

THE JOINT IMPLEMENTATION PROJECT

DISMANTLING OF WASTE HEAP AT
“NOVOPAVLOVSKA” MINE

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JOINT IMPLEMENTATION PROJECT DESIGN DOCUMENT FORM
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CONTENTS

- A. General description of the project
- B. Baseline
- C. Duration of the project / crediting period
- D. Monitoring plan
- E. Estimation of greenhouse gas emission reductions
- F. Environmental impacts
- G. Stakeholders' comments

Annexes

Annex 1: Contact information on project participants

Annex 2: Baseline information

Annex 3: Monitoring plan

Annex 4: An Extract of "Guide of quality, volume of coal production and enrichment products in 2008-2010"

Annex 5: Reference of the State Statistics Service of Ukraine "The actual costs of electricity production per one tonne of coal stone agglomerated"

Annex 6: Report on the propensity for spontaneous ignition of the waste heap at "Novopavlovska" mine

**SECTION A. General description of the project****A.1. Title of the project:**

Dismantling of waste heap at “Novopavlovska” mine
Sectoral scope: 8. Mining/mineral production
PDD version: PDD, version 2.0
Date of the document: dated 21/09/2012

A.2. Description of the project:*General description of the sector, company and activities*

Dumps (waste heaps) are an integral part of the Donbas region. One of the largest deposits of coal in the world is located in the Donetsk Basin (Ukraine, by geological reserves of fossil coal ranks first in Europe and eighth in the world). Coal production is carried out mostly through mining and has a 300-year history.

The total basin area is about 60 000 km² and covers the territory of the Dnipropetrovsk, Donetsk and Lugansk regions. Stocks of coal up to a depth of 1800 m are about 140.8 billion tons¹.

Coal beds occur at medium (400-800 m) and large (over 100 m) depth and in most cases have little power (about 0.6-1.2 m) Layers of coal alternate with ordinary rock (shale, sandstone, limestone). Coal mining is accompanied, therefore, with lifting to the surface large amounts of rock. Rocks that are in the dump are formed by shaft sinking (52%) and repair (48%). These “empty” rocks are stored near mine shafts in the form of heaps up to 60-80 m and ridge dumps (in the amount 92%), more rarely – flat dumps (8%)². Rock dumps in Donbas cover an area of over 7000 hectares.

Most of the coal is produced by large coal-mining unions of varying ownership. Along with them, there are small private companies involved in coal extraction, coal processing (sorting, enrichment), and in the fuel trade.

CE “Vtormet” Ltd is engaged in the wholesale fuel industry and has considerable experience in excavation and mining, as well as in land reclamation and landscaping. CE “Vtormet” Ltd uses the dump of “Novopavlovska” mine on a legitimate basis.

Situation before the proposed project start

By-product of continuous operation of coal mines is the formation of conic dumps of coal rocks-heaps. Smoldering and burning waste heap is a fundamental factor in violation of environmental and economic balance of Donbass mining areas, causing the formation of a complicated ecological situation, which affects the state of atmosphere, soil, water objects, leading to the degradation of natural landscapes and detrimental to health and people life.

The process of enrichment at the mines was not very effective, it is not considered economically feasible to extract 100% of the coal out of rocks that rose to the surface. Consequently, the dumps in Donbass, especially formed in 60-70 years, contain large amounts of coal. Examined mine waste heaps mass has an ash content within 57-99%, accounting for an average of 88.5%. Humidity varies from 0.2% to 11.7%, accounting for an average 3.4%³. However, coal content, even within the same waste heap, undergoes significant fluctuations and poorly predicted. It is possible that a big part of the rock dump contain a small amount of coal, while another part has a high concentration of coal mass with increased susceptibility to spontaneous combustion. Over time, almost all dumps, that contain coal, are very susceptible to spontaneous ignition and self-sustained combustion. Those dumps, that are currently burning or are at a risk of ignition, are the source of uncontrolled emission of greenhouse gases and hazardous substances. Oxidation and combustion of rocks is accompanied by emission of wide range of volatile components that are emitted from the rock mass, enriched by coal substance. Hot waste heaps produce

¹ BS Busygin, Dr. Sc. Sciences, prof., EL Sergejev. Monitoring data of Donbass heaps by multispectral satellite imagery. ISSN 2071-2227, Naukovy Visnyk of the NGU, 2011, # 2

²http://www.ipages.ru/index.php?ref_item_id=2607&ref_dl=1

³http://www.ipages.ru/index.php?ref_item_id=2607&ref_dl=1



steam, which can contain not only water but such components as: sulfuric acid (sulfate ion), carbon dioxide, nitrogen dioxide (nitrate ion). With the lack of oxygen there are hydrogen sulfide, hydrocarbons, ammonia, carbon monoxide in the gas-vapor emissions. Water erosion of the heap results in the leaching of toxic components and contamination of the soil and subsoil waters, extending them to a considerable distance. Thus, the role of heaps in the ecology of the region is extremely negative, increasing in many times during its burning. However, its outbreak and the possibility of explosion is very difficult to forecast and it can be only be estimated the probability of ignition, which is very high, based on statistical data. We can say that most waste heaps, sooner or later, ignite. The process of combustion of carbon in rock dumps is long lasting from 5 to 7 years⁴.

Despite the fact that the owners of waste heaps obliged to take measures to prevent their burning, immediate quenching of the rock dumps is not common practice in the Donbass region. Fines paid for the environmental pollution are much less than money spent on measures to prevent ignition or burning.

