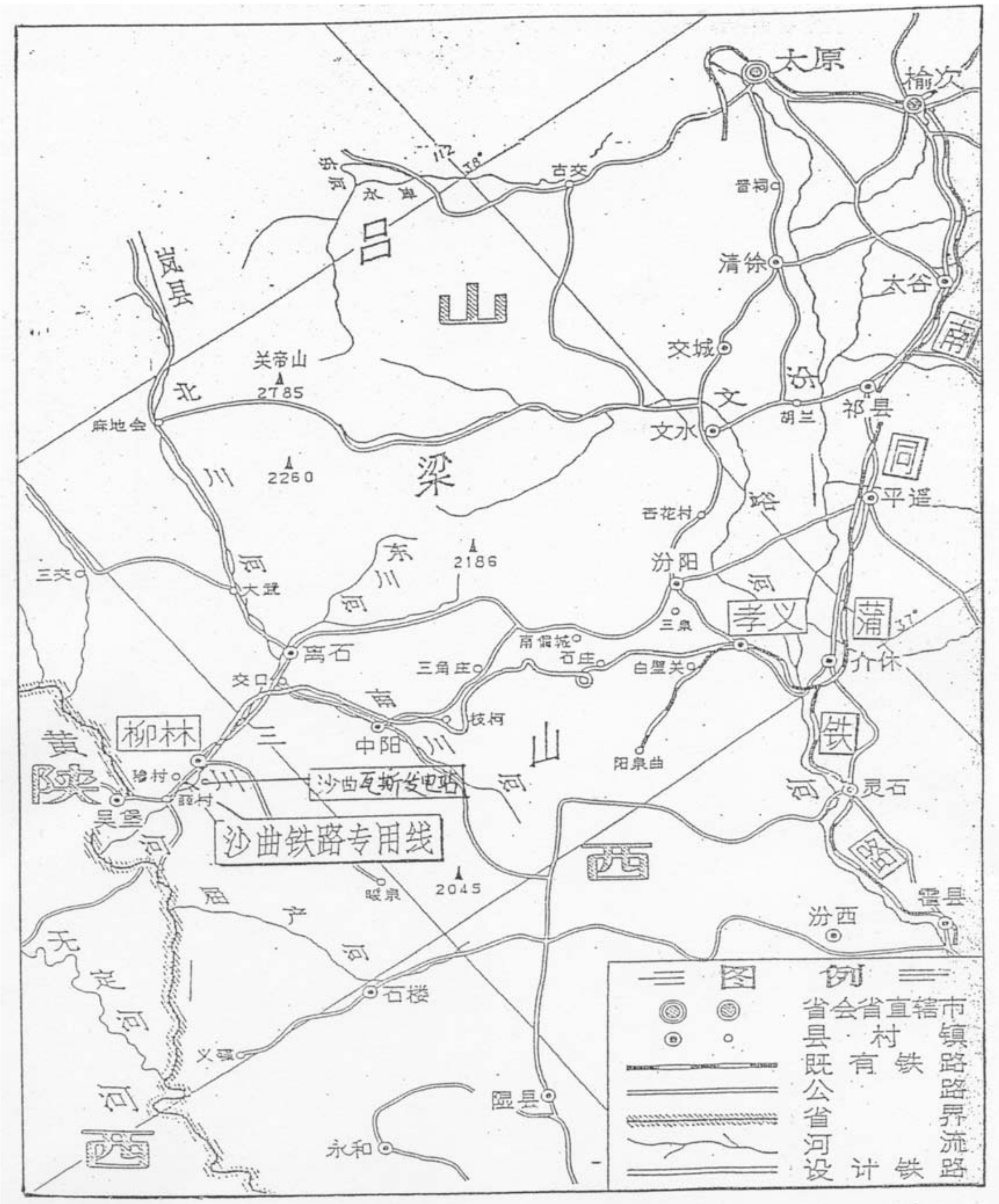

Figure A-2 Location of the Shaqu CMM Power Generating Plant in Shanxi province

A.4.2. Category(ies) of project activity:

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Category 8 : Mining and mineral production and

Category 10 : Fugitive emissions from fuels

The sectoral scopes associated with the proposed activity are Category 8 “Mining and mineral production” and “ Category 10 “Fugitive emissions from fuels”.

A.4.3. Technology to be employed by the project activity:

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CMM(methane) in power generation, ②replacement of grid electricity by supplying electricity to local electricity grid, (thus reducing emissions from regional grid-based power plants which are mostly coal fueled), ③replacement of coal-fired boilers by waste heat boilers that utilizes waste heat from power generation to supply heat to households in coalmine. ④flaring of excess CMM by open flare. The technologies employed in the project are state of the art technologies, which are cost-efficient. The equipments that will be used in the project are as follows :

・Power generator: Installation of 20 domestically produced gas engines of 700kW. Installation of a number of generators with small capacity can make the operation more flexible to adapt to the variable gas flow rate. One unit consists of gas engine with 34% thermal efficiency and the generator with 92% efficiency.

・Waste heat boiler: Installation of 4 boilers that utilizes waste heat produced from the power generator. Under normal condition, three boilers will operate (one boiler for back-up). Under normal operation, the heat supply will be 24.84GJ/h (9.857t/h of steam), so that it is enough to cover the needs of households, living in the coalmine, who require 22.925GJ/h (9.145t/h of steam) of heat at the most.

・Fuel transportation system: the system that transports CMM to the power generators. This system consists of ①gas-clearing device which removes impurities and moisture in CMM, ②gas tank (10,000m3 in capacity) to homogenize the gas quality and regulate the flow rate, and ③two pressure enhancing equipment (one is back-up).

・Excess gas destruction system: installation of one open flare. According to ACM0008 ” Consolidated methodology for coal bed methane and coal mine methane capture and use for power (electrical or motive) and heat and/or destruction by flaring” Version 3, CMM extracted for the proposed project has to be combusted. In addition, “National Coalmine Safety Regulation 2001 version and 2005 version”, in China, provides that CMM with concentration less than 30% cannot be utilized for the power generation. Thus, this flare system will be used when the concentration of CMM become less than 30% and therefore the power generators need to stop their operation, or when excess CMM emission occurs. The maximum combustion rate of the flare is 20,000m3/h (25% CMM).

・Coolant circulation system: a coolant system for power generators.

・Electricity equipment: connection system to supply electricity generated to domestic power supply system in coalmine and local power grid.

A.4.4 Estimated amount of emission reductions over the chosen crediting period:

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A.4.5. Public funding of the project activity:

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No public funding is being used for the proposed project activity.

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the project activity:

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The proposed project activity uses the approved methodology ACM0008 “Consolidated methodology for coal bed methane and coal mine methane capture and use for power (electrical or motive) and heat and/or destruction by flaring” Version 3.

And also the proposed project activity uses the approved methodology ACM0002 “Consolidated methodology for grid-connected electricity generation from renewable sources” Version 6 for the power generation connected to the grid.

B.2 Justification of the choice of the methodology and why it is applicable to the project activity:

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The methodology ACM0008 is applicable to the proposed project activities based on the following reasons:

1. The proposed project activity involves the use of the following extraction activity:

- underground boreholes in the mine to capture pre mining CMM;
- underground boreholes, gas drainage galleries capture techniques, including gas from sealed areas, to capture post mining CMM
- ventilation CMM that would normally be vented

2. The proposed project activity is one of the CMM capture, utilization and destruction project activities, where the baseline is the total atmospheric release of the methane. And also the proposed project activity include the following method to treat the gas captured:

- The methane is captured and destroyed through flaring;
- The methane is captured and destroyed through utilization to produce electricity and thermal energy;
- The remaining methane, to be diluted for safety reason, may still be vented
- All the CMM captured by the project will be used or destroyed and will not be vented

3. The proposed project activity does not have any of the following four features which cannot allow the methodology to apply to the project:

- Operate in open cast mines;
- Capture methane from abandoned/decommissioned coalmines;
- Capture/use of virgin coal-bed methane, e.g. methane of high quality extracted from coal seams independently of any mining activities;
- Use CO2 or any other fluid/gas to enhance CBM drainage before mining takes place

The proposed project activity also use the methodology ACM0002 “Consolidated methodology for grid-connected electricity generation from renewable sources” Version 6 for the part of the power generation connected to the grid of the project, in accordance with the item 7.4.1 "Grid power emission factor" of ACM0008, saying "If the baseline scenario includes grid power supply that would be replaced by the project activity, the Emissions Factor fro displaced electricity is calculated as in ACM0002."

