INITIAL AND FIRST PERIODIC ANNUAL JI MONITORING REPORT

Version 2.0

14th of December 2012

CONTENTS

SECTION A. General project activity and monitoring information

A.1 Title of the project activity:

"Carbonaceous rock processing and concentrating with the aim of reducing greenhouse gas emissions into the atmosphere"

Sectoral scope: 8. Mining/mineral production

A.2. JI registration number:

Reference number will be assigned later.

ITL ID number: UA1000503.

A.3. Short description of the project activity:

Purpose of the proposed project is dismantling and processing waste heaps by extracting thermal coal from carbonaceous rock, thus avoiding carbon dioxide emissions into the atmosphere from burning carbon component. The project is ecological and is aimed at improving the environmental situation in the region by preventing self-heating and self-ignition of waste heaps, formed by coal mines.

Waste heaps, formed by the coal mines, inclined to spontaneous combustion because of the presence of the coal fraction in them. As a result of physical and chemical processes in the middle of the waste heaps burning of coal-containing fractions and other combustible components occurs, leading to fugitive greenhouse gas emissions and other harmful pollutants in the environment. Measures on extinguishing the waste heaps are not regularly conducted, so the probability of spontaneous combustion is very high. Oxidation process of combustible elements in the waste heaps is slow and unpredictable, because it is difficult to identify centres of burning and eliminate them. Implementation of certain measures on extracting coal from the waste heaps are quite costly and are not possible without additional incentives. Legislation of Ukraine does not oblige owners of the waste heaps to monitor fire condition of these objects and liquidation of centres of spontaneous combustion.

Baseline scenario assumes that the problem of waste heaps combustion will not be effectively resolved, carbonaceous rock of waste heaps will undergo self-ignition and burn until all volume of coal contained in it does not burn. Continuation of existing situation will lead to large emissions of greenhouse gases in the atmosphere and to the general pollution of the ecosystem of the region. In addition, the baseline scenario assumes coal extraction by mining method that leads to fugitive methane emissions during extraction and carbon dioxide emissions for electricity consumption from the power grid of Ukraine.

This JI project is implemented on the territory of settlement Verhnyoherasymivska Village Council, Krasnodonskiy District of Lugansk region of Ukraine. Project boundaries include waste heaps #1, #2, #3, formed by the mine "Krasnodarska", and also enrichment complex, located close to the waste heap #1.

The project "Carbonaceous rock processing and concentrating with the aim of reducing greenhouse gas emissions into the atmosphere" involves the introduction of complex of measures aimed at waste heaps dismantling with the aim of black coal extraction, which will partially replace coal that would otherwise be extracted by mining method, which would in turn lead to fugitive emissions of methane and carbon dioxide by electricity consumption.

The decision on the implementation of this project was taken on March 10, 2008. During 2009 agreement with company-contractor, who will provide transportation services, was signed, and lease agreement of concentrating mill and contract on recultivation of the waste heaps were concluded. Starting date of the project is March 10, 2008, when the order No. 65 dated 10/03/2008 on implementation of this project using Joint Implementation Mechanism under the Kyoto Protocol was signed. Because of the fact that the proposed project is very expensive, the only incentive for the implementation of these actions was JI mechanism, which allows selling emission reduction units (ERUs) generated as a result of the project activity, at the International emissions trading market.

A.4. Monitoring period:

- Monitoring period starting date: 01/06/2009.
- Monitoring period closing date: 30/11/2012.[1]

[1] Both days are included in the monitoring period.

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

Specific approach of JI projects is used for the monitoring of emission reductions.

A.5.1. Baseline methodology:

Coal extraction from the waste heaps will prevent greenhouse gas (GHG) emissions into the atmosphere as if in the case of spontaneous burning and will produce additional amount of coal instead of its mining. Waste heaps are frequently spontaneously igniting and burning, causing emissions of hazardous substances and green-house gases. The fraction of coal in the waste heaps can be as high as 28-32%[2], so the risk of spontaneous self-heating and burning is very high. The survey[3] shows that 78% of waste heaps in the Luhansk Region are, or have been burning at some point in time. If a waste heap has started burning, even if the fire is extinguished, it will continue burning after a while unless the fire is extinguished regularly. Burning waste heaps in Ukraine are very often not taken care of properly, especially when there is no immediate danger to population and property, i.e. if the waste heap is located at a considerable distance from a populated area, or is at the early stages of self-heating. The monitoring of the waste heaps condition is not done on a systematic and timely basis and information is frequently missing. The only way to prevent a waste heap from burning is to extract all the combustible matter, which is generally residual coal from the mining process. This project will reduce the emissions by extracting coal from the waste heap matter and using the remaining rock for land engineering.

Coal extracted from the waste heaps will substitute the coal from the mines and will be used mainly for energy production purposes at coal-fired power plants. Coal mining is a source of the methane fugitive emissions. Therefore, the project activity will reduce methane emissions by reducing the amount of coal required to be mined.

Baseline emissions come from two major sources:

1) Carbon dioxide emissions that occur during combustion of energy coal. These are calculated as stationary combustion emissions from coal in the equivalent of the amount of coal that is extracted from the waste heaps in the project scenario. This emission source is also present in the project scenario and the emissions are assumed to be equal in both project and baseline scenarios. Therefore, this emission source is not included into calculations.
2) Carbon dioxide emissions from burning waste heaps. These are calculated as stationary combustion emissions from coal in the equivalent of the amount of coal that is extracted from the waste heaps in the project scenario, adjusted by the probability of a waste heap burning at any point in time. As the baseline suggests that the current situation is preserved regarding the waste heaps burning and the waste heaps in question are at risk of burning, it is assumed that actual burning will occur. The correction factor is applied in order to address the uncertainty of the waste heaps burning process. This factor is defined on the basis of the survey of all the waste heaps in the area providing a ratio of waste heaps that are or have been burning at any point in time to all existing waste heaps.

Leakage is the net change of anthropogenic emissions by sources and/or removals by sinks of GHGs which is done outside the project boundary, and that can be measured and is directly attributable to the JI project.

This project will result in a net change in of anthropogenic emissions by sources and/or removals by sinks of GHGs come from two sources:

- Leakages caused by fugitive methane emissions during coal extraction in coal mines;
- Leakages related to electricity consumption from the grid of Ukraine during coal extraction in the mine.

In the baseline scenario coal production by mining method is implemented (underground coal mines), while *fugitive emissions of coal mine methane* appear. In the project scenario, additional amount of thermal coal is extracted, using wet method of rock mass beneficiation of the waste heaps, which otherwise would be burned. Therefore, coal produced by the project activity substitutes the coal would have been otherwise mined in the

[2] *Geology of Coal Fires: Case Studies from Around the World,* Glenn B. Stracher, Geological Society of America, 2007, p. 47

[3] *Analysis on the fire risk of Luhansk Region's waste heaps*, Scientific Research Institute "Respirator", Donetsk, 2012.

baseline scenario that would cause fugitive methane emissions. Thus, coal extraction from the waste heap will cause methane emissions.

Electricity consumption and related with this greenhouse gas emissions during waste heap dismantling will be included in the calculation of the project emissions. *Carbon dioxide emissions as a result of electricity consumption*, during coal mining in the amount that equals to the project amount of coal, is leakage that can be taken into account on the basis of State Statistics Committee[4] about the specific electricity consumption during coal production in the mines of Ukraine in the relevant year. Data in this link indicates that the specific level of electricity consumption during coal mining is higher than the specific electricity consumption from grid in the project scenario.

As reliable and accurate national data on fugitive CH_4 emissions associated with the production of coal are available, project participants used this data to calculate the amount of fugitive CH_4 emission.

JI specific approach was developed for this project in line with the JI Guidance on Criteria for Baseline Setting and Monitoring, Version 03. The resulting Monitoring Plan was determined as part of the determination process. The resulting Monitoring plan was agreed in the determination process.