In the baseline scenario assumed that the common practice will be continued – heap can be spontaneously ignited with a certain probability, and the process of burning will continue till all coal, contained there, will be burned. The process of combustion is accompanied by release the carbon dioxide into atmosphere.

Proposed project provides complete dismantling of the dump with further reclamation of the area by restoring its fertile layer. During dismantling of the dump, the rocks will be divided into fractions, which will be used for blending with steam coal and subsequently supplied to heat power plants and boiler houses for burning as fuel. After sorting, the large fractions will be used for building and repairing of roads. As the result, rock mass of the dump will be fully utilized, and the received coal will replace coal, which otherwise would have had to be mined. As the result of the project, the opportunity of self-ignition of heap will be eliminated.

Brief history of the project: The project was initiated in November 2008. Installation of sorting equipment begins on December 01, 2008. Commissioning and the start of the sorting complex is on January 02, 2009. From the beginning the project is considered as JI project. Project idea (PIN) was submitted to assigned Coordinated Center (State Agency of Environmental Investments) on 21/08/2012. An important component of the project is its second phase – complex reclamation of the area by restoring its fertile layer and full restoration of natural ecological community. These works are planned to be completed in 2015 according to the Agreement # 3/11/08-2 from November 3, 2008. This part of the project is required, but totally expensive, due to this mechanism of joint implementation was one of the prominent factors of the project from the beginning, and financial benefits as part of this mechanism considered one of the reasons of the project implementation.

A.3. Project participants:

Table 1 - Project participants

| <u>Party involved</u> | Legal entity <u>project participant</u> (as applicable) | Please indicate if the <u>Party involved</u> wishes to be considered as <u>project participant</u> (Yes/No) |
|-----------------------|---|---|
| Ukraine (Host party) | . CE “Vtormet” Ltd | No |
| Republic of Latvia | SIA “Vidzeme Eko” | No |

.The role of project participants:

- . CE “Vtormet” Ltd - a legal entity, that operates lawfully the waste heap of “Novopavlovska” mine, and introduces the proposed JI project;

⁴ <http://ji.unfccc.int/UserManagement/FileStorage/IE7LK2SZF1NOXRVB4CYG65WQPJMHA3>



- SIA "Vidzeme Eko" responsible for the preparation of the PDD, obtaining approvals from the parties, monitoring and transfer of ERUs generated / AAUs.

See detailed information on project participants in Annex 1.

A.4. Technical description of the project:

Technical description of the project, as well as detailed information on the location of the project, are given below in sections from A.4.1. to A.4.3.

A.4.1. Location of the project:

Waste heap of "Novopavlovska" mine

A.4.1.1. Host Party(ies):

Ukraine

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

Luhansk region, Anratsit district



Figure 1 - Location of the project on the map of Ukraine

A.4.1.3. City/Town/Community etc.:

Krasnyi Luch town

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

The waste heap of “Novopavlovská” mine is located in Krasnyi Luch town, Antratsit district of Luhansk region. Geographical coordinates of the waste heap: 48° 05' 14" N. Lt. and 38° 57' 50" E. Lg.

Complex the rock dump sorting is located on the industrial site in suburbs of Sverdlovs town, Luhansk region at the distance of 52 km from the waste heap, considered in the project.



Figure 2 - The exterior of the waste heap of “Novopavlovská” mine under dismantling stage



Figure 3 – The waste heap of “Novopavlovská”, the appearance from the satellite

**A.4.2. Technology(ies) to be employed, or measures, operations or actions to be implemented by the project:**

The project provides the assemblage and installation of sorting rock mass complex of waste heap at “Novopavlovska” mine consisting of :

- Point of loading rock mass on Conveyor SP-202MS⁵;
- Point of sorting rock mass in classes 0-30 mm and 30 mm (vibrating inertial sifter GIL-52⁶);
- Point of storage class 0-30 mm (sheds).

Table 2 – Technical characteristics, sifter GIL-52

| | |
|---|-----------|
| Area screening surfaces, m ² | 1750X4500 |
| The number of layers of sieves, unit | 2 |
| The angle of inclination, degrees | 10-25 |
| The size of a piece of raw material, mm | 300 |
| Productivity, t/h | 250 |
| Engine power, kW | 13 |
| Weight, kg | 3680 |

Table 3 – Technical characteristics, scraper conveyor SP-202MS

| # | Main parameters | Standards for implementation |
|---|---|---|
| 1 | Length of the conveyor, m | 175 |
| 2 | Productivity calculated, t / min | 7.2 |
| 3 | Speed of the traction body, m/sec | 1,25 |
| 4 | Reduction unit | Three- step conical - cylindrical |
| 5 | engine: - the type - Power, kW - Number of units. - voltage | Three – phase, asynchronous, explosion – proof with squirrel-cage rotor 55 2 660 |

Class +30 mm is expected (as required under discharging tray of sifter) to be loaded in transports and delivered to customers for building and repairing of category 4-5 roads. Class 0-30 mm is expected to be loaded in transports, undergoes a mandatory procedure of weighting and is sent to the consumer for blending and subsequent combustion in the thermal power plants or boiler houses. Blending of fraction (0-30) with a steam coal allows to realize the fine finishing of quality the energy coal to the requirements of Standart 4083-2002, without compromising the quality of fuel on the one hand, but resulting in saving valuable energy coal on the other hand.