B.3. Description of the sources and gases included in the project boundary

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In accordance with the methodology ACM0008, The special extent of the project activity comprises:

- All equipment installed and used as part of the project activity for the extraction, compression, and storage of CMM at the project site, and transport to an off-site user.
- Flaring, captive power and heat generation facilities installed and used as part of the project activity.
- Power plants connected to the electricity grid, where the project activity exports power to the grid, as per the definition of project electricity system and connected electricity system in ACM0002.

The project boundary of the proposed project activity determined based on the above conditions is shown in Figure B1

Figure B1 The project boundary of the proposed project activity (Under development)

Table B1 shows the description of the emission sources which are included in and excluded from the project boundary for determination of both baseline and project emissions.

Table B1 Overview on emission sources included in or excluded from the project boundary

	Sources	Gas	Included or Excluded	Justification/Explanation
Baseline	Emissions of methane as a result of venting for current mining activities	CH_4	Included	• Main emission source. However, certain sources of methane may not be included, as noted in the applicability conditions. • Recovery of methane from coal seams will be taken into account only when the particular seams are mined through or disturbed by the mining activity. • Recovery of methane from abandoned coalmines will no be included. • The amount of methane to be released depends on the amount used (for local consumption, gas sales, etc.) in the baseline.
	Grid electricity generation (electricity provided to the grid)	CO_2	Included	• Only CO_2 emissions associated to the same quantity of electricity than electricity generated as a result of the use of methane included as baseline emission will be counted. • Use of combined margin method as described in ACM0002 should be used.
		CH_4	Excluded	• Excluded for simplification. This is conservative.
		N_2O	Excluded	• Excluded for simplification. This is conservative.
	Captive power and/or heat, and vehicle fuel use	CO_2	Included	• Only when the baseline scenario involves such usage.
		CH_4	Excluded	• Excluded for simplification. This is conservative.
		N_2O	Excluded	• Excluded for simplification. This is conservative.
Project activity	Emissions of methane as a result of continued venting	CH_4	Excluded	• Only the change in CMM/CBM emissions release will be taken into account, by monitoring the methane used or destroyed by the project activity.
	On-site fuel	CO_2	Included	• If additional equipment such as compressors are

	consumption due to the project activity, including transport of the gas			required on top of what is required fro purely drainage, energy consumption from such equipment should be accounted for.
		CH4	Excluded	• Excluded for simplification. This emission source is assumed to be very small.
		N2O	Excluded	• Excluded for simplification. This emission source is assumed to be very small.
	Emissions from methane destruction	CO2	Included	• From the combustion of methane in a flare, or heat/power generation.
	Emissions from NMHC destruction	CO2	Included	• From the combustion of NMHC in a flare, or heat/power generation, if NMHC accounts for more than 1% by volume of extracted coal mine gas.
	Fugitive emissions of unburned methane	CH4	Included	• Small amount of methane will remain unburned in flares or heat/power generation.
	Fugitive methane emissions from on-site equipment	CH4	Excluded	• Excluded for simplification. This emission source is assumed to be very small.
	Fugitive methane emissions from gas supply pipeline or in relation to use in vehicles	CH4	Excluded	• Excluded for simplification. However taken into account among other potential leakage effects (see leakage section).
	Accidental methane release	CH4	Excluded	• Excluded for simplification. This emission source is assumed to be very small.

B.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

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Step 1. Identify technically feasible options for capturing and/or using CBM or CMM

Step 1a. Options for CBM and CMM extraction

The baseline scenario alternatives should include all possible options that are technically feasible to handle CBM and CMM to comply with safety regulations. These options could include:

A. Ventilation air methane;
B. Pre mining CMM extraction including CBM to goaf drainage and/or indirect CBM to goaf only;
C. Post mining CMM extraction;
D. Possible combinations of options A, B and C, with the relative shares of gas specified.

These options should include the CDM project activity not implemented as a CDM project.

The extraction technology currently adopted in Shaqu coalmine is Pre-mining CMM extraction and Ventilation Air Methane (VAM). Shaqu coalmine utilizes the system, which extracts CMM and VAM simultaneously and release this mixed gas into the air. Shaqu coalmine is a new coalmine that has been operating for less than three years, and has not started Post-mining CMM extraction, which might be implemented for safety reasons in the future. Currently Shaqu coalmine is neither extracting CBM nor planning to do CBM extraction in the future. Therefore, CBM options are not dealt in the project activities.

Step 1b. Options for extracted CBM and CMM treatment

The baseline scenario alternatives should all possible options that are technically feasible to use CBM and CMM. These options could include:

i. Venting;
ii. Using/destroying ventilation air methane rather than venting it;
iii. Flaring of CBM/CMM;
iv. Use for additional grid power generation;
v. Use for additional captive power generation;
vi. Use for additional heat generation
vii. Feed into gas pipeline (to be used as fuel for vehicles or heat/power generation);
viii. Possible combinations of options i to vii with the relative shares of gas treated under each option specified.

These options should include the proposed project activity not implemented as a CDM project.

Step 1c. Options for energy production

The baseline scenario alternatives should include all possible options to generate electricity (grid, captive power plant using CBM/CMM or other fuels) and/or heat (using CBM/CMM or another fuel) and/or fuel vehicles.

The options for energy production for the proposed project activity are as follows:

(1) Importing electricity from China North Grid and venting the CMM mentioned in the step 1b option i.
(2) Building power generating power plant using CMM as fuel for option iv and v mentioned in the step 1b.
(3) Building a captive coal-fired power plant and venting the CMM
(4) Using coal-fired boiler to provide heat energy and venting the CMM
(5) Using boiler using CMM as fuel to provide heat energy as mentioned in the step 1b option vi.

Step 2. Eliminate baseline options that do not comply with legal or regulatory requirement

According to the clause on health and safety (item 100-150) in “National Coalmine Safety Regulation 2001 version and 2005 version”, it is provided that the CMM concentration in underground borehole should be kept below 1% to avoid the risk of explosion. Item 148 in the regulation provides that CMM with concentration less than 30% must not be utilized.

Shaqu coalmine complies with the legal and regulatory requirements by extracting VAM and Pre-mining CMM, which then be discharged into the air. Since Shaqu coalmine is a new coalmine that has been operating for less than three years, and has not yet started Post-mining CMM extraction. However, the extraction of Post mining CMM may be implemented in the future to comply with the regulations. In addition, it should be noted that the utilization of CMM with methane concentration less than 30% is not allowed and should be released into the air.

All the other options listed in Step1 comply with legal and regulatory requirements because the total volume of CMM released from coalmines is not regulated.

Chinese government promotes the utilization of CMM, especially in 2005, the National Development and Revolution Committee (NDRC) announced *the Coalmine Methane Treatment and Utilization Macro Plan* to encourage the extraction and utilization of CMM. On the other hand, there is no regulation or legislation that make the use of CMM mandatory. There is no financial support on CMM utilization in China either. Chinese government considers CDM as an incentive for CMM utilization.

Step 3. Formulate baseline scenario alternatives
On the basis of the options that are technically feasible and comply with all legal and regulatory requirements, coherent and comprehensive baseline scenario alternatives should be constructed. One of these alternatives shall be the CDM project activity not being registered as a CDM project.

All of the alternatives based on the discussion in Step 1 and Step 2 are as follows:

Step 3a. Alternatives for CMM extraction

A. Ventilation air methane;
B. Pre mining CMM extraction;
C. Post mining CMM extraction;
D. Combination of options A, B and C

The current extraction activity at Shaqu coalmine is the combination of A and B. Although Shaqu coalmine is a new coalmine and has not yet started the extraction of Post mining CMM, it will be implemented in the future to comply with the regulations. Therefore, the current extraction activity at Shaqu coalmine is D, which is the combination of A, B and C.

Step 3b. Alternatives for CMM treatment

Alternative scenario i: One possible baseline scenario is to release all CMM extracted from coalmine into the air. This is the current extraction activity of Shaqu coalmine.

Alternative scenario ii: Utilization or destruction of Ventilation Air Methane.

Alternative scenario iii: Destruction of the extracted CMM by flare. This measure is not widely accepted in the coal mining community. Chinese government encourages the utilization of CMM whereas they do not encourage flaring. .

Alternative scenario iv: Utilization of the collected CMM for power generation using gas engine or gas turbine. Electricity will be supplied to local grid. Heat generated from power generator can be collected and used in coalmine.

Alternative scenario v: Utilization of the collected CMM for power generation using gas engine or gas turbine. Electricity will be used in coalmine. . Heat generated from power generator can be collected and used in coalmine. A part of generated electricity is used in power generation system and waste heat collection system.

Alternative scenario vi: Utilization of the collected CMM in gas boiler to produce thermal energy. Thermal energy will be used as hot water and heating in coalmine.

