MONITORING REPORT

JI0079 - CMM utilisation on the Joint Stock Company named Komsomolets Donbassa Coal Mine of DTEK (Donbasskaya Toplivnaya Energeticheskaya Kompanya)

Monitoring Report 01
Monitoring period
09/08/2008 to 03/11/2009

Version 1.c
28 January 2010

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SECTION A. General project activity information

A.1 Title of the project activity:

CMM utilisation on the Joint Stock Company named Komsomolets Donbassa Coal Mine of DTEK (Donbasskaya Toplivnaya Energeticheskaya Kompanya)

A.2. JI registration number:

JI0079

A.3. Short description of the project activity:

In this project CMM, which has been sucked out of the active coal mine “Komsomolets Donbassa”, has been utilised in two enclosed flares. The methane has been burned to less harmful CO_2.

In this monitoring report credits, produced in the first monitoring period should be monitored for the purpose of the verification as Emission Reductions Units ERU.

Table-1 Amount of methane utilised for flaring

Unit	**period**	**CH_4 [t/period]**
Flare 3+4	09/08/2008-31/12/2008	975
Flare 3+4	01/01/2009-03/11/2009	2,794
Total	**09/08/2008-03/11/2009**	**3,769**

A.4. Monitoring period:

Start date 09/08/2008 (Flare 3)
27/10/2008 (Flare 4)

End date 03/11/2009 (both flares)

Start day and end day included.

A.5. Methodology applied to the project activity (incl. version number):

A.5.1. Baseline methodology:

The approved consolidated methodology ACM0008 / Version 03 "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") has been used to identify the baseline scenario of the proposed JI project [ACM0008].

According to ACM0008 the methodological “Tool to determine project emissions from flaring gases containing methane”, EB 28 Meeting report, Annex 13, has been taken for the determination of the project emissions from flaring. In difference to the flaring tool a combustion

efficiency of 99.5%, according to the IPCC guidelines (see also ACM0008 Version 1 and Version 2), has been taken into account instead of the default value of 90% as given in the flaring tool.

A.5.2. Monitoring methodology:

A monitoring plan provided by the "Approved consolidated baseline methodology ACM0008", Version 03, Sectoral Scope: 8 and 10, EB28 is applied to the project [ACM0008].

Applicability requirements for the monitoring plan of the ACM008 methodology are identical to respective requirements of the baseline setting.

According to ACM0008 the methodological "Tool to determine project emissions from flaring gases containing methane", EB 28 Meeting report, Annex 13, has been taken for the determination of the project emissions from flaring. In difference to the flaring tool a combustion efficiency of 99.5%, according to the IPCC guidelines (see also ACM0008 Version 1 and Version 2), has been taken into account instead of the default value of 90% as given in the flaring tool.

A.6. Status of implementation including time table for major project parts:

Table-2 Status of Implementation

Unit: Flare 3	
Manufacturer: OAO "NPAO Vniikompressormash" a subsidiary of Ukrrosmetal, Sumy, Ukraine	
Type:UKG-5/8	
Serial Numbers: 03-08	
Capacity: 5-8 MW	
Activity	**Status**
Date of commission	14/02/2008
Last major overhaul	none
Last inspection	August 2009 – Eco-Alliance
Start of operation	09/08/2008
Planned installation date [PDD]	Sept 2007

Unit: Flare 4	
Manufacturer: OAO "NPAO Vniikompressormash" a subsidiary of Ukrrosmetal, Sumy, Ukraine	
Type:UKG-5/8	
Serial Numbers: 04-08	
Capacity: 5-8 MW	
Activity	**Status**
Date of commission	14/02/2008
Last major overhaul	none
Last inspection	August 2009 – Eco-Alliance
Start of operation	27/10/2008
Planned installation date [PDD]	April 2008

Installation of further units as stated in the PDD is delayed due to the Global Financial Crisis and should follow in late 2009 and 2010.

A.7. Intended deviations or revisions to the registered PDD:

The installation of further units as stated in the PDD is delayed due to the Global Financial Crisis.

Central Shaft

At the time the main degasification pipe is renewed. The works should be finalised in summer 2011. The installation of the flares 1 and 2 as well as the boiler 1 is planned for late 2011 or early 2012.

Air shaft

The boiler 2 at Air Shaft has been upgraded with a CMM burner system and started operation in November 2009. A monitoring system for the boiler has not been installed yet, the installation is planned for early 2010.
The installation of the cogeneration units is planned for summer 2011.

The maximum supply pressure from the existing central gas suction system turned out to be not sufficient for the supply of the flares and the boiler with gas. Both flares have been equipped with compressors for additional pressure generation.

A.8. Intended deviations or revisions to the registered monitoring plan:

As both flares have been equipped with compressors for additional pressure generation, additional power has been consumed by the project. This power consumption has been included into the project emissions using the Baseline Carbon Emission Factor for the Ukrainian power grid, which has been specified in the PDD.
Because the consumed power amount is small, it has not been measured, but has been calculated using the operation hours of the flares, see Annex 4.