⁵ <http://www.rpromresurs.ru/konveer/sp202ms.html>

⁶ http://www.litstroy Mash.ru/GIL_52



Figure 4 - Machinery for sorting the rock mass

The rock mass, after being dismantled by bulldozers T-170⁷ (operating power – 132 kW, specific fuel consumption – 218 g/ kW) is loaded by Loader HK 632L⁸ (load-lift capacity 6000 kg with a bucket capacity of 3.2 m³, operating power 182 kW) into transport. Then the rock mass is delivered by trucks to the industrial site, where the intermediate storage is situated.

After bulldozers, layer by layer, get to the height, where the entrance road can be made- the combined method is used for the dump dismantling; further dismantling is made by excavator EO-5126⁹ (bucket capacity- 1.8 m³, operating power-132 kW, specific fuel consumption according operating power - 220 g/kW) with the direct rock loading on the conveyor, or on the intermediate site, where, with the help of the loader, the rock is delivered to the scraper conveyor SP – 202.

Before the delivery of rock mass to the belt conveyor, the moisture is applied (humidity of raw materials does not exceed 8%) with sprinklers.

The rock mass is loaded by Loader HK 632 L to the scraper conveyor SP-2002. From the scraper conveyor through the handling unit the rock mass is delivered to the sifter Gil-52 (for sorting into two classes -0-30 mm and +30 mm Productivity of the sifter on the original product is up to 250 t/hour, engine power-13 kW) Product of sifter screens +30 mm through the discharge tray, equipped with built-in nozzles for humidification, is delivered to the intermediate site without significant accumulation. From the intermediate site, the rock mass fraction +30 mm is loaded into transport by Loader HK 632 L and the fraction is delivered to the consumer.

Product of sorting class 0-30 through handling unit of sifter supplied on belt conveyor KLS¹⁰ (engine power 15 kW, capacity 1000 t/h). From the belt conveyor rock mass of class 0-30 mm through the handling unit of conveyor with built-in nozzles for humidification, emptied on the intermediate platform without significant accumulation, where loader HK 632L loads it in vehicles or on a platform (warehouse)

⁷ http://www.pervoe.su/tex11_02.php

⁸ <http://www.tdc.com.ua/content/view/55/104/>

⁹ http://russian-car.ru/ekskovator_eo-5126.htm

¹⁰ http://www.sibtenzo.com/vesi/1077_detail.htm

for storage. Warehouse is used if necessary without long-term storage. From storage the rock mass 0-30 mm by loader is loaded into the TPP or local boiler houses.



Figure 5 - Machinery involved in the project and weight scales.

. The project capacity of the complex allows to process 600 000 m³ of rock per year.
Installation of the sorting equipment begins on December 01, 2008.
Commissioning and the start of sorting complex work - January 02, 2009.

A.4.3. Brief explanation of how the anthropogenic emissions of greenhouse gases by sources are to be reduced by the proposed JI project, including why the emission reductions would not occur in the absence of the proposed project, taking into account national and/or sectoral policies and circumstances:

The project activities is aimed at extraction of coal from the dump, wich is in lawful possession by CE "Vtormet" Ltd, in order to prevent emissions into the atmosphere when spontaneous burning of dumps occur and to receiving more quantity of coal. Sorted fraction 0-30mm is delivered for blending with steam coal and subsequent combustion at power plants or boiler houses. In addition, sorted rock mass of class 30 mm is planned for building and repairing roads of 4-5 category at it's own expense without receiving any material benefit.

After the final sorting of the dump reclamation of the land is planned via restoration of the vegetation layer. After the restoration of the vegetation layer, grass, trees, and shrubs natural for climatic zone of Donbas region will be planted

The problem of waste heaps is very crucial nowadays in the Donbass. Waste heaps not only derive considerable land area from economic turnover and lead to disruption of ecological balance of natural biological community, but also are a source of high environmental hazard. Even at non-burning condition

heap is a source of pollution of air, soil, nearby water and groundwater. This risk is increased in many times by burning waste heap¹¹. The only way to eliminate the harmful effects of heap on the environment is its complete dismantling. However, the process of dismantling of heap is a very expensive process, which economic benefit is not offset possible costs. In addition there are significant risks associated with the

inability to timely determination of coal in total volume of waste heap. Significant costs bears followed after dismantling renewal of fertile layer and reclamation of earth area. This leads to a situation where the process of dismantling of heap facing financial difficulties, and for its successful implementation it is necessary to search for additional sources of funding. Receipt of additional income from the sale of quotas under the Joint Implementation project provides a powerful incentive for successful completion of this project.

Processing of these dumps will avoid their burning, improve ecological situation in the region, and significantly reduce CO₂ emissions and other harmful substances. Dismantling of rock dumps will reduce the probability of groundwater contamination. The area of land for agricultural activities and for other purposes will increase. Also, extra amount of coal will be obtained that does not require mining, thus it is possible to avoid leakages of methane, which accompanies coal mining. Emission reductions can be sold as ERUs on the international market of emissions trading.

The proposed project is aimed at reducing anthropogenic emissions. Emission reductions created by:

- Elimination of greenhouse gases sources associated with burning waste heaps, by extracting coal from the rock dumps;
- Reduction of uncontrolled methane emissions due to replacement of coal that would have been extracted through mining;
- Reduction of electricity consumption at waste heap dismantling in comparison to electricity consumption at coal mine.

Efforts to stop dumps burning and full their dismantling corresponds to the current legislation of Ukraine on the environmental protection. The proposed project is evaluated positively by local authorities. Detailed description of the baseline and additionality, contained in Section B of the project documentation.