Alternative scenario vii: The collected CMM is treated with gas purification system in the coalmine and supplied to neighboring natural gas pipeline. It is generally required for the methane concentration to be higher than 95% in order to be supplied to high-pressure natural gas. Another similar scenario is to supply CMM to gas pipeline connected to local household and commercial facilities. Low-pressure gas pipeline in local area requires the methane concentration higher than 30%.

Alternative scenario viii: The combination of alternative scenario i and iv. This is the proposed project activity not registered as CDM.

Step 3c. Alternatives for energy production

In addition to alternative scenario iv, v and vi in Step 3, there are other options for energy production as follows.

Alternative scenario a: Electricity used in the coalmine is purchased from China North Grid and the heat used in coalmine is generated from coal-fired boiler. This is current energy production at Shaqu coalmine.

Alternative scenario b: Power generation using CMM and heat generation using waste heat from power generator. This is the proposed project activity not registered as CDM.

Step 4. Elimination baseline scenario alternatives that face prohibitive barriers

Establish a complete list of barriers that would prevent identified baseline scenario alternatives mentioned above from occurring in the absence of the CDM. The identified baseline scenario alternatives for CMM extraction, CMM treatment and energy production will be assessed in accordance with the following steps.

Considering the alternatives for CMM extraction:

Shaqu coalmine has the gas extraction system that extracts pre mining CMM and VAM simultaneously. Therefore, separate extraction of CMM and VAM can only be achieved by the reconstruction of facilities, which needs additional costs. Reconstruction of facility may improve the rate of gas extraction and provide safer working environment. However, it is unrealistic at the moment in China, to invest additional money in further improvement of the security of gas extraction system when the current system is operating safely without any accidents. In China, their priority in coalmine is the extraction of coal, and the cost of compliance with safety regulation is usually kept at a minimum. Although Shaqu is a new coalmine and has not started post mining CMM extraction, it will be extracted using the current gas extraction system in the future. Thus, it is impossible to adopt A, B and C in Step3a individually, so that the alternative scenario A, B and C will be implemented together. This combination of A, B and C is same as alternative scenario D in Step 3b, which is the current CMM extraction system in project site.

From above discussion, it is possible to determine that the baseline scenario Alternative D. Now we will consider about the CMM treatment alternative scenarios under CMM extraction option D.

Alternative scenario i ： No barriers exist for this scenario. This is CMM treatment currently operated at coalmine.

Alternative scenario ii ： Shaqu coalmine has gas extraction system that extract CMM and VAM simultaneously. It is unrealistic to invest additional money to the reconstruction of facilities in order for the separate extraction of VAM, and moreover there are technical difficulties.

Alternative scenario iii: Since this scenario simply destroys CMM by flaring and do not utilize CMM as energy, it will not contribute to solve the energy shortage problem that China is facing. Flaring needs additional investment to install flare system, but it cannot create revenue as it only destroys CMM. In addition, flaring is not widely demonstrated technique in Chinese mining industry. Therefore, it is clear that flaring will face the investment barrier, which prevents this scenario to be implemented.

Alternative scenario iv: The tariff for power generation to local grid is lower than electricity purchase price. IRR of this scenario is lower than captive power generation (please refer to the consideration for Alternative scenario v stated below). Thus, this scenario will face severe investment barriers.

Alternative scenario v: Chinese government promotes the extraction and utilization of CMM. However, they do not provide support such as financial assistance or tax reduction. According to the economic research about CMM utilization, IRR of this kind of project is fairly low and it takes long time, generally 10 – 20 years to collect investment. Low IRR and long-term investment collecting period would prevent investors from developing such projects. From the reasons mentioned above, in Chinese coal industry, it is usual to install minimum equipment necessary to comply with safety regulations and the extracted CMM is released to the air without any treatments. Thus, there is a lack of technique and experience on power generation and heat utilization using CMM and the implementation of such project is not easy.

Alternative scenario vi: CMM-fueled boiler requires stable gas flow rate and more than 30% of methane concentration. Because CMM emitted from Shaqu coalmine has instable flow rate and low concentration with high fluctuation, CMM of Shaqu coalmine is not technically suitable to CMM-fueled boiler. Moreover, demand of heat in Shaqu coalmine has big seasonal fluctuation and demand is concentrated during winter, thus the operation of CMM-fueled boiler need to be changed by seasons. This implies that the amount of gas utilized also changes by seasons and most CMM has to be released into the air during summer. Decline in the operating rate will lead to negative impact on IRR and therefore become investment barrier.

Alternative scenario vii: Flow rate and methane concentration of CMM emitted from Shaqu coalmine is unstable and it is impossible to secure the concentration more than 95%. For this reason, it is technically impossible to supply the CMM to high-pressure natural gas pipeline. Similarly, it is very difficult and unrealistic to supply CMM of methane concentration more than 30% with stable flow rate to gas pipeline connected to local area for domestic and commercial use.

Alternative scenario viii: There are no barriers to Alternative scenario i , but a significant barrier exists for Alternative scenario vi.

Alternative scenario a: This scenario is the current energy generation activity in Shaqu coalmine and there is no barrier.

Alternative scenario b: This scenario is to utilize waste heat generated from power generation using CMM and supply thermal energy in the coalmine. As mentioned above, because there are serious barriers to power generation using CMM, it is impossible to carry out this scenario without any support of CDM.

Ultimately, D is the only possible scenario for CMM extraction. For energy generation, scenario ii、iii、iv、v、vi、vii and b face significant barriers. As a result, the selected scenarios are scenario i for methane treatment and scenario a for energy generation. Therefore, the only possible baseline scenario is to extract VAM, pre mining CMM and post mining CMM, release them into the air, purchase electricity used in coalmine from local grid, and generate heat with coal-fired boiler for the heat supply in coalmine.

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity (assessment and demonstration of additionality):

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The additionality of the project activity shall be demonstrated and assessed using the latest version of the "Tool for the demonstration and assessment of additionality" agreed by the Executive Board.
This section elaborates on the use of the tool, and in particular how it relates to the selection of the baseline scenario.

Step 0. Preliminary screening based on the starting date of the project activity

No project participants neither consider neither requesting CER prior to project registration nor plan to do so.

Step 1. Identification of alternatives to the project activity consistent with current laws and regulations

Because of the similarity of both approaches used to determine the baseline scenario and the additionality tool, step 1 of the tool for the demonstration and assessment of additionality can be ignored.

Step 2. Investment analysis

Determine the proposed project activity is the economically or financially less attractive than other alternatives without the revenue from the sale of certified emission reductions (CER). The investment analysis is conducted based on the following steps:

Sub-step 2a. Determine appropriate analysis method

The proposed project activity produces financial and economic profits other than profits generated from selling CER. Therefore, the simple cost analysis (Option 1) cannot be applied. The investment comparison analysis in Option II is based on the comparison of revenue earned from investment required for alternative scenario and investment to the proposed project activity proposed project activity. The alternative scenario for the proposed project activity is the baseline scenario identified in B.4. This is not a new investment project but continuation of current activity in the coalmine. Thus Option II is also inapplicable for this assessment. As a result, the benchmark analysis (Option III) is considered to be applicable for the assessment of proposed project activity and baseline scenario.

Sub-step 2b. Option III. Apply benchmark analysis

According to “Economic assessment formula and parameters for construction project 3rd edition”, a project will be financially acceptable when the financial Internal Return Rate (IRR) is better than the sectoral benchmark IRR, the project is able to be implemented. The benchmark IRR of electricity industry is 10%.