Emission reductions as a result of the implementation of this project will come from three major sources:

- Elimination of carbon dioxide emissions sources from self-heating of the waste heap by mining coal from it;
- Reduction of the fugitive methane emissions volume because of coal mining by substitution of the coal from the mine to the coal extracted from the waste heap under the project implementation;
- Reduction of energy consumption during waste heap dismantling compared to energy consumption during coal mining.

The following parameters are monitored:

1. **Amount of electricity that was consumed as a result of the project activity in the relevant period *y*.**

   For measurement of this parameter data of the company commercial is used. Monthly electricity bills (acceptance certificate) are supporting document on electricity consumption. This parameter is recorded using special electric energy meters. Meter is placed immediately after current transformers at the industrial site. This meter registers all electricity consumed in framework of the project as access to the electricity supply is carried out only through him. Indications are used for commercial accounts with the company-electricity supplier. Regular cross-checks with the energy supply company are performed. Monthly and annual reports are based on the monthly bills.

2. **Amount of diesel fuel that was consumed by transport as a result of the project activity in the relevant period *y*.**

   For the metering this parameter the commercial data of the company is used. For confirmation of the amount of fuel consumed completion certificates are used from the contractor. Company-contractor performs works on dismantling waste heap, rock mass transportation to industrial sites and other transportation services required by the project activity. Technical services for recultivation of waste heaps are provided by company-contractor. Therefore, clarity and reliability of collecting relevant information as well as monitoring of internal working regulations is conventional internal interests of the company. Only consumption of that fuel, which refers to the project activity, is taken into account under the project. At the industrial site diesel fuel consumption is done only by transport project, but if other equipment is used, fuel consumption by this equipment is also included. Diesel fuel is consumed by road transport, which transports raw materials and coal, bulldozers and excavators that dismantle the waste heap and form recultivated heap, special equipment that runs on industrial site. Monitoring covers total diesel fuel consumption within this project. Amount of diesel fuel consumed in accounting documents is given in litres, so for the purposes of monitoring conversion of measurement units of this fuel quantity is carried

[4] http://www.ukrstat.gov.ua/

out in tones using density which equals to 0.85 kg/l[5]. Regular cross-checks between lessee and lessor are held on trucks mileage. On the basis of these data, monthly and annual technical reports are prepared.

3. **Amount of coal products, which was obtained by enrichment of carbonaceous rock as a result of the project activity in the relevant period *y*.**

   This parameter is tracked based on internal company documents. Acceptance certificates of coal products are used t confirm the amount of coal shipped to the consumer. For calculating the GHG emission reduction only those products, which are shipped to a customer, are taken into account and related to the project activity. Weighing products is performed directly at the industrial site of concentrating complex. For this purpose special automobile scales are used. To ensure full control of this parameter, regular cross-checks are performed with buyers of coal products. At the end of the month monthly technical report is prepared; on its basis annual reports are prepared. Information on the volume of ROM coal extraction is stored in paper and electronic forms.

4. **Ash and water content of coal products, which was obtained by enrichment of carbonaceous rock a result of the project activity in the relevant period *y*.**

   These parameters are provided based on the findings of the independent laboratory that conducts regular periodic analysis of black coal samples, extracted from the waste heap. The main indicators of black coal quality are calorific value, ash content, water content and sulphur content. The conclusions of the laboratory include clear and transparent information on the number of shipped coal batch, indicators of ash and water content. Analysis of extracted coal is produced monthly. Also research of extracted coal samples may be conducted at the request of the consumer contrary to the established internal regulations. Besides, the buyer of coal products provides independent study of coal samples and compares with indicators in acceptance certificates of coal that is extracted from waste heap. Results of laboratory studies are stored in paper and electronic forms. If the data on the average ash content of sorted fraction and average water content of concentrated fraction, extracted from the heap in period y is not available to the developer, or is irregular with a high level of uncertainty, they are taken equal to the corresponding general Ukrainian standards. If necessary, the analysis of coal samples can be made at the request of the buyer.

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

Decisions on JI project implementation, which is aimed at processing rock mass of the waste heap with the aim of reducing GHG emissions in the atmosphere, was made on March 10, 2008. Date of commissioning of installation for waste heap processing is June 1, 2009. Plan of project implementation is shown below:

Activity	Date in the PDD	Actual Date
Date of decision taking	"10/03/2008"	"10/03/2008"
Starting date of the investment phase of the project	"18/04/2009"	"18/04/2009"
Commissioning works	"15/05/2009"	"15/05/2009"
End date of the investment phase of the project	"19/05/2009"	"19/05/2009"
Starting date of the operational phase of the project	"01/06/2009"	"01/06/2009"
Final (planned) date of operational phase of the project	"31/12/2013"	"31/12/2013"

Table 1 – Project implementation plan.

Letters of Approval were issued by both Parties involved mentioned in the PDD:
Letter of Approval from SEIA of Ukraine No. 3936/23/7 dated 21/12/2012.
Letter of Approval from Ministry of the Environment of Estonia No. 12-1/11002-2 dated 17/12/2012.
This JI project was made publicly available on the UNFCCC website. The full text of PDD could be found at http://ji.unfccc.int/JIITLProject/DB/MXVNLGGBFGA3URW0I8HPVB49C3S826/details.

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

There are no significant deviations to the PDD.
Achieved amount of emission reduction units differs from the amount that was planned in the PDD:

[5] 4840-2007 Diesel fuel. Specifications. Density in 0.85 kg/l is taken as the average value between the two types of diesel fuel: summer and winter (data from Table 1). Values are converted from units kg/m^3 into kg/l.

Period:	Data in the PDD***	Data in this report
Emission reductions in 2009*, tons of CO_2e	298 325	298 325
Emission reductions in 2010, tons of CO_2e	562 798	562 798
Emission reductions in 2011, tons of CO_2e	599 648	599 648
Emission reductions in 2012**, tons of CO_2e	536 901	500 623

Table 2 – Comparison of emission reductions

* Period from 01/06/2009 till 31/12/2009. Hereinafter in this report, the values in the tables of 2011 relate to this period.
** Period from 01/01/2012 till 30/11/2012. Hereinafter in this report, the values in the tables of 2012 relate to this period.
*** Recalculated according to monitoring period of this report.

Discrepancies for 2012 are due to the fact that the estimates in the PDD were based on forecasted data for coal content in waste heaps, on calculated operating modes of technological equipment, on fixed demand for coal products and other.

A.8. Intended deviations or revisions to the Monitoring plan:

There are no deviations to the monitoring plan.

A.9. Changes since last verification:

Not applicable.

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

"AGS-2008" LLC:

- Zagorskiy Sergiy Igorovych, Director.

SECTION B. Key monitoring activities

For the monitoring period stated in A.4. the following parameters have to be collected and registered:

1. **Amount of electricity that was consumed as a result of the project activity in the relevant period *y*.**

   For measurement of this parameter data of the company commercial is used. Monthly electricity bills (acceptance certificate) are supporting document on electricity consumption. This parameter is recorded using special electric energy meters. Meter is placed immediately after current transformers at the industrial site. This meter registers all electricity consumed in framework of the project as access to the electricity supply is carried out only through him. Indications are used for commercial accounts with the company-electricity supplier. Regular cross-checks with the energy supply company are performed. Monthly and annual reports are based on the monthly bills.