A.4.3.1. Estimated amount of emission reductions over the crediting period:

Table 4 - The total expected emission reductions over the crediting period

| | Years |
|---|--|
| Length of the <u>crediting period</u> | 4 years |
| Year | Estimate of annual emission reductions in tonnes of CO ₂ equivalent |
| 2009 | 416666 |
| 2010 | 440417 |
| 2011 | 425806 |
| 2012 | 418792 |
| Total estimated emission reductions over the <u>crediting period</u> (tonnes of CO ₂ equivalent) | 1 701 681 |
| Annual average of estimated emission reductions over the <u>crediting period</u> (tonnes of CO ₂ equivalent) | 425 420 |

Duration of the crediting period - four years (48 month).

¹¹ http://terrikon.donbass.name/ter_s/290-model-samovozgoraniya-porodnyx-otvalov-ugolnyx-shaxt-donbassa.html



The beginning of the crediting period -02/01/2009
The end of the crediting period – 31/12/2012

A.5. Project approval by the Parties involved:

Project Idea (PIN) was given to the Designated Coordinating Center (State Environmental Investment Agency) on 21/08/2012. Letter of endorsement # 2582/23/7 was received on 14/09/2012. It is planned to get a letter of approval from SEIA and a letter of approval from a foreign country in October 2012.

**SECTION B. Baseline****B.1. Description and justification of the baseline chosen:**

The baseline for a JI project should be brought into compliance with Annex B to Decision 9/CMP.1 ("Guidelines for the implementation of Article 6 of the Kyoto Protocol")¹², and according to the "Guidance On Criteria For Baseline Setting And Monitoring, Version 0.3"¹³ (hereinafter - the "Guidance") issued by the supervisory JI (JISC).

Under the Guidance, the baseline for a JI project is a scenario that objectively represents the anthropogenic emissions of GHG sources or anthropogenic GHG removals by the acquisition, which may occur in the absence of the proposed project. In accordance with paragraph 9 of the Guidance, the project participants may choose either approach within the criteria for establishing the baseline and monitoring, as long as the approach is designed in accordance with Annex B of the Guidance or method for determining the baseline setting and monitoring adopted by the Executive Committee of the clean development mechanism (CDM).

Article 11 of Guidance allows project participants to choose an approach to JI projects, or it must be used approved methodologies for CDM baseline or approved CDM methodological tools. The specific approach of JI was used to determine the baseline.

For description and justification of the baseline the following step by step approach used:

Step 1: Indication and description of the approach chosen regarding baseline setting

The baseline of this project is defined on a special project basis in accordance with Article 21 of the JISC Guidance. Can not be used multi-project emission factor or sectoral baseline, because the project under consideration is one of the few of its kind, both in the sector (mining of rock dumps in Ukraine) as well as among JI projects.

According to Article 9 of the JISC Guidance, Option A selected for determining the baseline: *(a) An approach for determining the baseline and monitoring designed in accordance with Annex B of JI Guidelines (JI specific approach);*

Under Article 11 of Guidance for setting the baseline the latest version of the current methodology is used, which have chosen in the project " Waste heaps dismantling with the aim of decreasing the greenhouse gases emissions into the atmosphere. ", which is published on the website of the UNFCCC¹⁴.

Taking in account JT-specific-approach for determining the baseline according to Article 24 of the JISC Guidance, the baseline is identified by a list and description of possible future scenarios based on conservative assumptions and choosing one of the most likely.

The most likely future scenarios will be identified by checking whether all alternatives to meet the applicable law and regulations, and by analyzing the barriers. If only two alternatives remained, one of which represents the project scenario without the JI incentive, must be used Tool Clean Development Mechanism (CDM) "Tool for demonstration and assessment of additionality" Version 06.0.0 to prove that the project scenario cannot be regarded as the most plausible.

Step 2. Application of the approach chosen

Plausible future scenarios will be identified in order to establish a baseline.

¹² <http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf>

¹³ http://ji.unfccc.int/Ref/Documents/Baseline_setting_and_monitoring.pdf

¹⁴ <http://ji.unfccc.int/UserManagement/FileStorage/IE7LK2SZF1NOXRVB4CYG65WQPJMHA3>

Sub step 2a. Identifying and listing plausible future scenarios.Scenario 1. Continuation of existing situation

In the current situation waste heaps are not utilized. Spontaneous self-heating and subsequent burning of waste heaps is very common and measures to extinguish fire are taken sporadically. Burning waste heaps are sources of uncontrolled greenhouse gas emissions. Coal is not extracted from the waste heaps. Coal is produced by underground mines of the region and used for energy production or other purposes. Coal mining activities cause emissions of fugitive methane and also the formation of new waste-heaps.

Scenario 2. Direct energy production from the heat energy of burning waste heap

Waste heaps are not extinguished and not monitored properly. Some burning heaps are used to produce energy by direct insertion of heat exchangers into the waste heap¹⁵. This captures a certain amount of heat energy for direct use or conversion into electricity. The coal is not extracted from the waste heaps. Coal is produced by underground mines of the region and used for energy production or other purposes. Mining activities, resulting in fugitive gas release, and the formation of more waste-heaps.

Scenario 3. Production of construction materials from rock dumps.

Waste heaps are processed in order to produce construction materials (bricks, panels, etc.). Coal in the waste heap matter is burnt during the agglomeration process¹⁶. Coal is produced by underground mines of the region and used for energy production or other purposes. Mining activities, resulting in fugitive gas release, and the formation of more waste-heaps.

Scenario 4. Coal extraction from waste heaps without JI incentives

This scenario is similar to the project activity only in this case the project does not benefit from the possible development as a joint implementation project. In this scenario waste heaps are processed in order to extract coal and used it the energy sector. Less coal is produced by underground mines of the region.