Sub-step 2c. Calculation and comparison of financial indicators

The parameters necessary for the assessment of main financial indexes are shown in the table below. These data are taken from the feasibility study report of the proposed project activity prepared by Huajin Coking Coal Co., Ltd,

Table Parameters necessary for the calculation of main financial indexes

Key Parameters	Value	Note
Installed Capacity	14,000 kW	700kW×20 基
Thermal efficiency of gas engine	34%	
Efficiency of power generator	92%	
Average amount of gas discharge	400m3/minute	
Percentage of gas with methane concentration more than 30%	52%	Conservative estimation at 30%
Percentage of gas with methane concentration between 25% and 30%	32%	Conservative estimation at 25%
Annual operation hours of power generator	7200 時間	Estimated operation at 90% of Rated output.
Annual Electricity Generation	90,720,000 kWh	
Auxiliary Power Ration	4.1 %	
Electricity supply to power grid	87,000,480 kWh	
Annual heat supply	51630 GJ	From boiler using waste heat
Total investment	74.34 Million RMB	
Operating costs	14.55 Million RMB	Electricity 97% Heat 3%
Electricity Sales Price	0.23RMB/kWh	
Heat Price	14 RMB/GJ	
Value Added Tax (VAT) of electricity	17%	
Value Added Tax (VAT) of heat	13%	
Income Tax	17%	
Town maintenance construction tax	5%	
Education Tax	3%	
`Project Period	20 years	Equivalent to the lifetime of generators
Crediting Period	7 years	On the assumption that the crediting periods will be renewed twice.
Expected CERs price	8 EUR	1 EUR = 10 RMB

In table 2, the amount of discharge and the concentration of CMM are calculated based on the data collected in the first half of 2006. This is because, although gas extraction in Shaqu coalmine started in October 2004, the concentration of gas sharply increased in 2006 and is keeping its level until now. Generally the concentration of CMM increases as mining of coal proceeds. Thus, we thought that it is appropriate to exclude the data taken prior to 31/12/2005 and use the data of 2006 only.
Considering that the standard price for 1 CER is about 8~9Euro when Chinese government certifies the project, the price of CER is expected to be 8Euro, which is conservative.

Table 3 shows the IRR of the project, which is assessed using the value and assumption shown in Table 2. IRR was calculated for project period.

Table 3 Financial Indicators of the Proposed Project Activity

	Project IRR
Without CDM	0.36%
With the revenue from CDM	75.5%

According to the benchmark analysis in Option III, when financial indicators of project like project IRR is lower than the benchmark value, the proposed project is considered to be not attractive. From table 3, it is possible to say that the project is not worth for investment because the IRR without CDM is 0.36% and this is lower than the benchmark IRR of 10%. However, if we consider the revenue from CDM (revenue by selling CER), the project IRR will improved significantly to 75.5% which is much higher than benchmark IRR. Therefore, if we consider about CDM, the proposed project will be attractive for the investor.

Sub-step 2d. Sensitivity Analysis

The objective of sensitivity analysis is to show the conclusion regarding the financial attractiveness is robust to reasonable variations in the critical assumptions. The investment analysis provides a valid argument in favor of additionality only if it consistently supports (for a realistic range of assumption) the conclusion that the project activity is unlikely to be the most financially attractive or is unlikely to be financially attractive.

For investment analysis, the following parameters have been selected as they have great uncertainty and are likely to influence financial attractiveness significantly.

Initial investment
Energy generation
Operating cost

The sensitivity analysis was conducted for those parameters. The result of assessment is shown in Table xx and Figure xx.

Table XX Results of the Sensitivity Analyses for Main Financial Parameters

Variation of Parameter	-10.0%	-7.5%	-5.0%	-2.5%	0.0%	+2.5%	+5.0%	+7.5%	+10.0%
Initial Investment	1.40%	1.12%	0.86%	0.60%	0.36%	0.12%	-0.11%	-0.33%	-0.55%
Energy	-3.15%	-2.19%	-1.29%	-0.44%	0.36%	1.12%	1.85%	2.55%	3.23%

Generation									
Operating Cost	2.43%	1.93%	1.42%	0.90%	0.36%	-0.20%	-0.79%	-1.39%	-2.02%

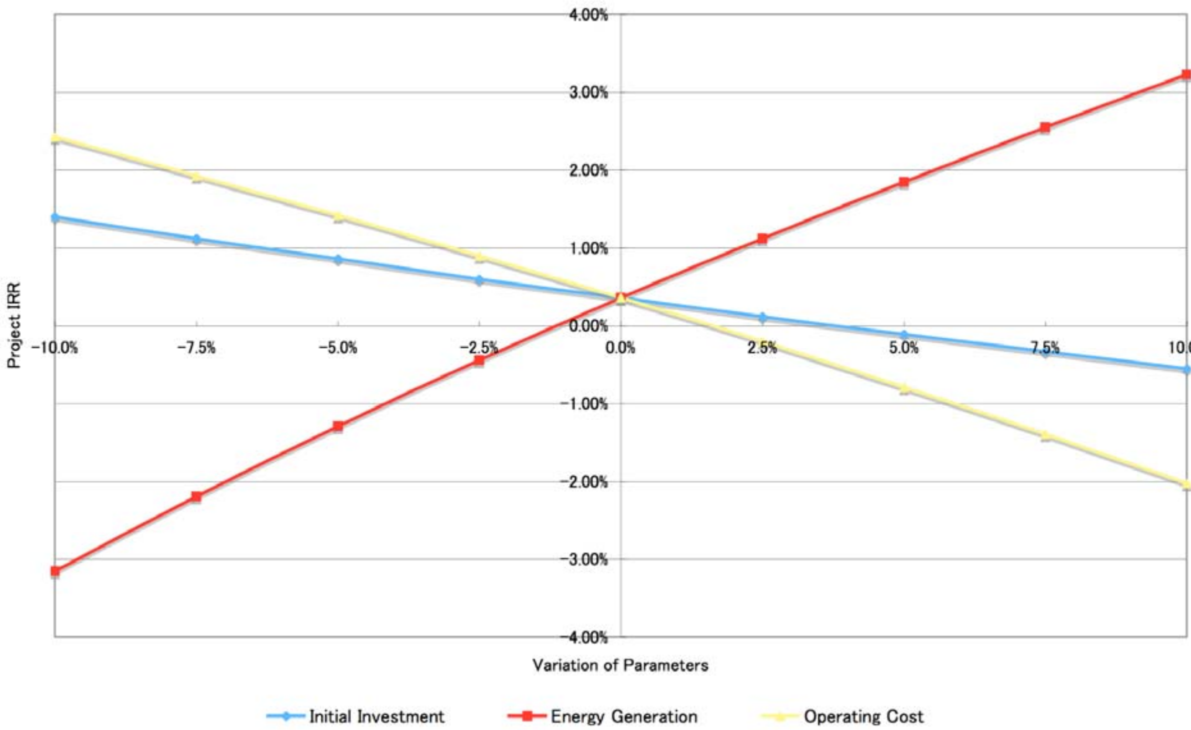

Figure XX Results of the Sensitivity Analyses for Main Financial Parameters

As shown in Table XX and Figure XX, the project IRR is lower than the benchmark IRR of 10% even if the main parameters vary between -10% to +10%.

The results of the above sensitivity analyses show the evidence that the implementation this type of project without the revenue from CER sales is below the typical rate of the economically attractive course of action in construction of generating power plant in China. Therefore, if the proposed project activity is not registered as a CDM project, it is not financially viable even though the possible variations of the main parameters are considered.

Step 4. Common practice analysis

In 2000, China emitted more than 12billion m3 of CMM. This accounts for 40% of the world CMM emission. By 2004 over 200 mines had established CMM drainage systems in China and over 1.5 billion m3 of CMM had been recovered. The amount of CMM collected by CMM drainage system is only 12.5% of CMM emission. CMM utilized in 2003 was 630 million m3, which is only 5% of CMM emission. According to another document, the amount of gas extracted with CMM drainage system is less than 5% of whole emission, and the other 95% is mainly emitted into the air in the form of ventilation air methane (VAM). In 2004, CMM utilized in China was those collected from methane drainage system only. A major usage of CMM has been to supply CMM to local area through local gas supply network.

As mentioned above, in China, the utilization of CMM and VAM is far from common practice. Regulations only mandate the extraction of CMM and discharge into the air for safe mining activity. Thus, there is no legal requirements for the utilization of CMM or VAM for energy generation.

China Coal Information Institute has provided further evidence that proves CMM utilization project without CDM is not a common practice. Their document summarizes the outlines of CMM utilization project currently conducted by major 15 coal supply groups in China. According to the document, all those projects are essentially carried out within the framework of CDM and CDM or Carbon finance is prerequisite for CMM utilization in China.

The situation in Shanxi province is exactly the same. In Shanxi province, there are xx CMM utilization projects at the moment and all of them are carried out within the framework of CDM. In Shanxi province, none of the project that utilizes CMM for power generation without using CDM framework. Therefore, it is possible to say that in Shanxi province, CMM utilization project without CDM is not common practice.

Step 5. Impact of CDM registration

Incentives for CDM project is eventually related to measurable green house gas in coal mining sector. Furthermore, the project participants can get financial profits produced by selling CER that generated from the registered CDM project. Hence the project participants can gain access to the capital, to which they do not have access without CDM, and installation of new technique will be promoted. This leads to reduction of risks related to CMM collection and utilization in China.

If the proposed project failed to obtain approval and get registered as CDM project, the expected consequence would be as follows.

- Incomes that can be earned from selling CER is significantly important supplementation to project's income. Therefore, without this income, the cash flow of the project will get worse significantly and return of debt will be impossible, and the project will end.