2. **Amount of diesel fuel that was consumed by transport as a result of the project activity in the relevant period *y*.**

   For the metering of this parameter the commercial data of the company is used. For confirmation of the amount of fuel consumed completion certificates are used from the contractor. Company-contractor performs works on dismantling waste heap, rock mass transportation to industrial sites and other transportation services required by the project activity. Technical services for recultivation of waste heaps are provided by company-contractor. Therefore, clarity and reliability of collecting relevant information as well as monitoring of internal working regulations is conventional internal interests of the company. Only consumption of that fuel, which refers to the project activity, is taken into account under the project. At the industrial site diesel fuel consumption is done only by transport project, but if other equipment is used, fuel consumption by this equipment is also included. Diesel fuel is consumed by road transport, which transports raw materials and coal, bulldozers and excavators that dismantle the waste heap and form recultivated heap, special equipment that runs on industrial site. Monitoring covers total diesel fuel consumption within this project. Amount of diesel fuel consumed in accounting documents is given in litres, so for the purposes of monitoring conversion of measurement units of this fuel quantity is carried out in tones using density which equals to 0.85 kg/l[6]. Regular cross-checks between lessee and lessor are held on trucks mileage. On the basis of these data, monthly and annual technical reports are prepared.

3. **Amount of coal products, which was obtained by enrichment of carbonaceous rock as a result of the project activity in the relevant period *y*.**

   This parameter is tracked based on internal company documents. Acceptance certificates of coal products are used t confirm the amount of coal shipped to the consumer. For calculating the GHG emission reduction only those products, which are shipped to a customer, are taken into account and related to the project activity. Coal products of 1-50 mm class are produced under the project, which are the final product. Coal concentrate of 1-50 mm class is shipped as ROM coal. Technologically coal products are shipped from different flyovers, because it requires the enrichment process, but one class of coal is shipped to the warehouse of finished products. Due to established distribution channel of coal, shipment of goods happens almost constantly during working time. Weighing products is performed directly at the industrial site of concentrating complex. For this purpose special automobile scales are used. Weighing coal is performed on tensometric scales. Procedure of weighing coal products is not complicated and is as follows: laden truck enters a metal platform of scales, and tensometric sensors generate electrical signal which is processed by the processor and is transformed into value of actual mass of the load. Operator of weighing point records these indications to the log. After this, truck is sent to the consumer of coal products. Time of weighing cargo is approximately 2 minutes. On the basis of log entries at the end of the month work completion certificates are formed. Except weighing coal products on these scales, also weighing carbonaceous rock is carried out, which is transported from the waste heap to the concentrating complex. So work completion certificates contain information on the number of weighted rock. To ensure full control of this parameter, regular cross-checks are performed with buyers of coal products. At the end of the month monthly technical report is prepared; on its basis annual reports are prepared. Information on the volume of ROM coal extraction is stored in paper and electronic forms.

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[6] DSTU 4840-2007. Diesel fuel. Specifications. Density in 0.85 kg/l is taken as the average value between the two types of diesel fuel: summer and winter (data from Table 1). Values are converted from units kg/m^3 into kg/l.

4. **Ash and water content of coal products, which was obtained by enrichment of carbonaceous rock a result of the project activity in the relevant period *y*.**

These parameters are provided based on the findings of the independent laboratory that conducts regular periodic analysis of black coal samples, extracted from the waste heap. The main indicators of black coal quality are calorific value, ash content, water content and sulphur content. The conclusions of the laboratory include clear and transparent information on the number of shipped coal batch, indicators of ash and water content. Analysis of extracted coal is produced monthly. Also research of extracted coal samples may be conducted at the request of the consumer contrary to the established internal regulations. Besides, the buyer of coal products provides independent study of coal samples and compares with indicators in acceptance certificates of coal that is extracted from waste heap. Quantitative indicators of coal ash and water content are determined in accordance with the regulations: DSTU 4096-2002, GOST 27314-91, GOST 11022-95 and others. Results of laboratory studies are stored in paper and electronic forms. If necessary, the analysis of coal samples may be carried out at the request of the buyer. If data on the average ash content of sorted fraction and average water content of sorted fraction extracted from the heap in the period y are not available to the developer, or are irregular with a high level of uncertainty, they are taken equal to the corresponding general Ukrainian parameters (State Statistics Service of Ukraine. Fuel and Energy Resources of Ukraine, Statistical Yearbook, (See Annex 5)). In case of necessity analysis of coal samples may be carried out at the request of the buyer.

B.1. Monitoring equipment types

1. Electricity meter "Actaris SL7000 Smart";
2. Automobile scales "BA-60CM".

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

ID	Parameter	Measuring instrument	Unit	Manufacturer	Type	Serial number	Accuracy class	Date of installation
EL1	Electricity consumed	Electricity meter "Actaris SL7000 Smart"	kWh	Actaris[7]	Multifunction electronic electricity meter of SL761B071 type	36128117	0,2s	24/02/2008
W	Amount of coal	Automobile scales "BA-60CM"	t	ZHO[8]	Strain- gauge automobile scales	511	20kg	20/01/2009

Table 3– Equipment used for monitoring activities

Basic chart of metering points is provided in Annex 2.

Calibration of the metering devices and equipment has been conducted on a periodic basis according to the procedures of the Host Party.

During the monitoring period calibration was not performed for the electricity meter "**Actaris SL7000 Smart**" (ID EL1):

- Last calibration was held by manufacturer on 15th of December, 2007. The calibration interval exceeds the monitoring period (see section B.1.3). Calibration confirmed that the measurements, provided by the device, are valid.

During the monitoring period calibration has been performed for the automobile scales "**BA-60CM**" (ID W):

- Last calibration was done on 01/11/2011. Calibration confirmed that the measurements, provided by the device, are valid. Calibration of the measuring device "BA-60CM" was implemented according to the following chronology: 20/01/2009, 09/01/2010, 20/01/2011, 19/01/2012.
- Next calibration to be performed not later than January 2013.

[7] http://www.actaris.com.ua/rus/katalog/schetchik-Actaris-SL7000
[8] http://www.ugmk.info/?company=1155197911&gr=1

Since the beginning of operation of complex for processing waste heap project equipment has not been changed. All technical characteristics of concentrating complex meet the relevant technical documentation. During monitoring only routine preventive maintenance of existing project equipment were performed.

Calibration of equipment will be implemented in accordance with the legislation of the host party – State Standard of Ukraine DSTU 2708:2006 "Metrology. Calibration of measuring instruments. The organization and procedure"[9].

B.1.3. Calibration procedures:

For electricity meter:

QA/QC procedures	Body responsible for calibration and certification
Calibration interval for the electricity meter "Actaris SL7000 Smart" is six years. Regular cross-checks with the electricity supply company.	Calibration will be performed by the authorized representatives of the State Metrological System of Ukraine [10]

Table 4 – Calibration procedures for electricity meter

For scales:

QA/QC procedures	Body responsible for calibration and certification
Calibration interval for automobile scales "BA-60CM" is one year. Regular cross-checks with the customers.	Calibration will be performed by the authorized representatives of the State Metrological System of Ukraine.

Table 5 – Calibration procedures for scales

B.1.4. Involvement of Third Parties:

Private Enterprise "Production and Commercial Firm "Enerhomax" – installation and connection of electricity meters.

Open Joint Stock Company "MCM "Bilorichenska" – Coal Chemistry Laboratory, which carries out investigation of coal samples, extracted from the waste heap.