The project emissions for uncombusted methane have been calculated using formulae referring to the flaring tool and not formula (9) from the PDD, see Annex 4.

A.9. Changes since last verification:

None. 1st verification

A.10. Person(s) responsible for the preparation and submission of the monitoring report:

Coal Mine Komsomolets Donbassa
- Alexander Mikhaylovich Agramakov, Techical Director until 28/04/2009
- Vladimir Raskidkin, Techical Director from 01/03/2009

Eco-Alliance OOO
- Vladimir Kasyanov, Managing director
- Olga Samus, Monitoring Engineer

Carbon-TF B.V
- Dr. Jürgen Meyer, Managing director
- Adam Hadulla, Consultant

SECTION B. Key monitoring activities according to the monitoring plan for the monitoring period stated in A.4.

B.1. Monitoring equipment:

B.1.2. Table providing information on the equipment used (incl. manufacturer, type, serial number, date of installation, date of last calibration, information to specific uncertainty, need for changes and replacements):

Table-4 Monitoring equipment

ID	Data	Method	Manufacturer	Classification	Serial number	Uncertainty level of data	Frequency of Measurement	Instal-lation
1	Methane amount to flare	Calculation	Vniikompresso-mash	GOST 8.586	-	low	Every 15 min.	2008
2	Gas flow	Standard orifice	Siemens	ME 11202CC22 1BA3	Flare 3: K2989B Flare 4: K2989A	low	-	2008
3	Pressure difference	Pressure difference transmitter	Siemens	SITRANS P PED:SEP DS III 7MF4433-1CA02-1AB1-Z	Flare 3: N1-W401-9002993 Flare 4: N1-W401-9002992	low	Every 15 min.	2008
4	Pressure	Pressure transmitter	Siemens	SITRANS P Serie Z AZB/W4117535	Flare 3: AZB/W4117535 Flare 4: AZB/V7119314	low	Every 15 min.	2008
5	Temperature	Resistance thermometer	JSC “Tera”, Chernigov	ТСПУ 1-3Н Pt-100 0,5% 80Ф8	Flare 3: 08262 Flare 4: 08269	low	Every 15 min.	2008

6	Flame Temperature	Thermocouple	Herth GmbH	Type S, Pt/PtRh	none	low	Every 15 min.	2008
7	CH_4 concentration	Infrared measurement	Siemens	Ultramat 23	Flare 3: N1 W4-339 Flare 4: N1 W4-340	low	Every 15 min.	2008
7a	CH_4 concentration	Infrared measurement	Analitpribor Smolensk	Gamma 100	2 units	low	Continuous	n.n.
7b	CH_4 concentration	Infrared measurement	Azov optic-mechanics plant	SHI-12	3 units	low	daily	n.n.
8	NMHC concentration	Gas chromatography	n.n.	n.n.	n.n	Very low	yearly	n.n.
9	CMM flow	Pitot Tube	Paul Gothe, Bochum	‘V9 ‘777	none	low	daily	n.n.

The CH_4 measurement units 7a and 7b are installed in the central suction system of the Air Shaft Nr. 3 and are taken for consistency and plausibility checks only. The SHI-12 units are hand held units which are used by the coal mine personnel to check the indication of the Gamma 100 units for plausibility.

B.1.3. Calibration procedures:

Table-5 Monitoring equipment

ID	Data	Uncertainty level of data (high/medium/low)	Calibration procedure	Last calibration	Calibrator
1	Methane amount to flares	calculation	none	none	none
2	Standard orifice	0.5 % of FSV*)	Calibration made using procedures of Sumystandartmetrology	14.12.2009	Sumystandart-metrology
3	Pressure difference	0.075 % of FSV*) Drift 0,25% in five years	Calibration made using procedures of Sumystandartmetrology	07.10.2009	Sumystandart-metrology
4	Pressure	0.5% of FSV*) Drift 0,3% per year	Calibration made using procedures of Sumystandartmetrology	07.10.2009	Sumystandart-metrology
5	Temperature	2.5% of FSV*)	Calibration made using procedures of Sumystandartmetrology	07.10.2009	Sumystandart-metrology
6	Flame temperature	± 1.5 K in the range from [0-600°C]**) 0.25% from value above 600°C**)	none, thermocouple is supposed to be changed at least one time per year, according to the flaring tool	none	none
7	CH_4 concentration (Ultramat)	1.0 % of FSV*)	Calibration made using procedures of Sumystandartmetrology Calibrations made using procedues of Eco-Alliance OOO every two weeks	07.10.2009 – Sumystandart-metrology 25.11.09 – EA	Sumystandart-metrology Eco-Alliance OOO
7a	CH_4 concentration (Gamma 100)	1.0% of FSV*)	Calibration made using procedures of Sumystandartmetrology Monthly calibration by coal mine	07.10.2009	Sumystandart-metrology Coal mine
7b	CH_4 concentration (SHI-12)	2.5% of FSV*)	Yearly calibrations using procedures of Derzhpromnaglyad	2008	Derzhprom-naglyad Donetsk
8	NMHC concentration	0.001%	Calibration made using procedures of MAKNII	n.n.	MAKNII
9	CMM flow	1.5%	none	none	none