Scenario 5. Systematic monitoring of waste heaps condition and regular fire prevention and extinguishing measures

Waste heaps are systematically monitored and their thermal condition is researched. Regular fire prevention measures are taken. In case of a burning waste heap, the fire is extinguished and measures are taken to prevent burning in the future. Coal is not extracted from the waste heaps. Coal is produced by underground mines of the region and used for energy production or other purposes. Mining activities, resulting in fugitive gas release, and the formation of more waste-heaps.

Sub step 2b. Consistency with mandatory applicable laws and regulations.

Existing Ukrainian laws and regulations treat waste heaps as sources of possible dangerous emissions into the atmosphere. In general burning waste heaps should be extinguished and measures must be taken to prevent fires in the future. However, due to the large numbers of waste heaps and their substantial sizes, combined with the limited resources of the owners, they typically do not even undertake the minimum required regular monitoring. Even when informed of a burning waste heap, and measures have to be taken

¹⁵ <http://masters.donntu.edu.ua/2004/fgtu/zayanchukovskaya/library/artcl3.htm>

¹⁶ *Opportunities for international best practice use in coal mining waste heap utilization of Donbas*, Matveeva N.G., Ecology: Collection of Scientific Papers, Eastern Ukrainian National University, Luhansk, #1 2007 http://www.nbu.gov.ua/portal/natural/Ecology/2007_1/Article_09.pdf



under existing legislation, it is more typical to accept the fine for air contamination, rather than take action to extinguish the burning waste heap itself.

Monitoring of dumps is not conducted systematically, and all activities are at the discretion of the dumps owner. Basically, dumps are in ownership of mines or regional coal association. Coal mines of Ukraine suffer from limited investment, which often leads to security problems due to severe conditions of production and financial difficulties, including the wages of miners often delayed for several months. In this case dumps are considered as an additional burden, but mine owners usually do not make even minimum measures required. Ignition and burning heaps are very common, and only concerning 48 out of 237 waste heaps, which were investigated in Luhansk region, was exactly known that they didn't burn, also exact data are not always available¹⁷.

In such circumstances it is safe to say that all scenarios do not contradict existing laws and regulations.

Sub step 2c. Barrier analysis

Scenario 1. Continuation of existing situation

This scenario does not anticipate any activities and therefore does not face any barriers.

Scenario 2. Direct energy production from the heat energy of burning waste heap

Technological barrier: This scenario is based on the highly experimental technology, which has not been implemented even in a pilot project. It is also not suitable for all waste heaps as the project owner will have to balance the energy resource availability (i.e. waste heap location) and the location of the energy user. On-site generation of electricity addresses this problem but requires additional interconnection engineering. In general this technology has yet to prove its viability. In addition it does not allow the control and management of the emitted gases. This technology can be applied only in the presence of dumps with developed combustion center. Even if the probability of burning rock dump is very high, it is currently impossible to predict the time of its outbreak and therefore predict the start of the use of thermal energy released during its combustion.

Investment barrier: Investment into unproven technology carries a high risk. In case of Ukraine, which carries a high country risk, investment into such unproven energy projects are less likely to attract investors than some other opportunities in the energy sector with higher returns. The pioneering character of the project may appeal to development programmes and governmental incentives but cost of the produced energy is likely to be much higher than alternatives.

Scenario 3. Production of construction materials from waste heap matter

Technological barrier: This scenario is based on known technology, however, this technology is not currently available in Ukraine and there is no evidence that such projects will be implemented in the near future. It is also not suitable for all types of waste heaps as the content of waste heap has to be predictable in order for project owner to be able to produce quality materials. High contents of sulphur and moisture can reduce the suitability of the waste heap for processing. A large scale deep exploration of the waste heap has to be performed before the project can start.

Scenario 4. Coal extraction from waste heaps without JI incentives

Investment barrier: This scenario is financially unattractive and faces barriers. Please refer to section B.2 for details.

Scenario 5. Systematic monitoring of waste heaps condition and regular fire prevention and extinguishing measures

Investment barrier: This scenario does not represent any revenues but anticipates additional costs for waste heaps owners. Monitoring of the waste heap status is not done systematically and in general actions are left to the discretion of the individual owners. Waste heaps are mostly owned by mines or regional coal mining associations. Coal mines in Ukraine suffer from limited investment resulting often in safety problems due

¹⁷ *Report on the analyzing the fire danger of waste heaps in Luhansk region*, Scientific Research Institute "Respirator", Donetsk, 2012. This report will be provided to an independent expert organization.

to complicated mining conditions and financial constraints, with miners' salaries often being delayed by few months. Waste heaps in this situation are considered as additional burdens and mines often do not even perform minimum required maintenance. Exact data are not always available. From a commercial view point the fines that are usually levied by the authorities are considerably lower than costs of all the measures outlined by this scenario.

Sub step 2d. Baseline identification

All scenarios, except Scenario 1 - Continuation of existing situation, face prohibitive barriers. Therefore, continuation of existing situation is the most plausible future scenario and is the baseline scenario.