[9] http://www.metrology.in.ua/downloads/gost/DSTU2708_2006.pdf
[10] http://www.dsiu.gov.ua:1080/control/uk/publish/article/main?art_id=33022&cat_id=32864

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

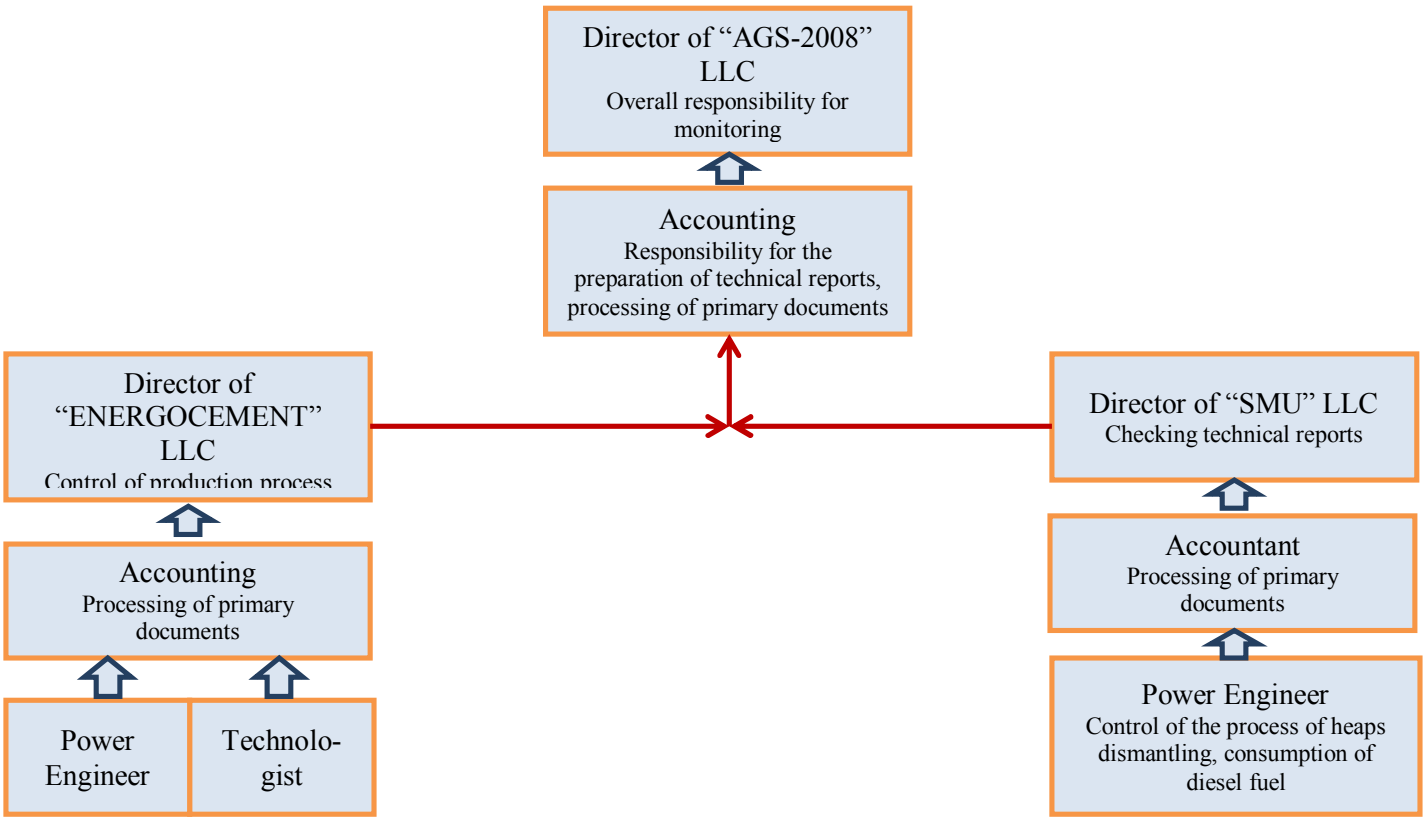

Figure 1 – Data flow scheme

B.2.1. List of fixed default values and ex-ante emission factors:

Data / Parameter	***Data unit***	***Description***	***Data Source***	***Value***
GWP_{CH4}	$tCO_2e/t\ CH_4$	Global warming potential of methane	IPCC Second Assessment Report[11]	21
ρ_{CH4}	t/m^3	Methane density	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2: Energy, Chapter 4: Fugitive Emissions, Page 4.12[12]. Value was converted from converted $Gg \cdot m^{-3}$ to t/m^3.IPCC default value under standard physical conditions (t=293,15 K; p=101,2325 kPa)	0.00067
p_{WHB}	dimensionless unit	Correction factor, determining the probability of spontaneous combustion of the waste heap	Report on the fire risk of Luhansk Region's waste heaps, Scientific Research Institute "Respirator", Donetsk, 2012	0.78

[11] http://www.ipcc.ch/ipccreports/sar/wg_I/ipcc_sar_wg_I_full_report.pdf Page 22.
[12] http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_4_Ch4_Fugitive_Emissions.pdf

$EF_{CH_4,CM}$	m^3/t	Fugitive methane emissions factor during coal mines operation	National Inventory Report of Ukraine 1990-2010, p. 90	25.67
$NCV_{Coal,y}$	TJ/kt	Net calorific value of coal in year *y*	National Inventory Report of Ukraine 1990-2010, p. 462[13], 468 (1.A.1.a – Public Electricity and Heat Production)	2009 – 21.8 2010 – 21.6 2011 – 21.6 2012 – 21.6
$OXID_{Coal,y}$	ratio	Carbon oxidation factor of coal in year *y*	National Inventory Report of Ukraine 1990-2010, p. 465, 471 (1.A.1.a – Public Electricity and Heat Production)	2009 – 0.963 2010 – 0.962 2011 – 0.962 2012 – 0.962
$k^C_{Coal,y}$	t C/TJ	Carbon content of coal in year *y*	National Inventory Report of Ukraine 1990-2010, p. 464, 470 (1.A.1.a – Public Electricity and Heat Production)	2009 – 25.97 2010 – 25.99 2011 – 25.99 2012 – 25.99
$A_{coal,y}$	%	Average ash content of thermal coal extracted in Luhansk region, Ukraine	Guide of quality, volume of coal production and enrichment products in 2008-2010, Ministry of Coal Industry of Ukraine, State Committee of Ukraine, Luhansk 2010 (see Annex 4). Indicators for thermal coal.	2009 – 38.40 2010 – 38.10 2011 – 38.10 2012 – 38.10
$W_{coal,y}$	%	Average water content of thermal coal extracted in Luhansk region, Ukraine	Guide of quality, volume of coal production and enrichment products in 2008-2010, Ministry of Coal Industry of Ukraine, State Committee of Ukraine, Luhansk 2010 (see Annex 4). Indicators for thermal coal.	2009 – 7.4 2010 – 7.4 2011 – 7.4 2012 – 7.4
$N^e_{coal,y}$	MWh/t	Average consumption of electricity per tonne of extracted coal in Ukraine in year *y*	State Statistics Service of Ukraine. Fuel and energy resources of Ukraine, Statistical Yearbook, Kyiv 2009 (see Annex 5)[14]	2009 – 0.0905 2010 – 0.0926 2011 – 0.0842 2012 – 0.0842
$NCV_{diesel,y}$	TJ/kt	Net calorific value of diesel fuel in year *y*	National Inventory Report of Ukraine 1990-2010 p. 476[15], 479 (value for mobile combustion, road transport)	2009 – 42.3 2010 – 42.5 2011 – 42.5 2012 – 42.5
$OXID_{diesel,y}$	ratio	Carbon oxidation factor of diesel fuel in period *y*	National Inventory Report of Ukraine 1990-2010 p. 478, 481 (value for mobile combustion, road transport)	2009 – 0.99 2010 – 0.99 2011 – 0.99 2012 – 0.99
$k^C_{diesel,y}$	t C/TJ	Carbon content of diesel fuel in period *y*	National Inventory Report of Ukraine 1990-2010 p. 477, 480 (value for mobile combustion, road transport)	2009 – 20.20 2010 – 20.20 2011 – 20.20 2012 – 20.20

[13] http://unfccc.int/files/national_reports/annex_i_ghg_inventories/national_inventories_submissions/application/zip/ukr-2012-nir-13apr.zip

[14] http://www.ukrstat.gov.ua/druk/katalog/m-e_res/Pal_en_res.zip

[15] http://unfccc.int/files/national_reports/annex_i_ghg_inventories/national_inventories_submissions/application/zip/ukr-2012-nir-13apr.zip