*) FSV: full scale value
**) Fixed within EN 60584-2: 1996, Type S, Class 2

B.1.4. Involvement of Third Parties:

- The lab analysis for the determination of the NMHC concentration has been done by MAKNII
- The calibrations of CH_4-concentration meters in the flares have been done by Eco-Alliance
- The calibrations of CH_4-concentration meters in the central suction station have been done by Ukrteplostroy
- Yearly calibrations of all CH_4 meters are provided by Derzhpromnaglyad Donetsk
- Calibration of the monitoring equipment has been done by Sumy Standartmetrology
- Eco-Alliance OOO supported the coal mine with the collecting of the monitoring data.
- Emissions-Trader ET GmbH has supervised the data for plausibility and completeness.

B.2. Data collection (accumulated data for the whole monitoring period):

B.2.1. List of fixed default values:

Table-6 List of ex-ante fixed values – variables not needed in this monitoring report but stated in the PDD are marked grey (this variables are referring to project components which are not installed yet)

ID number	Data variable	Source of data	Data unit	Comment
P8, B49 $CEF_{ELEC,PJ}$	Carbon emission factor of $CONS_{ELEC,PJ}$	official data of Ukrainian power grid	t CO_{2eq}/MWh	SenterNovem data taken instead of not available Ukrainian data, according to information given un the PDD: 2008: 0.695 2009: 0.680 2010: 0.666 2011: 0.651 2012: 0.636
P13 Eff_{FL}	Flare combustion efficiency	ACM0008 Version 1&2 / IPCC	t CH_4	Set to 99.5 % (IPCC)
~~P16 Eff_{ELEC}~~	~~Efficiency of methane destruction/ oxidation by heat generation~~	~~ACM0008 / IPCC~~	~~%~~	~~Set to 99.5 % (IPCC)~~
~~P19 Eff_{HEAT}~~	~~Efficiency of methane destruction / oxidation in heat plant~~	~~ACM0008 / IPCC~~	~~%~~	~~set at 99.5% (IPCC)~~
P23, B19 CEF_{CH4}	Carbon emission factor for combusted methane	ACM0008 / IPCC	t CO_2eq/t CH_4	set at 2.75 t CO_2eq/t CH_4
P28, B18 GWP_{CH4}	Global warming potential of methane	ACM0008 / IPCC	t CO_2eq/t CH_4	set at 21
~~B55 $EF_{CO2,Coal}$~~	~~CO_2 emission factor of fuel used for captive power or heat~~	~~IPCC 2006 1 Introduction Table 1.2~~	~~tCO_2/MWh~~	~~Set to 0.3406 tCO_2/MWh Using the value for "Other Bituminous Coal" of 94,600 kg CO_2/TJ~~
~~B57 Eff_{heat}~~	~~Energy efficiency of heat plant~~	~~Boiler pass~~	~~%~~	~~91 % old coal boiler 91 % upgraded boiler~~

B.2.2. List of variables:

Table-7 List of variables – variables not needed in this monitoring report but stated in the PDD are marked grey (this variables are referring to project components which are not installed yet)

ID number	Data variable	Source of data	Data unit	Comment
P1 PE_y	Project emissions in year y	monitored data	t CO_{2eq}	calculated using formulae from the PDD
P2 PE_{ME}	Project emissions from energy use to capture and use methane	monitored data	t CO_{2eq}	calculated using formulae from the PDD
P3 PE_{MD}	Project emissions from methane destroyed	monitored data	t CO_{2eq}	calculated using formulae from the PDD
P4 PE_{UM}	Project emissions from uncombusted methane	monitored data	t CO_{2eq}	calculated using formulae from the PDD
P5 $CONS_{ELEC,PJ}$	Additional electricity consumption by project	monitored data	MWh	calculated using operation hours of the flares
P11 MD_{FL}	Methane destroyed by flaring	monitored data	t CH_4	calculated using formulae from the PDD
P12 MM_{FL}	Methane sent to flare	monitored data	t CH_4	calculated using formulae from the PDD
~~P14~~ ~~MD_{ELEC}~~	~~Methane destroyed by power generation~~	~~monitored data~~	~~t CH_4~~	~~calculated using formulae from the PDD~~
~~P15~~ ~~MM_{ELEC}~~	~~Methane sent to power plant~~	~~monitored data~~	~~t CH_4~~	
~~P17~~ ~~MD_{HEAT}~~	~~Methane destroyed by heat generation~~	~~monitored data~~	~~t CH_4~~	~~calculated using formulae from the PDD~~
~~P18~~ ~~MM_{HEAT}~~	~~Methane sent to heat generation~~	~~flow meter~~	~~t CH_4~~	
~~P24~~ ~~CEF_{NMHC}~~	~~Carbon emission factor for combusted non methane hydrocarbons (various)~~	~~lab analysis~~	~~-~~	~~Calculated if applicable~~
P25 PC_{CH4}	Concentration of methane in extracted gas	IR measurement	%	
~~P26~~ ~~PC_{NMHC}~~	~~NMHC concentration in coal mine gas~~	~~lab analysis~~	~~%~~	~~Used to check if more than 1% of emissions and to calculate r~~
~~P27~~ ~~r~~	~~Relative proportion of NMHC compared to methane~~	~~lab analysis~~	~~%~~	~~Calculated if applicable, based on the lab analysis.~~
B1 BE_y	Baseline emissions in year y	monitored data	t CO_{2eq}	calculated using formulae from the PDD
B3 $BE_{MR,y}$	Baseline emissions from release of methane into the atmosphere in year y that is avoided by the project activity	monitored data	t CO_{2eq}	calculated using formulae from the PDD