This baseline scenario has been established according to the criteria outlined in the JISC Guidance:

- 1) On a project specific basis. This project is the few of its kind and therefore other options could not be used;
- 2) In a transparent manner with regard to the choice of approaches, assumptions, methodologies, parameters, data sources and key factors. All parameters and data are either monitored by the project participants or are taken from sources that provide a verifiable reference for each parameter. Project participants use approaches suggested by the JISC Guidance and methodological tools provided by the CDM Executive Board;
- 3) Taking into account relevant national and/or sectoral policies and circumstances, such as sectoral reform initiatives, local fuel availability, power sector expansion plans, and the economic situation in the project sector. It is demonstrated by the above analysis that the baseline chosen clearly represents the most probable future scenario given the circumstances of modern day Luhansk coal sector;
- 4) In such a way that emission reduction units (ERUs) cannot be earned for decreases in activity levels outside the project activity or due to force majeure. According to the proposed approach emission reductions will be earned only when project activity will generate coal from the waste heaps, so no emission reductions can be earned due to any changes outside of project activity.
- 5) Taking account of uncertainties and using conservative assumptions. A number of steps have been taken in order to account for uncertainties and safeguard conservativeness:
 - a. Same approaches as used for the calculation of emission levels in the National Inventory Reports (NIRs) of Ukraine are used to calculate baseline and project emissions when possible. NIRs use the country specific approaches and country specific emission factors that are in line with default IPCC values;
 - b. Lower range of parameters is used for calculation of baseline emissions and higher range of parameters is used for calculation emissions as a result of introduction of the project.
 - c. Default values were used to the extent possible in order to reduce uncertainty and provide conservative data for emission calculations.

Baseline Emissions

In order to calculate baseline emissions following assumptions were made:

- 1) The project will produce carbonaceous fraction (0-30mm), which contains energy coal that will displace the same amount of the same type of coal in the baseline scenario;
- 2) The coal that is displaced in the baseline scenario and the coal that is generated in the project activity are used for the same type of purpose and is stationary combusted;
- 3) The coal that is displaced in the baseline scenario is produced by the underground mines of the region and as such causes fugitive emissions of methane;
- 4) Coal production in the mine involves using a large amount of electricity (see annex 5);
- 5) Coal production in mine is accompanied by consumption of other energy sources (gas, diesel, fuel oil), but their share in compare with electricity are small¹⁸;
- 6) Regional waste heaps are vulnerable to spontaneous self-heating and burning and at some point in time will burn;

¹⁸ The effective method of electricity consumption control at coal mines. B.A.Gryaduschy, Doctor of Technical Science, DonUGI, G.N.Lisovoy, V.I.Myalkovsky, Chehlaty NA, Cand. Science, NIIGM named M.M.Fedorov, Donetsk, Ukraine www.mishor.esco.co.ua/2005/Thesis/10.doc

- 7) The probability of the waste heap burning at any point in time is determined on the basis of the survey of all the waste heaps in the area that provides a ratio of waste heaps that are or have been burning at any point in time to all existing waste heaps;
- 8) Coal burning in the waste heaps will oxidize to CO₂ completely if allowed to burn uncontrolled.
- 9) Carbonaceous rocks are delivered to the consumer without significant accumulation on the intermediate storage, therefore, these methane emissions of enriched rocks can be neglected.
- 10) Sorted fraction +30 mm has a low content of coal and has no tendency to spontaneous ignition.

Baseline emissions come from two major sources:

- Carbon dioxide emissions that occur during combustion of energy coal. These are calculated as stationary combustion emissions from mining coal in the equivalent of the amount of coal that is extracted from the waste heap in the project scenario. These emissions in the baseline scenario is exactly equal to the same emissions in the project scenario, thus are excluded from the calculation;
- Carbon dioxide emissions from burning waste heaps. These emissions are calculated as emissions of carbon dioxide generated by burning coal dumps, the equivalent amount of coal extracted from the rock dump in the project scenario, adjusted for the probability of burning dumps at any time;

As the baseline suggests that the current situation is preserved regarding the waste heaps burning, it is assumed that for any given waste heap, actual burning will occur at some point in time. This probability of burning is established by the study¹⁹ that assessed the status of all existing waste heaps in Luhansk region historically. Based on the gathered data it is concluded that 78% of all waste heaps in the Luhansk region have been, or are now, on fire.

The table below provides values for constant parameters used to determine the baseline emissions.

Table 5 - List of constants and parameters in the calculation of baseline emissions

| <i>Data / Parameter</i> | <i>Data unit</i> | <i>Description</i> | <i>Data Source</i> | <i>Value</i> |
|-------------------------|------------------|---|--|--|
| HCV_{Coal} | kcal/kg | High Calorific Value of steam coal | Guide of quality, volume of coal production and enrichment products in 2008-2010, Ministry of Coal Industry of Ukraine, State Committee of Ukraine (see Annex 4) (during the monitoring period the value can be changed) | 2009-7641 2010-7641 2011-7641 2012-7641 |
| $OXID_{Coal}$ | d/l | Carbon Oxidation factor of steam coal | National Inventory Report of Ukraine 1990- 2010, p. 459, 465, 471(during the monitoring period the value can be changed) | 2009-0.963 2010-0.962 2011-0.962 2012-0.962 |
| K_{Coal}^c | tC/TJ | Carbon content of steam coal | National Inventory Report of Ukraine 1990- 2010, p. 458, 464, 470(during the monitoring period the value can be changed) | 2009-25.97 2010-25.99 2011-25.99 2012-25.99 |
| A_{Coal} | % | The average ash content of steam coal produced in Luhansk region of Ukraine | Guide of quality, volume of coal production and enrichment products in 2008-2010, Ministry of Coal Industry of Ukraine, State Committee of Ukraine (see Annex 4) (during the monitoring period the value can be changed) | 2009 – 38.40 2010 – 38.10 2011 – 38.10 2012 – 38.10 |
| W_{Coal} | % | The average moisture of steam coal produced in Luhansk region of Ukraine | Guide of quality, volume of coal production and enrichment products in 2008-2010, Ministry of Coal Industry of Ukraine, State Committee of Ukraine (see Annex 4) (during the monitoring period the value can be changed) | 2009 – 7.40 2010 – 7.40 2011 – 7.40 2012 – 7.40 |