$EF_{grid,y}$	tCO_2/MWh	Specific indirect carbon dioxide emissions during the consumption of electric energy by the 2nd class electricity consumers according to Procedure for determining consumers' classes.	National Environmental Investment Agency Orders: No. 63 dated 15/04/2011[16] for 2009 No. 43 dated 28/03/2011[17] for 2010 No. 75 dated 12/05/2011[18] for 2011 (2012)	2009 – 1.237 2010 – 1.225 2011 – 1.227 2012 – 1.227

Table 6 – Fixed parameters

CO_2 emission factor for electricity, consumed under the project activity in period y, accepted DFP and is based on existing data of power stations in accordance with "Calculation method of specific carbon dioxide emissions during electricity production at thermal power plants and during its consumption", State Environmental Investment Agency (SEIA), 2011[19].This method and specific carbon dioxide emissions resulting from its use were developed by DFP in Ukraine for use in JI projects. Assessment of specific carbon dioxide emissions for 2008, 2009, 2010 and 2011 is available[20]. It was stated that valid actual specific carbon dioxide emissions will be calculated and published each year for the previous year on the 1st of March. As for expected indicators in the project development document for each period of assessment, the value of specific carbon dioxide emissions for the relevant year are used. Actual value of specific carbon dioxide emissions is used if available to calculate emission reductions. If this value is not available, instead the last available value is used.

B.2.2. List of variables:

Project emissions variables to be monitored:

ID (from PDD)	***Parameter***	***Calculation method (Measured/Calculated/Estimated)***	***Unit***	***Comment***	***Meters used (as per B.1.2)***	***Data aggregation frequency***
P-1	$EC_{PJ,y}$ - Amount of electricity that was consumed by the project activity in relevant period *y*.	(M) Continuously measured by specialized meter. Summarized monthly by calculation. Records of the company-supplier and meter	MWh[21]	The data will be archived and kept for two years after the last transfer of ERUs from the project.	EL_1	Data are aggregated monthly. Annual reports are prepared.
P-2	$FC_{PJ,Diesel,y}$ - Amount of diesel fuel that was consumed by transport by the project activity in relevant period *y*.	(C) Calculated by summing the data on fuel consumption - expenditure invoices, write-off certificates, company records	t	The data will be archived and kept for two years after the last transfer of ERUs from the project.	-	Data are summarized monthly and annual reports are prepared.

[16] http://www.neia.gov.ua/nature/doccatalog/document?id=127172
[17] http://www.neia.gov.ua/nature/doccatalog/document?id=126006
[18] http://www.neia.gov.ua/nature/doccatalog/document?id=127498
[19] http://www.neia.gov.ua/nature/doccatalog/document?id=125381
[20] http://www.neia.gov.ua/nature/doccatalog/document?id=127498
[21] In primary documents from the company supplying electricity this parameter is presented in kWh. For monitoring purposes, this parameter was converted into MWh.

Table 7 – Monitored project emissions variables

ID (from PDD)	***Parameter***	***Calculation method (Measured/Calculated/Estimated)***	***Unit***	***Comment***	***Meters used (as per B.1.2)***	***Data aggregation frequency***
B-1	$FR_{Coal,y}$ - Amount of thermal coal, which is extracted from waste heap as a result of the project activity in relevant period *y*	(M/C) Measured by weighing each separate batch of products. Then weighing results are aggregated in the calculation.	t	The data will be archived and kept for two years after the last transfer of ERUs from the project.	W	Daily measurements of shipped products. Monthly and annual reports are prepared
B-2	$A_{coal,PJ,y}$ - Average ash content of thermal coal, extracted as a result of the project activity in relevant period *y*	(M/C) Independent laboratory studies	%	The data will be archived and kept for two years after the last transfer of ERUs from the project.	-	Studies of coal quality are performed 3 times a month
B-3	$W_{coal,PJ,y}$ - Average ash content of thermal coal, extracted as a result of the project activity in relevant period *y*	(M/C) Independent laboratory studies	%	The data will be archived and kept for two years after the last transfer of ERUs from the project.	-	Studies of coal quality are performed 3 times a month

Table 8 – Monitored baseline parameters variables

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

Variables	***Description***	***Units***	***Values***			
			2009[22]	**2010**	**2011**	**2012**[23]
$EC_{PJ,y}$	Amount of electricity that was consumed as a result of the project activity in the relevant period *y*.	MWh	1 336.81	2 578.30	2 716.62	2 257.92
$FC_{PJ,Diesel,y}$	Amount of diesel fuel that was consumed by transport as a result of the project activity in the relevant period *y*.[24]	l	115 543	237 837	262 066	220 599

[22] Monitoring period from 01/06/2009 till 31/12/2009. Hereinafter in this report, the values in the tables of 2009 relate to this period.

[23] Monitoring period from 01/01/2012 till 30/11/2012. Hereinafter in this report, the values in the tables of 2012 relate to this period.

[24] In the internal company report number of diesel fuel is given in litres. While calculating emissions to convert this amount in tonnes the following formula is used: ***Diesel fuel in tons = (0.85* Diesel fuel in litres)/1000*** Where 0.85 determines the density of diesel fuel in kg/l. Data are taken from DSTU 3868-99 Diesel fuel. Specifications. Density 0.85 kg/l

Table 9 – Data that were collected in the project scenario

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

Variable	*Description*	*Units*	*Value*			
			2009	**2010**	**2011**	**2012**
$FR_{Coal,y}$	Amount of coal products, which was obtained by enrichment of carbonaceous rock as a result of the project activity in the relevant period *y*	t	99 975	191 162	203 810	171 002
$A_{coal,PJ,y}$	Average ash content of enriched coal, extracted from waste heaps in the relevant period *y*	%	9.30	9.50	9.25	9.55
$W_{coal,PJ,y}$	Average water content of enriched coal, extracted from waste heaps in the relevant period *y*	%	10.60	10.50	10.40	10.50

Table 10 – Data that were collected in the baseline scenario

B.2.5. Data concerning leakage:

Leakage is the net change of anthropogenic emissions by sources and/or removals by sinks of GHGs, which can occur outside the project boundary, and that can be measured and be directly attributable to the JI project.

This project will result in a net change in of anthropogenic emissions by sources and/or removals by sinks of GHGs come from two sources:

- Leakages caused by fugitive methane emissions during coal production in coal mines;
- Leakages related to electricity consumption from the grid of Ukraine during coal production in the mine.

In the baseline scenario coal production by mining method is implemented (underground coal mines), while *fugitive emissions of coal mine methane* appear. In the project scenario, additional amount of thermal coal is extracted, using wet method of rock mass beneficiation of the waste heaps, which otherwise would be burned. Therefore, coal produced by the project activity substitutes the coal would have been otherwise mined in the baseline scenario that would cause fugitive methane emissions. Thus, coal extraction from the waste heap will cause methane emissions.

Electricity consumption and related with this greenhouse gas emissions during waste heap dismantling will be included in the calculation of the project emissions. *Carbon dioxide emissions as a result of electricity consumption,* during coal mining in the amount that equals to the project amount of coal, is leakage that can be taken into account on the basis of State Statistics Committee[25] about the specific electricity consumption during coal production in the mines of Ukraine in the relevant year. Data in this link indicates that the specific level of electricity consumption during coal mining is higher than the specific electricity consumption from grid in the project scenario.

As reliable and accurate national data on fugitive CH_4 emissions associated with the production of coal are available, project participants used this data to calculate the amount of fugitive CH_4 emissions.

B.2.6. Data concerning environmental impacts:

Comprehensive EIA was performed in 2007 by Scientific Research Production and Commercial Firm "CER "Eko-Tera Ukraine" LLC. This study was focused on the impact of waste heaps dismantling on the environment. According to Ukrainian laws and regulations, preparation of reports from Environmental Impact Assessment and positive conclusions of State Department of Ecology and Natural Resources makes procedure of environmental impact assessment.

is taken as average value between the two types of diesel fuel: summer and winter (data from Table 1). Values are converted from units kg/m^3 into kg/l.