- Without incomes from selling CER, it would be impossible to obtain capital needed to solve technical problems that the proposed project have. In such case, the owner of the proposed project would consider the high technical risks, and they may delay or cancel the implementation of project.

In conclusion, it is clear that the proposed project is not the baseline scenario. Without profits earned by selling CER, the proposed project scenario would not happen. The proposed project has clear additionally and contribute to reduce a large amount of greenhouse gases. If the proposed project fails to be registered as CDM, then such reduction of greenhouse gases would not come true.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

>>

This project adopted the approved methodology ACM0008 "Consolidated baseline methodology for coal bed methane and coal mine methane capture and use for power (electrical or motive) and heat and/or destruction by flaring" Version 3. The following methodological choices were made in applying the ACM0008 to the proposed project activity.

CBM:
The project does not include any coalbed methane (CBM) extraction and does not have any plan to use coalbed methane in the future. Therefore, any references to CBM were omitted from the formulae required to calculate emission reductions.

NHMCs:
The coal mine gas from Shaqu coal mine does not include traces of NHMCs which exceed 1% of volume of the extracted coal mine gas. Therefore, all references to NHMCs were omitted from the formulae required to calculate emission reductions.

PMM
The ACM0008 distinguish between pre-mining and post-mining CMM extraction. The CMM extraction system extracts pre-mining CMM and ventilation air methane (VAM) at the same time, but does not extract PMM. Therefore, all references to PMM were omitted from the formulae required to calculate emission reductions.

Emission reduction by flaring:
The proposed project uses open flare system to flares extra CMM that could not be combusted in power generator. Emission reduction by flaring was calculated based on ACM0008 ”Methodological Tool to determine project emissions from flaring gases containing methane”

Grid power emission factor:
The baseline scenario includes grid power supply that would be replaced by the project activities. Therefore, the emission reductions for the displaced electricity are calculated based on ACM0002. Operating and build margins in the calculation adopt the values provided by the NDRC in China.

Heat generation emissions factor:
The proposed project activity produce thermal energy which will replace the heat currently produced by existing coal boilers. According to section 7.4.4 of the ACM0008, two options are provided for calculating the heat generation emission factor. Option B was selected, which sets boiler efficiency at 100% as a conservative approach.

Considering the above choices, the calculation of project emission, baseline emission, leakage and emission reduction are shown as follows:

1. Project Emission
Project emissions are defined by the following equation
$PE_y = PE_{ME} + PE_{MD} + PE_{UM}$

Where:

PEy	Project emissions in year y (tCO2e)
PEME	Project emissions from energy use to capture and use methane (tCO2e)
PEMD	Project emissions from methane destroyed (tCO2e)
PEUM	Project emissions from un-combusted methane (tCO2e)

Collection and dispersion of methane into the air is included in the baseline scenario. Therefore, for the proposed project activity, PRME=0.

PEME = CONSELEC,PJ x CEFELEC +CONSHEAT,PJ x CEFHEAT

where:

PEME	Project emissions from energy use to capture and use methane (tCO2e)
CONSELEC,PJ	Additional electricity consumption for capture and use of methane, if any (MWh)
CEFELEC	Carbon emissions factor of electricity used by coal mine (tCO2e/MWh)
CONSHEAT,PJ	Additional heat consumption for capture and use of methane, if any (GJ)
CEFHEAT	Carbon emissions factor of heat used by coal mine (tCO2/MWh)

Emissions from combustion and destruction of captured methane can be calculated as follows:

PEMD = (MDFL + MDELEC + MDHEAT + MDGAS) x CEFCH4

where:

PEMD	Project emissions from CMM destroyed (tCO2)
MDFL	Methane destroyed through flaring (tCH4)
MDELEC	Methane destroyed through power generation (tCH4)
MDHEAT	Methane destroyed through heat generation (tCH4)
MDGAS	Methane destroyed after being supplied to gas grid or for vehicle use (tCH4)
CEFCH4	Carbon emission factor fro combusted methane (2.75 tCO2/tCH4)

In each end-use, the amount of gas destroyed depends on the efficiency of combustion of each end-use.

The proposed project activity is not involved in any methane destruction after being supplied to gas grid or for vehicle use. The proposed project activity does not use any methane or other fossil energy for heat generation because it adopts waste heat boilers. Therefore, PEMD in this project is defined as follows:

PEMD = (MDFL + MDELEC) x CEFCH4

Project emissions from un-combusted methane from flaring and end-uses is calculated using the following:

$$PE_{UM} = [GWP_{CH4} \times \sum_i MM_i \times (1 - Eff_i)] + PE_{flare}$$

where:

PEUM	Project emissions from un-combusted methane (tCO2e)
GWPCH4	Global warming potential of methane (21 tCO2/CH4)
i	Use of methane (power generation, heat generation, supply to gas grid to various combustion end uses)
MMi	Methane measured sent to use i (tCH4)
Effi	Efficiency of methane destruction in use i (%)
PEflare	Project emissions from flaring of the residual gas stream (tCO2e)

2. Baseline emissions

Baseline emissions are given by the following equation:

$BE_y = BE_{MD,y} + BE_{MR,y} + BE_{Use,y}$

where:

BE_y	Baseline emissions in year y (tCO_2e)
$BE_{MD,y}$	Baseline emissions from destruction of methane in the baseline scenario in year y (tCO_2e)
$BE_{MR,y}$	Baseline emissions from release of methane into the atmosphere in year y that is avoided by the project activity (tCO_2e)
$BE_{Use,y}$	Baseline emissions from the production of power, heat or supply to gas grid replaced by the project activity in year y (tCO_2e)

In the baseline scenario, all extracted methane is released into the air and is not destroyed at all, so that $BE_{MD,y}=0$.

Considering that this project is not involved in the extraction of CBM and PMM, the amount of Methane released into the atmosphere can be defined as follows:

$$BE_{MR,y} = GWP_{CH_4} \times \sum_i (CMM_{PJi,y} - CMM_{BLi,y})$$

Emissions from power and/or heat generation and vehicle fuel replaced by project is defined by the following equation:

$BE_{Use,y} = ED_{CBMw,y} + ED_{CBMz,y} + ED_{CPMM,y}$

where:

$BE_{Use,y}$	Total baseline emissions from the production of power or heat replaced by the project activity in year y (tCO_2)
$ED_{CBMw,y}$	Emissions from displacement of end-uses by use of coal bed methane captured from wells where the mining are interested the zone of influence in year y (tCO_2)
$ED_{CBMz,y}$	Emissions from displacement of end-uses by use of coal bed methane captured from wells where the mining are interested the zone of influence prior to year y (tCO_2)
$ED_{CPMM,y}$	Emissions from displacement of end-uses by use of coal mine methane and post-mining Methane (tCO_2)

Considering the project does not implement the extraction of any CBM, the emissions from the replacement are as follows:

$BE_{Use,y} = ED_{CPMM,y}$

The total methane captured during year y can be described as follows:

$CBMM_{tot,y} = CMM_{PJ,i,y}$

where:

$CBMM_{tot,y}$	Total CBM and CMM captured and utilized by the project activity (tCH_4)
$CMM_{PJ,i,y}$	Pre-mining CMM captured by the project activity in year y (tCH_4)

The potential total emissions reductions from displacement of power/heat generation are given by the following equation:

PBEUse,y = GENy x EFELEC + HEATy x EFHEAT

where:

PBEUse,y	Potential total baseline emissions from the production of power or heat replaced by the project activity in year y (tCO2e)
GENy	Electricity generated by project activity in year y (MWh), including through the use of CBM
EFELEC	Emissions factor of electricity (grid, captive or a combination) replaced by project (tCO2/MWh)
HEATy	Heat generation by project activity in year y (GJ), including through the use of CBM
EFHEAT	Emissions factor of heat production replaced by project activity (tCO2/GJ)

As a result, the emissions from the replacement are as follows:

$$BE_{Use,y} = ED_{CPMM,y} = \frac{CMM_{PJ,y}}{CBMM_{tot,y}} \times PBE_{Use,y} = PBE_{Use,y}$$

3. Grid power emissions factor
If the baseline scenario includes grid power supply that would be replaced by the project activity, the Emissions Factor for displaced electricity is calculated as in ACM0002. In China, the NDRC, Chinese DNA, publish the grid power emission factor for each independent grid calculated based on the methodology ACM0002

4. Heat generation emissions factor (Now we do not have any basic data to calculate)
If the baseline scenario includes heat generation (either existing or new) that is replaced by the project activity, the emissions factor fro displaced heat generation is calculated as follows:

$$EF_{heat,y} = \frac{EF_{CO2,i}}{Effheat} \times \frac{44}{12} \times \frac{1TJ}{1000GJ}$$

where:

EFheat,y	Emissions factor for heat generation (tCO2/GJ)
EFCO2	CO2 emissions factor of fuel used in heat generation(tC/TJ)
Effheat	Boiler efficiency of the heat generation (%)
44/12	Cabon to Carbon Dioxide conversion factor
1/1000	TJ to GJ conversion factor

5. Emission Reduction
The emissions reduction ERy by the project activity during a given year y is the difference between the baseline emissions (BEy) and project emissions (PEy), as follows:

ERy = BEy – PEy – LEy

where:

ERy	emissions reductions of the project activity during the year y (tCO2e)
BEy	baseline emissions during the year y (tCO2e)
PEy	project emissions during the year y (tCO2e)
LEy	leakage emissions in year y (tCO2e)

For the proposed project activity, leakage is equal to zero, thus the emission reductions is calculated based on the following formula:

ERy = BEy - PEy

B.6.2. Data and parameters that are available at validation:

(Copy this table for each data and parameter)

Data / Parameter:	**Concentration of CH4 in extracted CMM**
Data unit:	% (Volume Concentration)
Description:	Average density
Source of data used:	Past record associated the gas extracted from Shaqu coal mine
Value applied:	30% and 25%
Justification of the choice of data or description of measurement methods and procedures actually applied :	Using the CMM data recorded every hour from October 2004 to the end of June 2006, including density of CH4 and gas flow rate. Actual concentration of methane will be measured by meters during the monitoring phase.
Any comment:	

Data / Parameter:	**Gas flow rate**
Data unit:	m3/minute
Description:	Average value
Source of data used:	Past record associated the gas extracted from Shaqu coal mine
Value applied:	400
Justification of the choice of data or description of measurement methods and procedures actually applied :	Using the CMM data recorded every hour from October 2004 to the end of June 2006, including density of CH4 and gas flow rate. Actual gas flow rate will be measured by meters during the monitoring phase.
Any comment:	

Data / Parameter:	**Concentration of NMHC**
Data unit:	% (volume concentration)
Description:	
Source of data used:	Analysis report of Shaqu coal mine gas
Value applied:	> 1%
Justification of the choice of data or	Analysis report implemented in the Shaqu Coal Mine Gas Generation Feasibility Study on power generation and heat supply using coal mine

description of measurement methods and procedures actually applied :	methane. Based on this result, NMHC was excluded from the assessment.
Any comment:	

Data / Parameter:	**Calorific value of extracted CMM**
Data unit:	kJ/m3
Description:	
Source of data used:	Shaqu Coal Mine Gas Generation Feasibility Study Report
Value applied:	10025
Justification of the choice of data or description of measurement methods and procedures actually applied :	Actual value of calorific value of extracted CMM will be calculated based on actual production of electricity, heat efficiency of gas engine and efficiency of generator during monitoring phase.
Any comment:	

Data / Parameter:	**Auxiliary power rario**
Data unit:	%
Description:	
Source of data used:	Shaqu Coal Mine Gas Generation Feasibility Study Report
Value applied:	4.1
Justification of the choice of data or description of measurement methods and procedures actually applied :	The percentage of electricity used for operation of generator and waste heat boiler in electricity produced in the project.
Any comment:	

B.6.3 Ex-ante calculation of emission reductions:

>>

Project emissions are defined by the following equation

$$PE_y = PE_{ME} + PE_{MD} + PE_{UM}$$

Where:

PEy	Project emissions in year y (tCO2e)
PEME	Project emissions from energy use to capture and use methane (tCO2e)
PEMD	Project emissions from methane destroyed (tCO2e)
PEUM	Project emissions from un-combusted methane (tCO2e)

Electricity only is used to capture and use methane for the project activities. The amount of the electricity is considered as auxiliary power ratio, the value of 4.1%, and will be subtracted from the total amount of electricity generated by the project activities. Therefore, for the proposed project activity, PEME=0 and project emissions are defined as follows:

PEy = PEMD + PEUM

The proposed project activity is not involved in any methane destruction after being supplied to gas grid or for vehicle use. The proposed project activity does not use any methane or other fossil energy for heat generation because it adopts waste heat boilers. Therefore, PEMD in this project is defined as follows:

PEMD = (MDFL + MDELEC) x CEFCH4

Based on the "Tool to determine project emissions from flaring gases contaminating methane", MDFL is estimated to 6,561 t-CH4. The efficiency of combustion of generators uses 0.995 according to IPCC recommendation. Considering the efficiency and the gas data shown in Table 2, MDELEC is calculated to 22,206 t-CH4. CEFCH4 is defined as 2.27 t-CO2e/t-CH4 in ACM0008:

PEMD = (6,561 + 22,206) * 2.27 = 79,110 t-CO2e

PEUM is the sum of non-combustion methane in open flare system (50% of methane sent to the flare) and in generators (0.5% of methane sent to the generators). Considering the global warming potential is 21 t-CO2/t-CH4, PEUM is calculated as follows:

PEUM = (6,561 + 112) * 21 = 140,133 t-CO2e

Therefore, project emissions are estimated as follows:

PEy = 79,110 + 140,133 = 219,244 t-CO2e

In the baseline scenario of the proposed project activity, BEMD,y is defiend as zero because all of the coal mine gases extracted are released into the air. The baseline emissions, BEy, is defined as follows:

BEy = BEMR,y + BEUSE,y

BEMR,y	Baseline emissions from release of methane into the atmosphere in year y that is avoided by the project activity (tCO2e)
BEUse,y	Baseline emissions from the production of power, heat or supply to gas grid replaced by the project activity in year y (tCO2e)

The generators and open flare system installed for the proposed project activity can combust all of the CMM extracted where concentration is more than 25%. Considering the global warming potential of methane, 21 t-CO2e/t-CH4 and the gas data of Shaqu Coal Mine, MEMR,y is calculated as follows:

MEMR,y = 35,440 * 21 = 744,250 t-CO2e

The 95.9% of the amount of electricity generated in the project activities is provided to the local grid because the 4.1% of the electricity is used in the facilities for the project. The amount of electricity provided to the local grid is estimated to 87,000 MWh as shown in Table 2.
Chinese government has published the Operating Margin (OM) and Build Margin (BM) for each independent grid in China. The local grid of the project area is belonged to the central electricity system of China. The OM and BM of the system are 1.0585 t-CO2/MWh and 0.9066 t-CO2/MWh respectively. Therefore, the Combined Margin (CM) of the system is calculated as 0.98255 t-CO2/MWh and the basic unit of emissions for the local grid is 0.98255 t-CO2/MWh.
The emission reductions by the replace of the grid power is calculated as follows:

87,000 * 0.98255 = 85,482 t-CO2e

In the proposed project activities, the old coal-fired boiler system, which provide heat and hot water to the resident are in Shaqu Coal Mine, will be replacet by the waste heat boiler. The feasibility study by Shaqu Coal Mine says that the emission reductions by the replacement of boilers are estimated to 54,000 t-CO2e. But now we do not have any data to recalculate the value. Therefore, at the moment, we use the value of 54,000 t-CO2e.

Based on the results calculated above, BEUse,y is estimated as follows:

BEUse,y = 85,482 + 54,000 = 139,482 t-CO2e

Finally, the baseline emissions, BEy, are calculated as follows:

BEy = BEMR,y + BEUse,y = 744,250 + 139,482 = 883,732 t-CO2e

The emission reductions by the proposed project activity is defined as follows:

ERy = BEy – PEy – LEy

Here, in this project LEy = 0 because any leakage is not assumed. Therefore , ERy is calculated as follows:

ERy = 883,732 – 219,244 – 0 = 664,488 t-CO2e

The annual emission reductions by the proposed project activity are estimated to 664,488 t-CO2e.

B.6.4 Summary of the ex-ante estimation of emission reductions:

>>

The crediting period will be started on September 1st, 2007. For simplification, the emission reductions in 2007 are defined as one-third of the annual emission reductions calculated above. The summary of the ex-ante estimation of emission reductions is shown in below Table

	2007	2008	2009	2010	2011	2012	2013
Annual emission reductions	221,496	664,488	664,488	664,488	664,488	664,488	664,488

(Unit: t-CO2e)

The total amount of emission reductions up to the end of 2012, the end of the first commitment period of the Kyoto Protocol, is estimated to 3,543,936 t-CO2e.