¹⁹ *Report on the analyzing the fire danger of waste heaps in Luhansk region*, Scientific Research Institute “Respirator”, Donetsk, 2012. This report will be provided to an independent expert organization.

| | | | | |
|-----------|-----|------------------------------------|---|------|
| p_{WHB} | d/l | Probability of waste heap burning. | <i>Report on the analyzing the fire danger of waste heaps in Luhansk region</i> , Scientific Research Institute “Respirator”, Donetsk, 2012. | 0.78 |
| k | d/l | Hydrogen content factor of coal | State Standard 4083-2002. Coal and anthracite for powdered combustion in thermal power plants. Kyiv. State Standard of Ukraine 2002. The standard will be provided by an independent expert organization. | 0.21 |

Emissions in the baseline scenario are calculated as follows:

$$BE_y = BE_{WHB,y} \quad , \quad (1)$$

where:

BE_y – baseline emissions in the year y (tCO₂ e),

$BE_{WHB,y}$ - baseline emissions due to burning of the waste heap in the year y (tCO₂ e),

In this project there is no beneficiation of coal, so in order to correctly calculate the amount of energy coal produced in mines and substituted by coal, received by dismantling of waste heap, it is necessary to recount, taking into account different value of ash and moisture content of energy coal and fraction (0-30), obtained by dismantling of the waste heap. If in the mass of carbonaceous rocks we extract moisture and substances that are not burned during combustion, and turn to ash, we obtain the conditional ideal coal with no moisture and ash content. Therefore, to obtain coal with averaged over Ukraine characteristics it is necessary to add to that ideal coal the averaged moisture and ash content. In addition to moisture and ash, the coal (carbonaceous rocks) also contains sulfur, but its amount does not exceed a few percent²⁰, content of it in carbonaceous rocks always less than in coal, extracted from the mine, so to calculate the amount produced in coal mine, which replaced by coal from waste heap, this value can be neglected. For the calculation are used data on ash content and moisture content of steam coal that is mined in the Luhansk region of Ukraine according to the annual Guide of Ministry of Coal Industry²¹

Thus, the amount of coal produced in mines in the baseline scenario is calculated by the formula:

$$FC_{BE,Coal,y} = FR_{Coal,y} \cdot \left(1 - \frac{A_{Rock,y}}{100} - \frac{W_{Rock,y}}{100}\right) / \left(1 - \frac{A_{Coal}}{100} - \frac{W_{Coal}}{100}\right), \quad (2)$$

where:

$FR_{Coal,y}$ - amount of sorted fraction (0-30mm), which is extracted from the dumps because of the project in a year y , that came to blending with further combustion in thermal power plants, t;

$A_{Rock,y}$ -the average ash content of sorted fractions (0-30mm), which is extracted from dump in year y , %;

$W_{Rock,y}$ -the average humidity of sorted fractions (0-30mm), which is extracted from dump in year y , %;

A_{Coal} - the average ash content of steam coal, mined in Luhansk region in year y , % ;

W_{Coal} -the average humidity of steam coal, mined in Luhansk region in year y , % ;

100 - conversion factor from percent to fraction, d/l.

Baseline emissions due to burning dumps in year y calculated by the formula:

$$BE_{WHB,y} = \frac{FC_{BE,Coal,y}}{1000} \cdot p_{WHB} \cdot NCV_{Coal} \cdot OXID_{Coal} \cdot K_{Coal}^c \cdot 44/12 \quad (3)$$

where:

²⁰ <http://masters.donntu.edu.ua/2009/feht/semkovskiy/library/article9.htm>

²¹ Guide of quality, volume of coal production and enrichment products in 2008-2010, Ministry of Coal Industry of Ukraine, State Committee of Ukraine (see Annex 4)

$FC_{BE,Coal,y}$ - amount of coal that has been mined in the baseline scenario and combusted for energy use, equivalent to the amount of coal extracted from the waste heaps because of the project activity in the year y , t, (calculated by the formula (2));

p_{WHB} - probability of waste heap burning, d/l;

NCV_{Coal} - net Calorific Value of steam coal, TJ/kt;

$OXID_{Coal}$ - carbon Oxidation factor of coal, d/l;

K_{Coal}^c - carbon content of coal, tC/TJ;

1/1000 - conversion factor from tons in kilotonnes, d / l

44/12 - stoichiometric relationship between the molecular weight of carbon dioxide and carbon.

Net Calorific Value of steam coal calculated by the formula²²:

$$NCV_{Coal} = \{HCV_{Coal} * \left(1 - \frac{A_{Coal}}{100}\right) * \left(1 - \frac{W_{Coal}}{100}\right) - 2.442 * \left[\frac{W_{Coal}}{100} + k * \left(1 - \frac{A_{Coal}}{100}\right) * \left(1 - \frac{W_{Coal}}{100}\right)\right]\} * 4.187/1000 \quad (4)$$

де:

HCV_{Coal} - High Calorific Value of steam coal, kcal/kg

A_{Coal} - The average ash content of steam coal produced in Luhansk region of Ukraine, in year y , %

W_{Coal} - The average moisture of steam coal produced in Luhansk region of Ukraine, in year y , %

k - Hydrogen content factor of coal, d/l

100 - conversion factor from % into a fraction, d/l

4.187 - conversion factor from kilocalories to kilojoules kcal/KJ

1/1000 - - conversion factor from KJ / kg into TJ / kt

Net Calorific Value, (calculated by the formula (4)), is a lower value, provided by the National Inventory²³ is around 8% that is why, for reasons of conservatism, the project takes on a value calculated by the formula (4).