[25] http://www.ukrstat.gov.ua/

Key findings of this EIA are summarized below:

- The main impact of the project activity on the environment is the impact on air. Additional amount of coal dust and dust of coal concentrate will be released to the atmosphere as a result the project activity. However, the study of emission levels and pollutant distribution schemes show that during the project lifetime maximum concentration boundaries will not be exceeded. Fugitive emissions of dust and hazardous substances from the waste heap can also be avoided;
- Impact on water is insignificant. During the project activity water will be used in a closed cycle without draining wastewater. For replenishment of water cycle drainage water from a nearby mine will be used. Thus discharge of this water (treated with chlorine) into the environment will be reduced;
- Impact on flora and fauna is mixed. As a result of the project activity the existing landscape will change, but the aggregate final effect is positive. Grass and trees will be planted on the recultivated land. Rare or endangered species will avoid impact. Place of the project activity implementation is not located near national parks or areas that are protected;
- Noise impact is limited. The main source of noise will be at the minimum desired distance from residential areas, mobile sources as for noise (traffic) provisions of local standards will be met;
- Impact on land use is positive. Considerable areas of land will be exempt from waste heaps and available for building;
- There are no transboundary effects. There are no impacts which occur on the territory of any other country, and which are caused by the implementation of this project that is physically located entirely within Ukraine.

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

All data will be archived electronic and paper. Data acquisition and processing procedure for each parameter monitored:

1. **Amount of electricity, which was consumed as a result of the project activity in the relevant period *y*.**

   For measurement of this parameter data of the company commercial is used. Monthly electricity bills (acceptance certificate) are supporting document on electricity consumption. This parameter is recorded using special electric energy meters. Meter is placed immediately after current transformers at the industrial site. This meter registers all electricity consumed in framework of the project as access to the electricity supply is carried out only through him. Indications are used for commercial accounts with the company-electricity supplier. Regular cross-checks with the energy supply company are performed. Monthly and annual reports are based on the monthly bills.

2. **Amount of diesel fuel, which was consumed by transport as a result of the project activity in the relevant period *y*.**

   For the metering of this parameter the commercial data of the company is used. For confirmation of the amount of fuel consumed completion certificates are used from the contractor. Company-contractor performs works on dismantling waste heap, rock mass transportation to industrial sites and other transportation services required by the project activity. Technical services for recultivation of waste heaps are provided by company-contractor. Therefore, clarity and reliability of collecting relevant information as well as monitoring of internal working regulations is conventional internal interests of the company. Only consumption of that fuel, which refers to the project activity, is taken into account under the project. At the industrial site diesel fuel consumption is done only by transport project, but if other equipment is used, fuel consumption by this equipment is also included. Diesel fuel is consumed by road transport, which transports raw materials and coal, bulldozers and excavators that dismantle the waste heap and form recultivated heap, special equipment that runs on industrial site. Monitoring covers consumption of all diesel fuel within this project. Amount of consumed diesel fuel in the accounting records is given in litres, so for the purposes, for monitoring purposes unit of measurement of the amount of this fuel is converting

in tonnes using density that equals 0.85 kg/l[26]. Regular cross-checks are carried out between tenant and landlord regarding trucks mileage. The monthly and annual reports are based on these data.

3. **Amount of coal products, which was obtained by enrichment of carbonaceous rock as a result of the project activity in the relevant period *y*.**

   This parameter is tracked based on internal company documents. Acceptance certificates of coal products are used t confirm the amount of coal shipped to the consumer. For calculating the GHG emission reduction only those products, which are shipped to a customer, are taken into account and related to the project activity. Coal products of 1-50 mm class are produced under the project, which are the final product. Coal concentrate of 1-50 mm class is shipped as ROM coal. Technologically coal products are shipped from different flyovers, because it requires the enrichment process, but one class of coal is shipped to the warehouse of finished products. Due to established distribution channel of coal, shipment of goods happens almost constantly during working time. Weighing products is performed directly at the industrial site of concentrating complex. For this purpose special automobile scales are used. Weighing coal is performed on tensometric scales. Procedure of weighing coal products is not complicated and is as follows: laden truck enters a metal platform of scales, and tensometric sensors generate electrical signal which is processed by the processor and is transformed into value of actual mass of the load. Operator of weighing point records these indications to the log. After this, truck is sent to the consumer of coal products. Time of weighing cargo is approximately 2 minutes. On the basis of log entries at the end of the month work completion certificates are formed. Except weighing coal products on these scales, also weighing carbonaceous rock is carried out, which is transported from the waste heap to the concentrating complex. So work completion certificates contain information on the number of weighted rock. To ensure full control of this parameter, regular cross-checks are performed with buyers of coal products. At the end of the month monthly technical report is prepared; on its basis annual reports are prepared. Information on the volume of ROM coal extraction is stored in paper and electronic forms.

4. **Ash and water content of coal products, which was obtained by enrichment of carbonaceous rock as a result of the project activity in the relevant period *y*.**

   These parameters are provided based on the findings of the independent laboratory that conducts regular periodic analysis of black coal samples, extracted from the waste heap. The main indicators of black coal quality are calorific value, ash content, water content and sulphur content. The conclusions of the laboratory include clear and transparent information on the number of shipped coal batch, indicators of ash and water content. Analysis of extracted coal is produced monthly. Also research of extracted coal samples may be conducted at the request of the consumer contrary to the established internal regulations. Besides, the buyer of coal products provides independent study of coal samples and compares with indicators in acceptance certificates of coal that is extracted from waste heap. Quantitative indicators of coal ash and water content are determined in accordance with the regulations: DSTU 4096-2002, GOST 27314-91, GOST 11022-95 and others. Results of laboratory studies are stored in paper and electronic forms. If necessary, the analysis of coal samples may be carried out at the request of the buyer. If data on the average ash content of sorted fraction and average water content of sorted fraction extracted from the heap in the period y are not available to the developer, or are irregular with a high level of uncertainty, they are taken equal to the corresponding general Ukrainian parameters (State Statistics Service of Ukraine. Fuel and Energy Resources of Ukraine, Statistical Yearbook, (See Annex 5)). In case of necessity analysis of coal samples may be carried out at the request of the buyer.

B.4. Special event log:

All special and exceptional events (critical equipment failures, reconstruction works, emergencies etc.) are documented by the special notes to the management of the company. No such events were observed during the monitoring period.

The nature of the project and underlying operations does not foresee any factors that can cause unintended emissions due to emergencies. Possible emergencies can have impact on the continuation of operations (shutdowns) which will lead to a decreased number of ERUs which is, in turn, conservative.

[26] DSTU 4840-2007. Diesel fuel. Specifications. The density of 0.85 kg/l is taken as average value between the two types of diesel fuel: summer and winter (data from Table 1). Values are converted from kg/m^3 into kg/l.

SECTION C. Quality assurance and quality control measures

C.1. Documented procedures and management plan:

C.1.1. Roles and responsibilities:

The general monitoring management is implemented by the Director of the company "AGS-2008" LLC through the supervision and coordination of the activities of his subordinates: Chief Technologist, Chief Energetic and Accounting department. **"AGS-2008" LLC** has the following management structure:

1. Director of "AGS-2008" LLC is the main figure in management structure of the enterprise. He is responsible for the accuracy and reliability of all monitoring indicators, provides cross checks of certain parameters used for calculation of GHG emission reductions. Strategy of development and planning of the project depends on his direct actions.
2. Accounting Department is responsible for collecting, archiving and visualization of monitoring parameters. This department carries out cross-checks on the number of shipped coal products with buyers; on the number of consumed fuel and consumed electricity with companies-contractors. Accounting forms monthly and annual technical reports and submit them to the Director of "AGS-2008" LLC.