~~B4 $BE_{Use,y}$~~	~~Baseline emissions from the production of power, heat or supply to gas grid replaced by the project activity in year y~~	~~monitored data~~	~~t CO_{2eq}~~	~~calculated using formulae from the PDD~~
B14 $CMM_{PJ,y}$	CMM captured and destroyed in the project activity in year y	flow meter	t CH_4	calculated using formulae from the PDD
~~B46 GEN_y~~	~~electricity generation by project~~	~~monitored data~~	~~MWh~~	
~~B47 $HEAT_y$~~	~~Heat generation by project~~	~~monitored data~~	~~MWh~~	
PE_{Flare}	Project emissions from flaring	monitored data	t CO_{2eq}	Calculated using formula from the flaring Tool (AM_Tool_07)

B.2.3. Data concerning GHG emissions by sources of the project activity

Table-8 GHG emissions by sources of the project activity – variables not needed in this monitoring report but stated in the PDD are marked grey (this variables are referring to project components which are not installed yet)

ID number	Data variable	Source of data	Data unit	Comment
P12 MM_{FL}	Methane sent to flare	monitored data	t CH_4	
~~P15 MM_{ELEC}~~	~~Methane sent to power plant~~	~~monitored data~~	~~t CH_4~~	
~~P18 MM_{HEAT}~~	~~Methane sent to heat generation~~	~~flow meter~~	~~t CH_4~~	

B.2.4. Data concerning GHG emissions by sources of the baseline

Table-9 GHG emissions by sources of the baseline – variables not needed in this monitoring report but stated in the PDD are marked grey (this variables are referring to project components which are not installed yet)

ID number	Data variable	Source of data	Data unit	Comment
B14 $CMM_{PJ,y}$	CMM captured and destroyed in the project activity in year y	Sum of flow meters	t CH_4	
~~B46 GEN_y~~	~~electricity generation by project~~	~~monitored data~~	~~MWh~~	
~~B47 $HEAT_y$~~	~~Heat generation by project~~	~~calculation~~	~~MWh~~	

B.2.5. Data concerning leakage

Not applicable.

B.2.6. Data concerning environmental impacts

Not applicable.

B.3. Data processing and archiving (incl. software used):

The data are collected, processed and stored using a Siemens SIMATIC PLC S7 system and Siemens WINCC programming software. All data is stored in the internal memory about 2 GB. One time per hour the data are sent via GPS to an Internet-based Server data base. The server provider ensures regular back ups and archiving. Further on the data is stored and archived by Eco-Alliance OOO.
The data can be read any time from the internet data base by authorised personnel. The utilised methane amount is automatically calculated and stored in the PLC. As all input data are stored, the automatically calculation can by checked in retrospect any time.

For plausibility checks and potential data back up the data logged in the hand written journals of the suction system can be taken.

B.4. Special event log:

No special events.

SECTION C. Quality assurance and quality control measures

C.1. Documented procedures and management plan:

C.1.1. Roles and responsibilities:

The general project management is implemented by the Technical Director of the Coal Mine Komsomolets Donbassa through supervising and coordinating activities of his subordinates, such as the Director of Capital Development, the Deputy Director on surface degasification, heat technician, head of safety engineering departments, etc.
Daily a group of mechanics and electricians who are responsible for the measures and maintenance of all technological equipment and measuring instruments are present on-site. There are two shifts, 12 h each. For every shift there is one person on-duty responsible for the proper operation and keeping of the journals.
Overview calculations about the methane amount utilised are made on a monthly and yearly basis and notified in the journal. The monitoring system is supervised by the administration of the coal mine under the existing control and reporting system. The general supervision of the electronically monitoring system is executed by Eco-Alliance OOO, who is consultant for the coal mine.