B.7 Application of the monitoring methodology and description of the monitoring plan:

Under discussion with Shaqu Coal Mine

B.7.1 Data and parameters monitored:

(Copy this table for each data and parameter)

Data / Parameter:	**CONSELEC,PJ**
Data unit:	MWh
Description:	The total amount of electricity used for the operation of project activity
Source of data to be used:	Electric energy meter
Value of data applied for the purpose of calculating expected emission reductions in section B.5	This item is included in Auxiliary power ratio in the calculation of the section B.5.
Description of measurement methods and procedures to be applied:	Continuous measurement by electric energy meters
QA/QC procedures to be applied:	
Any comment:	

Data / Parameter:	**MMFL**
Data unit:	tCH4
Description:	Methane sent to the flare
Source of data to be used:	Flow meters installed on site
Value of data applied for the purpose of calculating expected emission reductions in section B.5	This is calculated based on the data of first half of 2006. This is the amount of extra gas, which cannot be combusted in power generator, and the value is XXtCH4 per year. Data is estimated based on how much methane remains after all other demands such as power generation have been met. For the first crediting period an estimated XXXXX tCH4 will be sent to the flare
Description of measurement methods and procedures to be applied:	Continuous measurement by differential pressure volume flow meters. The meters will provide a cumulative flow reading in addition to the instantaneous reading. Measurements of cumulative flow will be recorded once per day. Recorded values will be entered into a spreadsheet. In case of breakdown or suspended problems, the manufacturer will be called in.

	Flow meters will record gas volumes, pressure and temperature. Density of methane under normal conditions of temperature and pressure is 0.67 kg/m3 (Revised 1996 IPCC Reference Manual p 1.24 and 1.16)
QA/QC procedures to be applied:	The meters will be subject to maintenance and calibration according to manufacturer's recommendations. On site staff will receive some training in CDM monitoring and the maintenance requirements of the flow meters. Calibrations will be carried out by the manufacturer or a suitably qualified external company. Calibration and maintenance records will be retained. Data will be recorded in hard copy format and transferred to an electronic file. Checks of the data entry process will be conducted by someone other than the person entering the data.
Any comment:	

Data / Parameter:	**EffFL**
Data unit:	%
Description:	Flare combustion efficiency
Source of data to be used:	ACM0008
Value of data applied for the purpose of calculating expected emission reductions in section B.5	It is 50% because the project adopted an open type of flaring system.
Description of measurement methods and procedures to be applied:	Efficiency will be based on default value set by the methodology ACM0008.
QA/QC procedures to be applied:	
Any comment:	

Data / Parameter:	**MMELEC**
Data unit:	tCH4
Description:	Methane sent to the power generators
Source of data to be used:	Flow meters installed on site
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Data is also estimated based on how much methane will be consumed by the power generators. The calculation is implemented considering heat efficiency of gas engines, generating efficiency of generators, calorific value of the gas, and production of electricity.
Description of measurement methods and procedures to be applied:	Continuous measurement by differential pressure volume flow meters. The meters will provide a cumulative flow reading in addition to the instantaneous reading. Measurements of cumulative flow will be recorded once per day. Recorded values will be entered into a spreadsheet. In case of breakdown or suspended problems, the manufacturer will be called in.

QA/QC procedures to be applied:	The meters will be subject to maintenance and calibration according to manufacturer's recommendations. On site staff will receive some training in CDM monitoring and the maintenance requirements of the flow meters. Calibrations will be carried out by the manufacturer or a suitably qualified external company. Calibration and maintenance records will be retained. Data will be recorded in hard copy format and transferred to an electronic file. Checks of the data entry process will be conducted by someone other than the person entering the data.
Any comment:	

Data / Parameter:	**EffELEC**
Data unit:	%
Description:	CH4 Combustion efficiency of gas engine
Source of data to be used:	ACM0008
Value of data applied for the purpose of calculating expected emission reductions in section B.5	It is determined based on the recommendation of the methodology ACM0008.
Description of measurement methods and procedures to be applied:	Efficiency will be based on default value set by the methodology ACM0008.
QA/QC procedures to be applied:	
Any comment:	

Data / Parameter:	
Data unit:	
Description:	
Source of data to be used:	
Value of data applied for the purpose of calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	
Any comment:	

B.7.2 Description of the monitoring plan:

>>

B.8 Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity(ies)

>>

The PDD is under development.

Name of person/entity determining the baseline and the monitoring methodology:
Mr. Yuichi ABE (Consultant)
JAPAN NUS CO.,LTD
9-15 Kaigan 3-chome, Minato-ku,
Tokyo 108-0022, JAPAN

Prof. Wang Ming
CDM R&D Center, School of Public Policy & Management
Tsinghua University, Beijing 100084, P.R. China

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

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The proposed project activity will be started on June 1st, 2007.

C.1.2. Expected operational lifetime of the project activity:

>>

The proposed project activity will continue the operation for twenty years, which is equal to the lifetime of generators.

C.2 Choice of the crediting period and related information:

C.2.1. Renewable crediting period

C.2.1.1. Starting date of the first crediting period:

>>

The starting date of the first crediting period for the proposed project activity is September 1st, 2007.

C.2.1.2. Length of the first crediting period:

>>

The length of the first crediting period is seven-years.

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>
Not applicable.

C.2.2.2. Length:

>>
Not applicable.

SECTION D. Environmental impacts

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D.1. Documentation on the analysis of the environmental impacts, including transboundary impacts:

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The purpose of environment impact assessment is to evaluate negative effect of the proposed project on environment. The Report on Environment Impact of Shaqu Coalmine Gas Exploitation prepared by Shanxi Environment Science Research Academy in June 2006 states that the project and its siting are feasible as the planned exploitation is in compliance with the national industrial policy, the overall coalmine planning and clean production standard, namely, pollutant discharge and its quantity are visibly positive for environment. The Report is summarized in multi folds as follows:

Air quality
The pollutant emitted from the proposed project imposes little negative impact on the environment. Firstly, the replacement of heating boiler will improve the environment; secondly, emission of ozone, sulfid and nitrogen oxides resulted from the coal power generation will be avoided. Therefore, the Report believes that the proposed project represents evident positive effect on the environment due to air improvement.
Assessment criteria: Standard for Air Quality GB3095－1996.

Water quality
Most of the cooled water from the generator unit is circulated and the rest is used for greenery and dust containing after sedimentation. Boiler waste water and domestic sewage are discharged after treatment in the existing sewage treatment plant. The Report believes that the proposed project will not harm the surrounding waters.
Assessment criteria: General Standard for Sewage Discharge GB8928-1996 (Grade II)

Eco environment
As the proposed project is sited within the reserved field for the Shaqu Coalmine Gas Station, the power plant construction will not exert visible impact on the ecological system.

Animals and plants
As no national protected animals and few plants (mainly bushes) reside in the project area, there is no negative impact from the proposed project.

Acoustic environment

Although the noise generated by machinery during the construction period may interrupt the acoustic environment, normal life of the villagers around will not be impacted because of the short construction period, limited influential sphere of 350m and long distance from the surrounding villages. The Report indicates no serious harm of noise to the environment.

The main source of noise in the operation period, the generator unit, is designed with such strict measures as noise elimination & isolation, vibration reduction, isolation and internal noise shielding. The greenery can also considerably decrease the contribution value of the highly noisy equipment. In addition, as stated in the Report, the diminishing noise will hardly impact even the nearest village 1.2km away.
Assessment criteria: Standard for Environment Noise in Urban Areas GB3096-93

Transportation
Transportation means necessary for construction, operation and maintenance can access the production area via external roads. Since the existing road system is capable enough for infrastructure and operation, impact hereon may be ignored.

Greenery
The 26% greenery rate is capable of environment purification and noise reduction.

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

>>
The proposed project is believed not to be negatively influential on the environment. On the contrary, it will lead to significant decrease of pollution including GHG emission in the local area (as described before).

SECTION E. Stakeholders' comments

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E.1. Brief description how comments by local stakeholders have been invited and compiled:

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On September 20th 2006, over 20 local residents and officials were invited by Huajin Coking Coal Co., Ltd. for a stakeholder seminar specially on CDM project. Coordinated by Tsinghua University CDM R & D Centre, the seminar not only collected wide comments from local residents, power authority, the government and contractors but provided questionnaire for the participants.

The meet was held under the cooperation of both CDM research center in School of Public Policy & Management, Tsinghua University and HuaJin Coding Coal Company, Limited. The attendants included government officials(province level, city level and county level), local and neighboring residents influenced by the project, staffs in the electricity plant, represents from the construction side and electric power company. All the attendants were invited to participate in the name of both CDM research center and HuaJin via face to face invitation, telephone invitation and so on. For example, the local residents, government officials and electric power company were invited face to face, and others were invited mainly through telephone.