"SMU" LLC has the following management structure:

1. Director of "SMU" LLC is responsible for efficiency of work on waste heaps dismantling, as well as for clarity and transparency of information which is formed in the accounting reports. He controls the accounting documents, verifies their reliability and transmits the information to the accounting department of "AGS-2008" LLC.
2. Accountant is responsible for collection and archiving data on consumption of diesel fuel and the number of transported carbonaceous rock to the concentrating complex. He forms the writing off certificates of diesel fuel, spending bills, and transfers completion certificates with clear and precise information on the consumption under the project to the Director of "SMU" LLC.
3. Power Engineer controls the process of waste heaps dismantling, is responsible for safety and implementation of plan, appointed by management of the enterprise. He collects primary information on the consumption of diesel fuel (receipts, logs) and transmits them to the accounting department of "SMU" LLC. Besides, Power Engineer is responsible for the technical condition of spectechnique and cargo transport and the number of transported rock.

"ENERGOCEMENT" LLC has the following management structure:

1. Director of "ENERGOCEMENT" LLC is fully responsible for course of the production process. He conducts revision of workplaces, monitors indicators of industrial productivity, and makes appropriate adjustments. He controls the accounting documents, which go to him, namely, amount of produced goods, amount of consumed electricity, etc.
2. Accounting Department is responsible for collecting, archiving and visualization of primary data on the amount of enriched coal, electricity consumption. Accounting is a buffer between production site and Director of the enterprise. This department is also responsible for periodic studies of coal samples that were extracted from the waste heap as a result of the project activity. He forms monthly and annual technical reports and submit them to the Director of "AGS-2008" LLC.
3. Power Engineer and Technologist are responsible for stable work of the concentrating complex, safety and control of measuring equipment. Power Engineer is responsible for timely calibration of electricity meters and automobile scales, safety in the operation of electrical equipment. All reports and recommendations on the project activity, he submits to the Director. Technologist is responsible for stable operation of all links of technological scheme of concentrating complex. He controls the percent of an exit of the final product and makes appropriate hardware settings in case of discrepancies in production program. Also Technologist works closely with the Power Engineer and submits appropriate recommendations on improving work of all technological equipment.

Documents and reports on the data that are monitored will be archived and stored by the project participants. The following documents will be stored: primary documents for the accounting of monitored parameters in paper form; intermediate reports, orders and other monitoring documents in paper and electronic form; documents on measurement devices in paper and electronic form. These documents and other data monitored and required for determination and verification, as well as any other data that are relevant to the operation of the project will be kept for at least two years after the last transfer of ERUs to the buyer.

C.1.2. Trainings:

Training on safety issues is mandatory and must be provided to all personnel of the project as required by local regulations. Procedure for safety trainings includes the area of training, training intervals, forms of training, knowledge checks etc. The project host management maintains records for such trainings and periodic knowledge check-ups.

Activities that are directly related to the monitoring do not require specific training other than provided by the professional education. However, monitoring personnel will receive training on monitoring procedures and requirements. Personnel of the project host management will receive necessary training and consultations on monitoring requirements.

C.2. Involvement of the Third Parties:

Private Enterprise "Production and Commercial Firm "Enerhomax" – installation and connection of electricity meters.
Open Joint Stock Company "MCM "Bilorichenska" – Coal Chemistry Laboratory, which carries out investigation of coal samples, extracted from the waste heap.

C.3. Internal audits and control measures:

Internal cross-checks and audits are performed for all of the data monitored as the raw documents used for monitoring are also used in the commercial dealings of the company. Director of the company reviews monthly and yearly reports and conducts selective cross-checks with the raw documents.

C.4. Troubleshooting procedures:

In cases if any errors, fraud, inconsistencies or situations when monitoring data are unavailable will be identified during the monitoring process special commission will appointed by project host management that will conduct a review of such case and issue an order that must also include provisions for necessary corrective actions to be implemented that will ensure such situations are avoided in future.
For data and parameters, monitoring of which is not made during the whole crediting period, and the values are determined only once (and remain unchanged during the whole crediting period) and are available or unavailable at the stage of determination of the PDD, the values indicated in the PDD are used. If updated data are not available, last publicly available actual values are used. If any data are not available for calculations GHG emissions data of the previous period are used.
For data and parameters, which are monitored during the whole crediting period, standard procedures in this sector for each data type are used. For example cross-checking with suppliers, receiving estimated values, averaging etc. In each case, changing the method of receiving data will be recorded and displayed in the monitoring report.

SECTION D. Calculation of GHG emission reductions

D.1. Table providing the formulas used:

Formula number from PDD	***Formula***	***Formula description***
Equation 16	$ER_y = BE_y - LE_y - PE_y$	Emission reductions as a result of the project implementation in period *y*
Equation 1	$BE_y = BE_{WHB,y}$	Baseline emissions in period *y*
Equation 2	$BE_{WHB,y} = \frac{FC_{BE,Coal,y}}{1000} \cdot p_{WHB} \cdot NCV_{Coal,y} \cdot OXID_{Coal,y} \cdot k^{C}_{Coal,y} \cdot 44/12$	Baseline emissions related to the burning of heaps in period *y*
Equation 3	$FC_{BE,coal,y} = FR_{coal,y} \cdot \frac{\left(1 - \frac{A_{coal,PJy}}{100} - \frac{W_{coal,PJ,y}}{100}\right)}{\left(1 - \frac{A_{coal,y}}{100} - \frac{W_{coal,y}}{100}\right)}$	Amount of coal that would be mined using mining method under baseline scenario and consumed in the energy sector to produce energy in relevant period *y*
Equation 4	$LE_y = LE_{CH_4,y} + LE_{EL,y}$	Leakages as a result of the project implementation in period *y*
Equation 5	$LE_{CH_4,y} = -FC_{BE,Coal,y} \cdot EF_{CH_4,CM} \cdot \rho_{CH_4} \cdot GWP_{CH_4}$	Leakages related to the fugitive methane emissions during the operation of mines in period *y*
Equation 6	$LE_{EL,y} = -FC_{BE,Coal,y} \cdot N^{e}_{coal,y} \cdot EF_{grid,y}$	Leakages as a result of electricity consumption from energy grid during coal mining in period *y*
Equation 7	$PE_y = PE_{EL,y} + PE_{Diesel,y}$	Project leakages as a result of the project implementation in period *y*
Equation 8	$PE_{EL,y} = EC_{PJ,y} \cdot EF_{grid,y}$	Leakages related to consumption of electricity from the grid during coal production in mines in period *y*
Equation 9	$PE_{Diesel,y} = \frac{FC_{PJ,Diesel,y}}{1000} \cdot NCV_{Diesel,y} \cdot OXID_{Diesel,y} \cdot k^{C}_{Diesel,y} \cdot 44/12$	Project emissions as a result of diesel fuel consumption during project implementation in period *y*

Table 11 – Calculation formulas

Parameters in the formulas are as per Sections B.2.1 and B.2.2 of this report.
The coefficient 44/12 in the equations above is the ratio of the molecular weight of CO_2 (44) and the molecular weight of C (12) and is used to convert carbon emissions into carbon dioxide emissions.