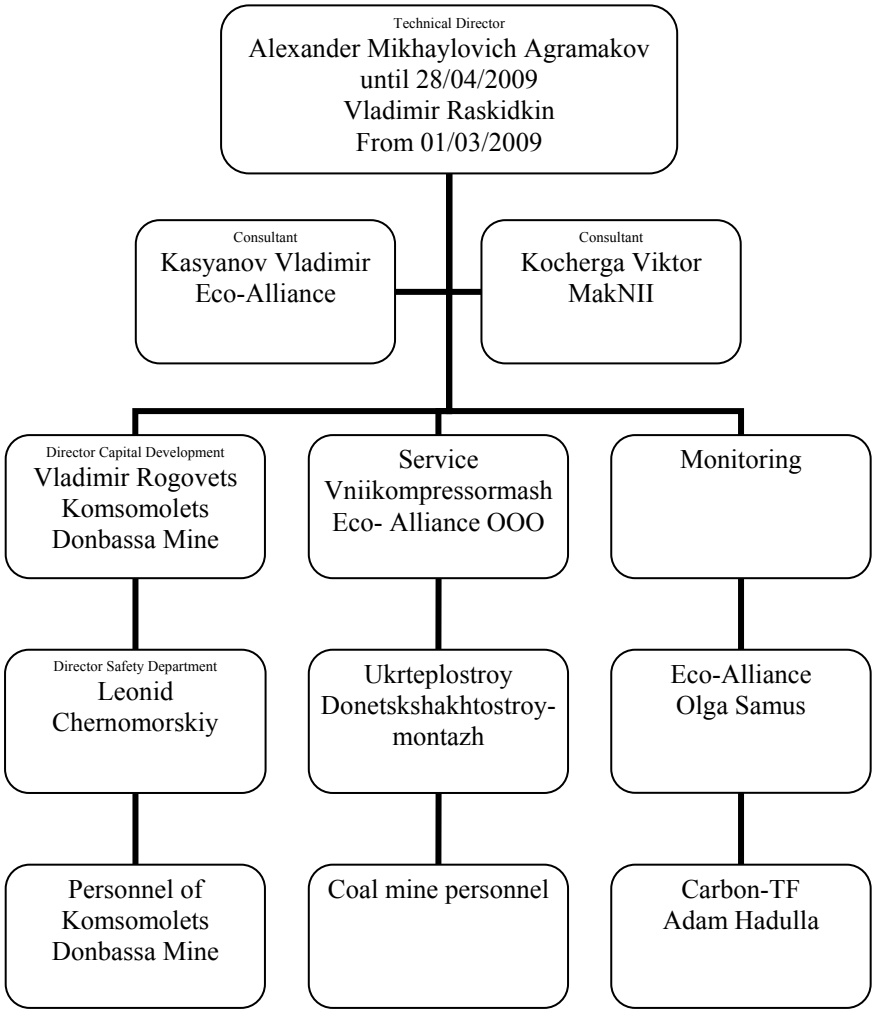

Figure 1 – Organigram

C.1.2. Trainings:

The employees responsible for the monitoring control have been trained on–the–job during the installation of the system.
The responsible personnel of Eco-Alliance has been trained on the handling with CMM-utilisation units and the applied monitoring systems, during several practical courses in Germany. In this courses which has been carried out by A-TEC Anlagentechnik GmbH, a Joint-Venture participant of Eco-Alliance, also the basic principles of emissions trading and the background of the monitoring has been explained.
A-TEC Anlagentechnik GmbH is already running several CMM utilisation plants and monitoring systems in Germany.
These trained personnel is the basis of a team of engineers, which should establish a specialised service team in the Ukraine and instruct further operating and monitoring personnel, as well for this project.

C.2. Involvement of Third Parties:

- Sumystandartmetrology, has been involved for the yearly examination and calibrations of the measurement equipment
- MakNII Institute, the “State Makeyevka Institute for Research and Education for Safe Work in the Coal Mining Industry”, a subsidiary of the “Ukrainian Ministry for Fuel and Energy”, has been involved for the lab analysis (NHMHC) of the CMM.
- Ukrteplostroy has been involved for the service and upgrade of the boiler and calibration of the CMM flow meter in the vacuum pump station.
- Donetskshakhtostroymontazh has been involved for installation of pipelines
- Vniikompressormash has delivered the flares been involved for service during the first period
- Eco-Alliance has been involved for monitoring and service of the flares since summer 2009

C.3. Internal audits and control measures:

Methane concentration and CMM flow data of the flares are compared with the indication of the meters from the vacuum pump station for plausibility. The coal mine personnel has been instructed by Eco-Alliance.

C.4. Troubleshooting procedures:

The general troubleshooting for the whole coal mine is available at the coal mine. The coal mine personnel are instructed to follow the procedures. The flares are automatically shut down in case of faults. Internal trouble shooting procedures are available inside the flares.

SECTION D. Calculation of GHG emission reductions

D.1. Table providing the formulas used:

Table-10 Formulae used taken from the PDD, strike-through symbols are not used in this monitoring report (this symbols are referring to project components which are not installed yet).