During the meeting, the CDM research center first of all introduced basic information about the project followed by the Kyoto Protocol and Clean Development Mechanism, the explanation of the whole CDM sanction process by the Chinese government(which requires the project developer should collect the stake holders' opinions), and last but not the least, the clarification of the object of this meeting(the attendants were invited to discuss the pros and cons of the CDM project and how the effect could be further enhanced).

Some attendants raised questions like how to deal with the remaining methane whose density doesn't meet the bottom line of power generation? How to assure the living standard of local residents unaffected by the project? These questions were well answered and all attendants were satisfied. No more questions were raised later.
At the end of the meeting, a survey was done towards all participants via questionnaire.

E.2. Summary of the comments received:

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No negative comments were heard either from the discussion or from the questionnaire. All stakeholders were in favour of the proposed project and expressed the wish for early operation after knowing that the implementation of the project would be able not only to generate power out of waste gas but to reduce GHG emission through replacement of petroleum fuels.
In response to the suggestions put forward by the local Environment Protection Bureau, to properly dispose of the portion of gas which is not concentrated enough for power generation and to minimize the potential impact of noise on the local residents, the owner of the proposed project has answered with the following solutions: firstly, to directly discharge gas of 25% and below as defined in the Code on Coalmine Production Safety; secondly, to take every feasible measures including greenery to minimize noise during the construction and future operation.
No negative comments on the project itself were heard from any stakeholder.

E.3. Report on how due account was taken of any comments received:

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No negative comments on the project were heard. Both the local government and residents are supportive. The owner of the project is ready to input sufficient investment to satisfy all environment related standards.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	
Street/P.O.Box:	
Building:	
City:	
State/Region:	
Postfix/ZIP:	
Country:	
Telephone:	
FAX:	
E-Mail:	
URL:	
Represented by:	
Title:	
Salutation:	
Last Name:	
Middle Name:	
First Name:	
Department:	
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

Annex 3

BASELINE INFORMATION

The transition of methane concentration of coal mine gas is shown in Fiture A3-1 and A3-2, and the transition of the amount of coal mine gas extracted in Figure A3-3

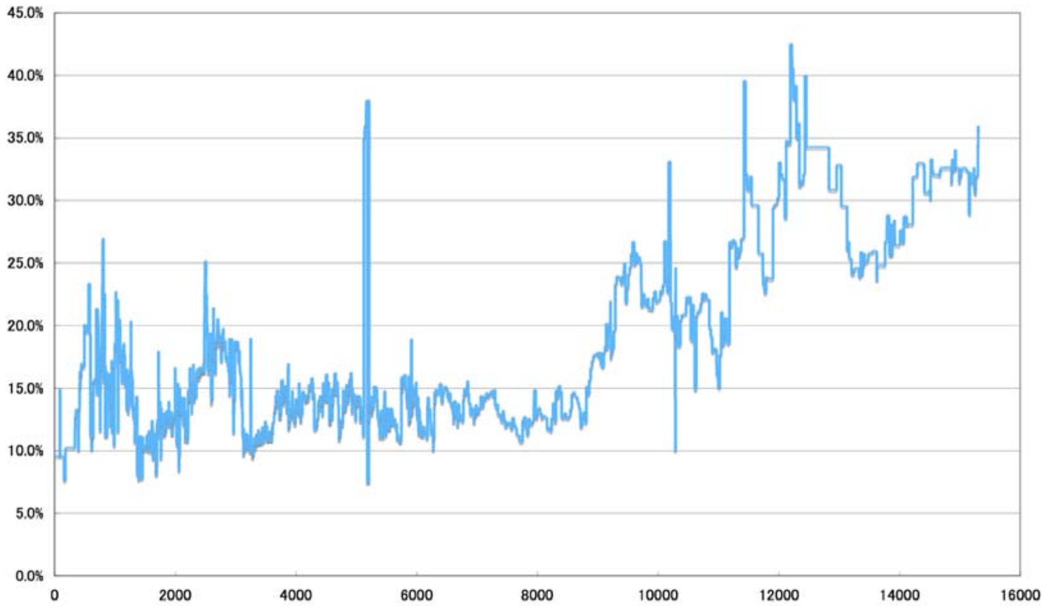

Figure A3-1 Transition of the methane concentration of coalmine gas extracted from October 1st, 2004 to June 30th, 2006

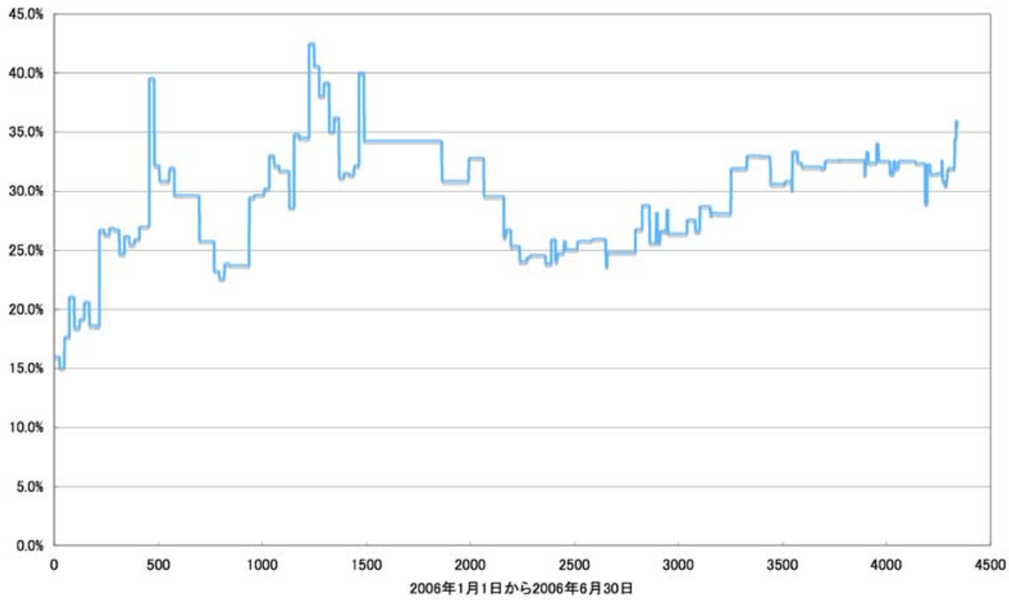

Figure A3-2 Transition of the methane concentration of coalmine gas extracted from January 1st, 2006 to June 30th, 2006

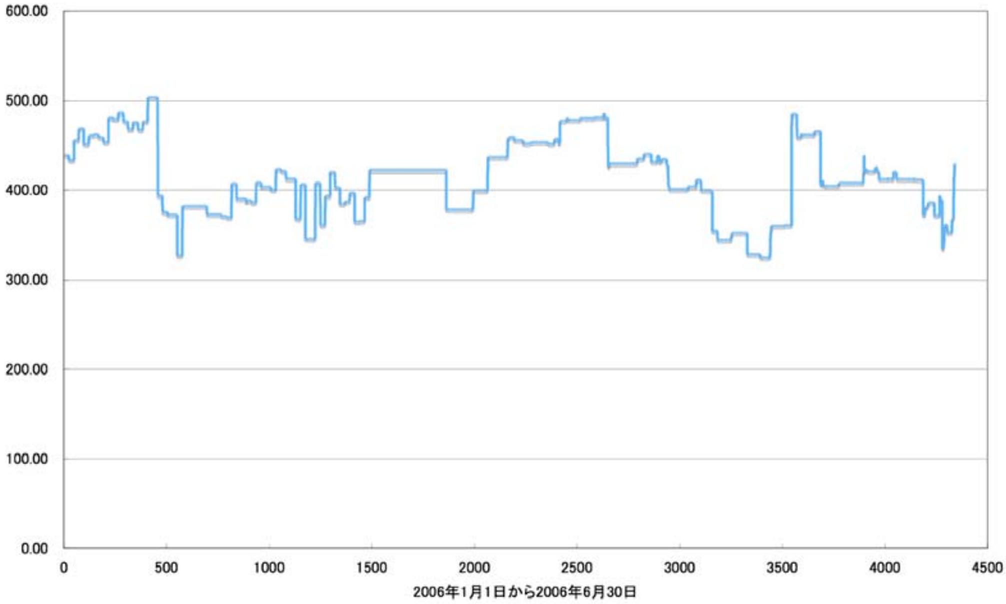

Figure A3-3 Transition of the amount of coalmine gas extracted from October 1st, 2004 to June 30th, 2006

Annex 4

MONITORING INFORMATION

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