Additionally in the formulas:

Parameter	***Data unit***	***Description***
ER_y	tCO_2e	Emission reductions as a result of the project implementation in period *y*
BE_y	tCO_2e	Baseline emissions in period *y*
PE_y	tCO_2e	Project emissions as a result of the project implementation in period *y*
LE_y	tCO_2e	Leakages as a result of the project implementation in period *y*
$BE_{WHB,y}$	tCO_2e	Baseline emissions related to the burning of heaps in period *y*
$PE_{Diesel,y}$	tCO_2e	Project emissions as a result of diesel fuel consumption as a result of the project implementation in period *y*
$PE_{EL,y}$	tCO_2e	Project leakages as a result of electricity consumption from energy grid during project implementation in period *y*
$LE_{EL,y}$	tCO_2e	Leakages as a result of electricity consumption from energy grid during coal mining in period *y*
$LE_{CH_4,y}$	tCO_2e	Leakages related to the fugitive methane emissions during the operation of mines in period *y*

Table 12 – Parameters in formulas

Results of the emissions calculations above are presented in metric tons of carbon dioxide equivalent (tCO_2e). The metric ton of carbon dioxide equivalent is equal to the metric ton of carbon dioxide (tCO_2). Therefore 1 tCO_2e = 1 tCO_2.

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

All measurement uncertainties and error propagation of the measured parameters are according to the manuals of equipment manufacturers. Uncertainty level of the fixed values and external data is low as they are taken from reliable and publicly available, verifiable sources.

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

D.3.1. Project emissions:

Parameter	Unit	2009	2010	2011	2012	Total
Project emissions	tCO_2e	1 959	3 788	4 027	3 354	13 128

Table 13 – Project emissions

D.3.2. Baseline emissions:

Parameter	Unit	2009	2010	2011	2012	Total
Baseline emissions	tCO_2e	230 380	433 408	464 105	387 457	1 515 350

Table 14 – Baseline emissions

D.3.3. Leakage:

Parameter	Unit	2009	2010	2011	2012	Total
Leakage	tCO_2e	-69 904	-133 178	-139 570	-116 520	-459 172

Table 15 – Leakage

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

Parameter	Unit	2009	2010	2011	2012	Total
Emission reductions	tCO_2e	298 325	562 798	599 648	500 623	1 961 394

Table 16 – Emission reductions

Annex 1

Definitions and acronyms

Acronyms and Abbreviations

CH_4	METHANE
CO_2	CARBON DIOXIDE
GHG	GREENHOUSE GASES
GWP	GLOBAL WARMING POTENTIAL
IPCC	INTERGOVERMENTAL PANEL ON CLIMATE CHANGE
PDD	PROJECT DESIGN DOCUMENT

Definitions

Baseline	The scenario that reasonably represents what would have happened to greenhouse gases in the absence of the proposed project, and covers emissions from all gases, sectors and source categories listed in Annex A of the Protocol and anthropogenic Removals by sinks, within the project boundary.
Emissions reductions	Emissions reductions generated by a JI project that have not undergone a verification or determination process as specified under the JI guidelines, but are contracted for purchase.
Global Warming Potential (GWP)	An index that compares the ability of greenhouse gases to absorb heat in the atmosphere in comparison to carbon dioxide. The index was established by the Intergovernmental Panel of Climate Change.
Greenhouse gas (GHG)	A gas that contributes to climate change. The greenhouse gases included in the Kyoto Protocol are: carbon dioxide (CO2), Methane (CH4), Nitrous Oxide (N2O), Hydrofluorcarbons (HFCs), Perfluorcarbons (PFCs) and Sulphurhexafluoride (SF6).
Joint Implementation (JI)	Mechanism established under Article 6 of the Kyoto Protocol. JI provides Annex I countries or their companies the ability to jointly implement greenhouse gas emissions reduction or sequestration projects that generate Emissions Reduction Units.
Monitoring plan	Plan describing how monitoring of emission reductions will be undertaken. The monitoring plan forms a part of the Project Design Document (PDD).

Annex 2

Location of Measurement Points and Devices

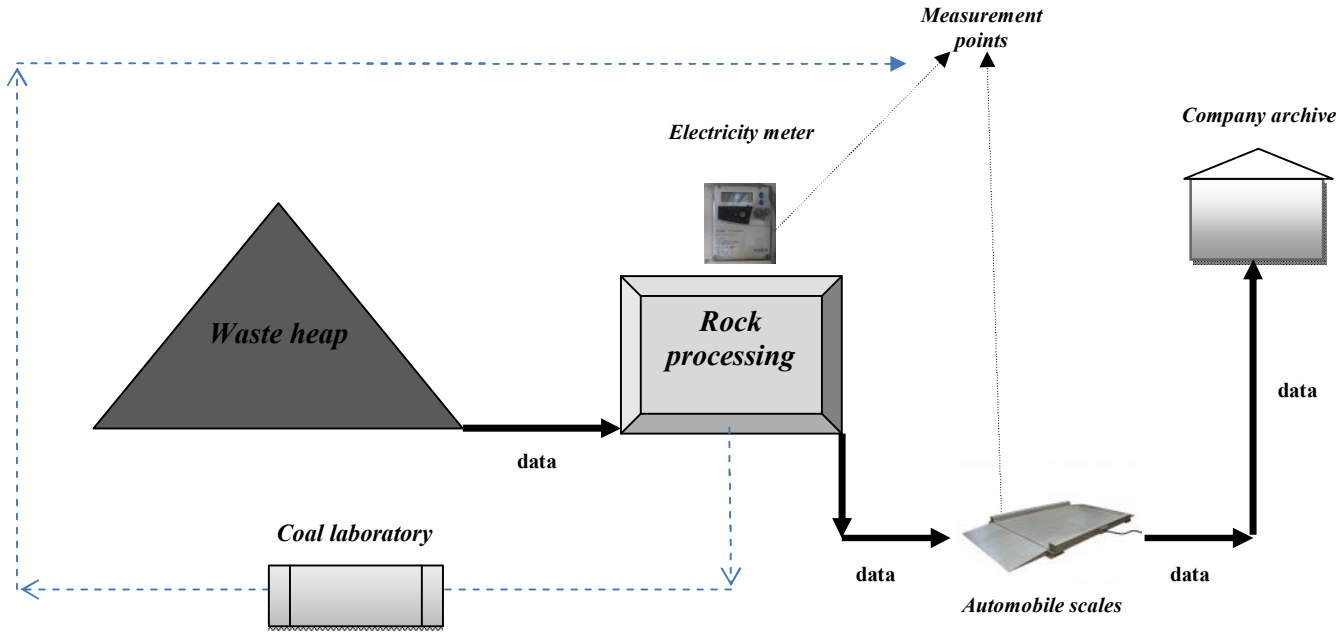

Figure 2 – Location of Measurement Points and Devices

Annex 3

Measurement Devices

Figure 3 – Electricity meter **"Actaris SL7000 Smart"**

Figure 4 – Automobile scales **"BA-60CM"**

Annex 4

REFERENCE OF THE STATE STATISTICS SERVICE OF UKRAINE "ACTUAL EXPENSES OF ELECTRICITY FOR PRODUCTION OF ONE TON OF NON-AGGLOMERATED COAL"[27]

ДЕРЖАВНА СЛУЖБА СТАТИСТИКИ УКРАЇНИ
(Держстат України)

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29.05.2012р. № 15/1-20/691АІ На № від

Товариство з обмеженою відповідальністю
«Науково-дослідний центр КТФ»

01030 м. Київ, вул. Б. Хмельницького, 16/22

На Ваш лист від 23.05.2012р. № 12 Держстат у межах своїх повноважень надає наявну статистичну інформацію щодо фактичних витрат електроенергії на видобуток однієї тонни вугілля кам'яного неагломерованого.

Фактичні витрати електроенергії на видобуток однієї тонни вугілля кам'яного неагломерованого*.

кВт.г/т

	2008	2009	2010	2011
Україна	87,8	90,5	92,6	84,2

*Розраховано як частка від ділення фактичних витрат електроенергії на видобуток вугілля кам'яного неагломерованого за звітний період на обсяг видобутого вугілля кам'яного неагломерованого за звітний період, помножена на 1000.

Заступник Голови Н.С. Власенко

Вик. Смалина В.П.,
тел 287-36-81

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[27] http://ji.unfccc.int/UserManagement/FileStorage/NMPXTGSA7E4C095DHRJYUWLOI8Z3V1