ID number	Data variable	Formula
P1 PE_y	Project emissions in year y	$PE_y = PE_{ME} + PE_{MD} + PE_{UM}$
P2 PE_{ME}	Project emissions from energy use to capture and use methane	$PE_{ME} = CONS_{ELEC,PJ} \times CEF_{ELEC,PJ}$
P3 PE_{MD}	Project emissions from methane destroyed	$PE_{MD} = (MD_{FL} + MD_{ELEC} + MD_{HEAT}) \times (CEF_{CH4} + r \times CEF_{NMHC})$
P4 PE_{UM}	Project emissions from uncombusted methane	$PE_{UM} = GWP_{CH4} \times [+ MM_{ELEC} \times (1 - Eff_{ELEC}) + MM_{HEAT} \times (1 - Eff_{HEAT})] + PE_{Flare}$
P5, $CONS_{ELEC}$	Additional electricity consumption by the project	$CONS_{ELEC} = (h_3 + h_4) * P_M * Eff_M / 1000$
~~P27~~ ~~r~~	~~Relative proportion of NMHC compared to methane~~	~~$r = PC_{NMHC} / PC_{CH4}$~~
B1 BE_y	Baseline emissions in year y	$BE_y = BE_{MR,y} + BE_{Use,y}$
B3 $BE_{MR,y}$	Baseline emissions from release of methane into the atmosphere in year y that is avoided by the project activity	$BE_{MR,y} = CMM_{PJ,y} \times GWP_{CH4}$
~~B4~~ ~~$BE_{Use,y}$~~	~~Baseline emissions from the production of power, heat or supply to gas grid replaced by the project activity in year y~~	~~$BE_{Use,y} = GEN_y * EF_{ELEC} + (HEAT_y / Eff_{HEAT,coal}) * EF_{HEAT}$~~
B14 $CMM_{PJ,y}$	CMM captured and destroyed in the project activity in year y	$CMM_{PJ,y} = (MD_{FL} + MD_{ELEC} + MD_{HEAT})$
ER	Emission reductions	$ER_y = BE_y - PE_y$
PE_{Flare}	Project emissions from flaring	$PE_{flare,y} = \sum_{h=1}^{8760} TM_{RG,h} x (1 - \eta_{flare,h}) x \frac{GWP_{CH4}}{1000}$

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

The resulting uncertainty is shown in the <Possible sources of error> document.
Obvious errors in the journals have been corrected by Eco-Alliance during the supervision of the documents.

D.3. GHG emission reductions (referring to B.2. of this document):

D.3.1. Project emissions:

period	project emissions [t CO_{2eq}]
09/08/2008-31/12/2008	3,597
01/01/2009-03/11/2009	9,422
Total 09/08/2008-03/11/2009	**13,019**

D.3.2. Baseline emissions:

period	baseline emissions [t CO_{2eq}]
09/08/2008-31/12/2008	20,485
01/01/2009-03/11/2009	58,672
Total 09/08/2008-03/11/2009	**79,157**

D.3.3. Leakage:

Not applicable.

D.3.4. Summary of the emissions reductions during the monitoring period:

Period	Emission reductions [t CO_{2eq}]
09/08/2008-31/12/2008	16,887
01/01/2009-03/11/2009	49,250
Total 09/08/2008-03/11/2009	**66,138**

Annex 1

REFERENCES

- Project Design Document; Version 04, dated 2008-04-14
- Final Determination Report for the project: JI0079 CMM utilisation on the Joint Stock Company named Komsomolets Donbassa Coal Mine of DTEK (Donbasskaya Toplivnaya Energeticheskaya Kompanya), Report No: 2008-200 Rev 02, by DNV Det Norske Veritas, dated 2008-09-18
- Letter of Approval, Nr. M000011, issued on 2007-10-03 by the Ukraine (host party)
- Letter of Approval, Nr. 2007JI04, issued on 2007-11-26 by the Kingdom of the Netherlands (investor party)
- Letter of Endorsment, Nr. 11439/10/310, issued on 2006-12-22 by the Ukrainian Ministry of Environmental Protection
- supporting evidence documents provided by the coal mine

[AM_Tool_07] Methodological “Tool to determine project emissions from flaring gases containing methane”, EB 28, Meeting report, Annex 13
http://cdm.unfccc.int/Reference/tools/index.html

Annex 2

Installation scheme including metering positions

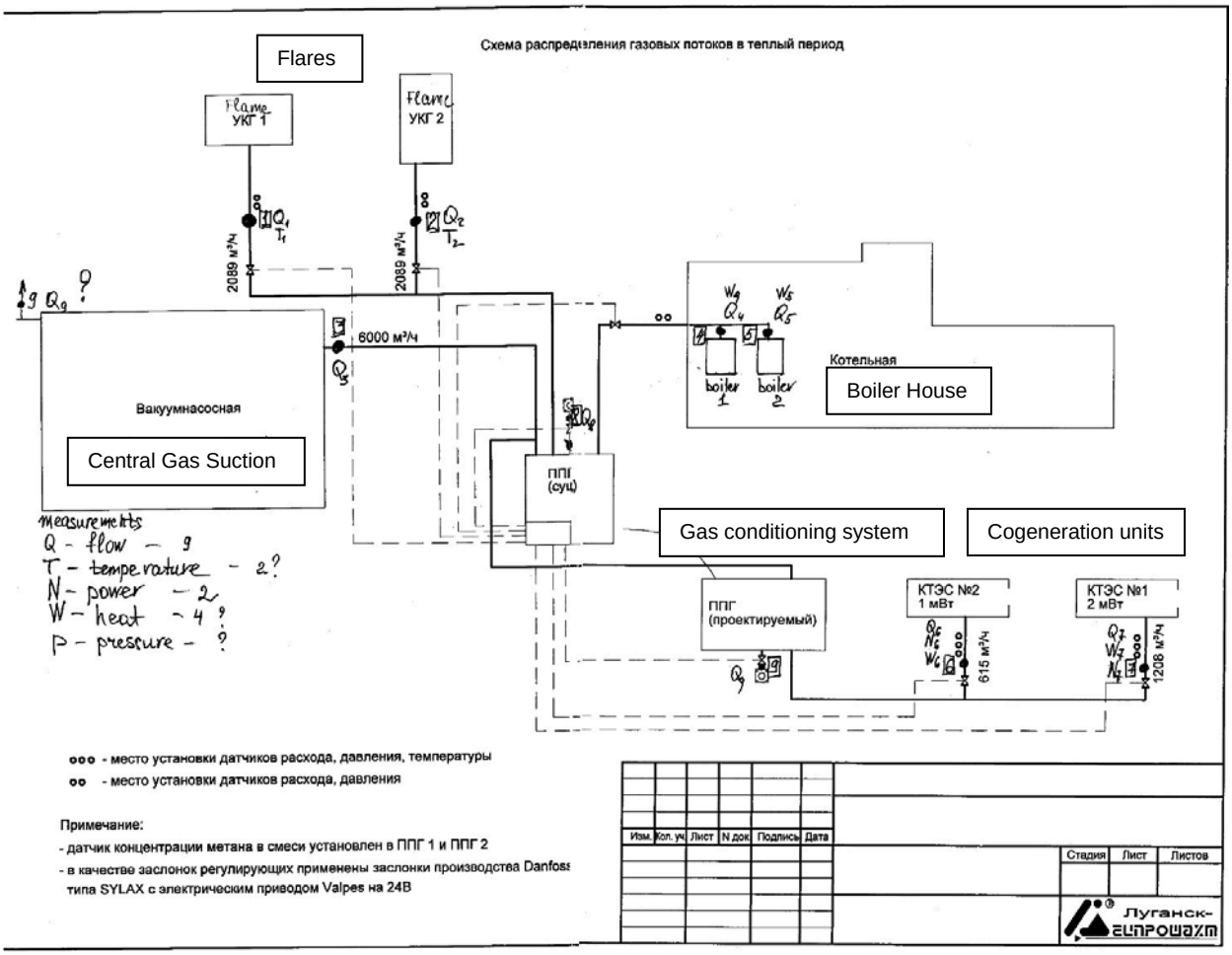

Figure-2 Installation scheme – Coal Mine Komsomolets Donbassa, Air Shaft Nr.3

Вакуум насосная – *Gas pumps of the Coal Mine*

Котельная – *boiler house – four boilers, two of which have been upgraded with a CMM burner system*

ППГ – *gas conditioning system*

УКГ - *flares*

КТЭС – *cogeneration units*

Annex 3

Data flowchart

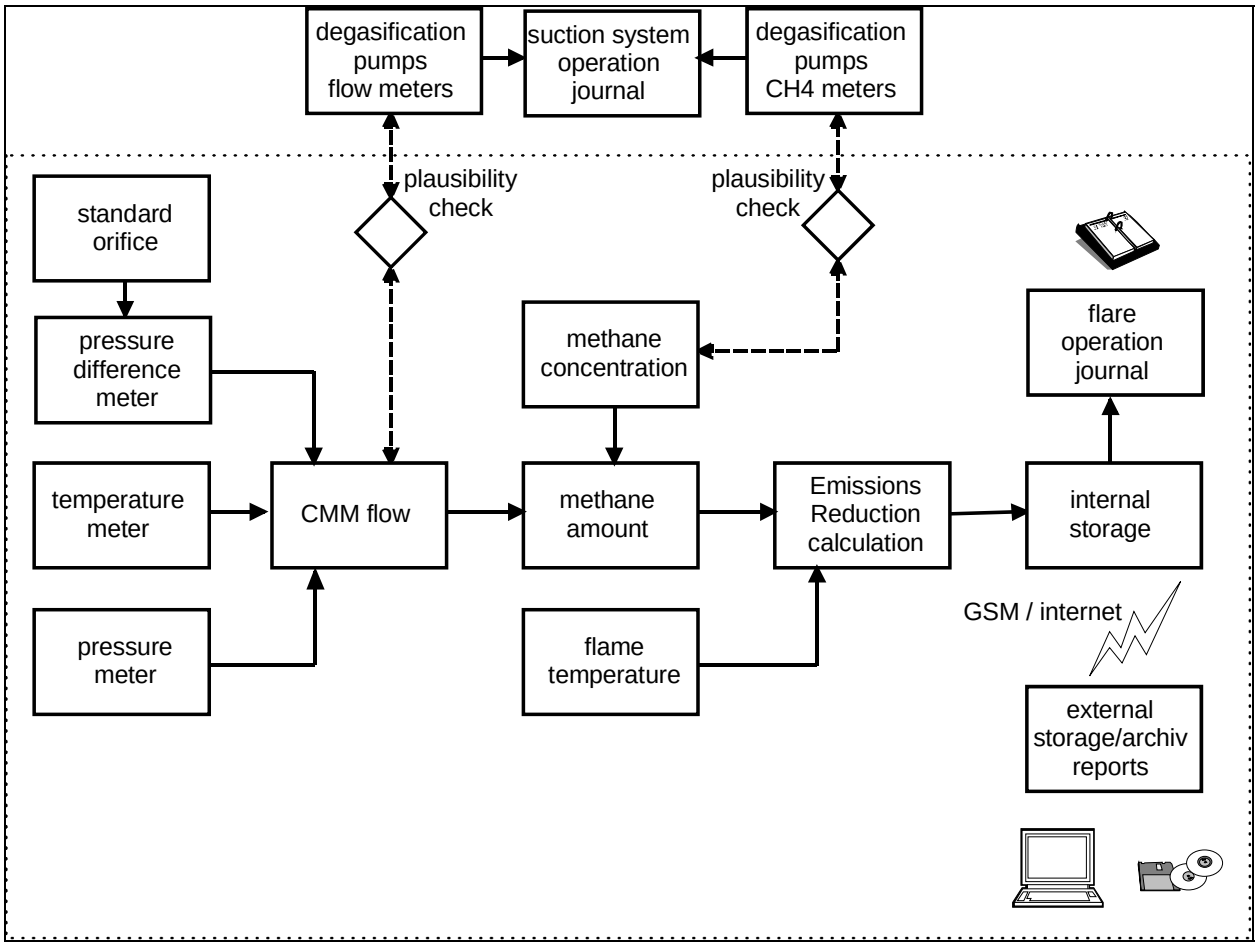

Figure-6 data flow scheme

Annex 4

Deviation from the monitoring plan as stated in the PDD

A4.1 Project emissions from flaring

In the PDD the formula for project emissions from uncombusted methane is given as per:

$$PE_{UM} = GWP_{CH4} \times [(MM_{FL} \times (1 - Eff_{FL}) + MM_{ELEC} \times (1 - Eff_{ELEC}) + MM_{HEAT} \times (1 - Eff_{HEAT})] \quad (9)$$

In this Monitoring Report the formula 9 has been replaced by the following formula:

$$PE_{UM} = GWP_{CH4} \times [MM_{ELEC} \times (1 - Eff_{ELEC}) + MM_{HEAT} \times (1 - Eff_{HEAT})] + PE_{flare}$$

Using formula (15) from the flaring tool for the calculation of PE_{Flare}:

$$PE_{flare,y} = \sum_{h=1}^{8760} TM_{RG,h} x (1 - \eta_{flare,h}) x \frac{GWP_{CH4}}{1000} \quad (AM\_Tool\_07\text{-}15)$$

where:

$PE_{flare,y}$	Project emissions from flaring of the residual gas stream in year y (t CO_2eq)
$TM_{RG,h}$	Mass flow rate of methane in the residual gas in the hour h (kg/h)
$\eta_{flare,h}$	flare efficiency in the hour h
GWP_{CH4}	Global warming potential of methane (21 tCO_2eq/tCH_4)

For $\eta_{flare,h}$ three different values have been taken, depending on the combustion temperature of the flare:

T_{Flame}	$\eta_{flare,h}$
> 850°C	99.5%
500-850°C	90.0%
< 500°C	0%

A4.2 Project emissions from energy use to capture and use methane

The formula for the calculation of PE_{ME} is given in the PDD. The amount of the energy used by the compressors installed in the flares $CONS_{ELEC}$ has not been measured, but calculated using the operation hours of the flare, whereby the effective load and capacity are different if the flare unit is standby and the compressor is not working:

$$CONS_{ELEC} = CONS_{ELEC,\ Flare\ 3} + CONS_{ELEC,\ Flare\ 4}$$

$$CONS_{ELEC,\ Flare\ i} = (Eff_M * P_M * h_{i,M}) + ((h_{i,total} - h_{i,M}) * (P_{total} - P_M) * Eff_{SB})$$

with

$CONS_{ELEC,Flare\ i}$	additional electric energy used by the compressors and other equipment installed in the flares [MWh]

$h_{i;M}$	operation hours of compressor from flare i [h] (operation)
$h_{4i,\ total}$	operation hours of flare i [h] (operation+standby)
P_M	motor capacity [kW], set to 45 kW for each compressors
P_{total}	total capacity of the flare unit [kW], set to 60 kW for each flare
Eff_M	effective load of electric motor [%], set to 75% for both flares
Eff_{SB}	effective load of the flare unit during standby [%], set to 45% for both flares

Annex 5

Photo of the plant

Figure-4 Flare 3 and Flare 4 – Komsomolets Donbassa Coal Mine, Air Shaft Nr.3