Leakages

Leakage is the net change of anthropogenic emissions by sources and/or removals by sinks of GHGs which occurs 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 fugitive methane emissions due to the mining activities. As coal in the baseline scenario is only coming from mines it causes fugitive emissions of methane. These are calculated as standard country specific emission factor applied to the amount of coal that is extracted from the waste heaps in the project scenario (which is the same as the amount of coal that would have been mined in the baseline scenario). Source of the leakage are the fugitive methane emissions due to coal mining. These emissions are specific to the coal that is being mined. Coal produced by the project activity is not mined but extracted from the waste heap through the advanced beneficiation process. Therefore, coal produced by the project activity substitutes the coal would have been otherwise mined in the baseline. Coal that is mined in the baseline has fugitive methane emissions associated with it and the coal produced by the project activity does not have such emissions associated with it.

As reliable and accurate national data on fugitive CH₄ emissions associated with the production of coal are available, project participants used this data to calculate the amount of fugitive CH₄ emission as described below.

This leakage is measurable: through the same procedure as used in 2006 IPCC Guidelines²⁴ (See Volume 2, Chapter 4, Page 4-11) and also used in CDM approved methodology ACM009, Version 03.2²⁵ (Page 8).

²² State Standard 4083-2002. Coal and anthracite for powdered combustion in thermal power plants. Kyiv. State Standard of Ukraine 2002. The standard will be provided by an independent expert organization.

²³ National Inventory Report of anthropogenic emissions by sources and removals by sinks of greenhouse gases in the Ukraine 1990- 2010, p. 456, 462, 468



Activity data (in our case amount of coal extracted from the waste heap which is monitored directly) is multiplied by the emission factor (which is sourced from the relevant national study – National Inventory Report of Ukraine under the Kyoto Protocol) and any conversion coefficients.

Electricity consumption and related greenhouse gas emissions due to dismantling of waste heap to be taken into account in calculating the project emissions. Carbon dioxide emissions due to electricity consumption in the coal mine way in an amount, equivalent to the design of coal - a leakage, that can be taken into account at base of the State Statistics Committee data²⁶, concerning unit costs of electricity at coal mines in Ukraine in the relevant year.

This leakage is directly attributable to the JI project activity according to the following assumption: the coal produced by the project activity from the waste heap will substitute the coal produced by underground mines of the region in the baseline scenario. This assumption is explained by the following logic: Energy coal market is demand driven as it is not feasible to produce coal without demand for it. Coal is a commodity that can be freely transported to the source of demand and coal of identical quality can substitute some other coal easily. The project activity cannot influence demand for coal on the market and supplies coal extracted from the waste heaps. In the baseline scenario demand for coal will stay the same and will be met by the traditional source – underground mines of the region. Therefore, the coal supplied by the project in the project scenario will have to substitute the coal mined in the baseline scenario. According to this approach equivalent product supplied by the project activity (with lower associated specific green-house gas emissions) will substitute the baseline product (with higher associated specific green-house gas emissions). This methodological approach is very common and is applied in all renewable energy projects (substitution of grid electricity with renewable-source electricity), projects in cement sector (e.g. JI0144 Slag usage and switch from wet to semi-dry process at JSC “Volyn-Cement”, Ukraine²⁷), projects in metallurgy sector (e.g. UA1000181 Implementation of Arc Furnace Steelmaking Plant "Electrostal" at Kurakhovo, Donetsk Region²⁸) and others.

These leakages are significant and will be included in the calculation of the project emission reductions. Procedure for ex ante estimation and quantification of this source is similar to the procedure made in the project, that was determined – “Dismantling of waste heap at former mine "ROZSYPNYANSKA-1” (Project ITL UA1000317)²⁹

²⁴ http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_4_Ch4_Fugitive_Emissions.pdf

²⁵ <http://cdm.unfccc.int/UserManagement/FileStorage/K4P3YG4TNQ5ECFNA8MBK2QSMR6HTEM>

²⁶ <http://www.ukrstat.gov.ua/>

²⁷

http://ji.unfccc.int/JI_Projects/DB/P1QYRYMBOCEQOT0HOQM60MBQ0HXNYU/Determination/Bureau%20Veritas%20Certification1266348915.6/viewDeterminationReport.html

²⁸ <http://ji.unfccc.int/JIITLProject/DB/4THB9WT0PK6F721UQA5H6PTHZEXT4C/details>

²⁹ <http://ji.unfccc.int/JIITLProject/DB/0RQXGLUAS7ETAGMUQZWFQJLN1SIAW/details>

Table 6 - List of constants used in the calculations of leakage

| <i>Data / Parameter</i> | <i>Data unit</i> | <i>Description</i> | <i>Data Source</i> | <i>Value</i> |
|-------------------------|---------------------------------------|--|---|--|
| GWP_{CH_4} | tCO ₂ e / tCH ₄ | Global Warming Potential of Methane | IPCC Second Assessment Report ³⁰ (during the the monitoring period value can be changed) | 21 |
| ρ_{CH_4} | t/m ³ | Methane density | Standard (at room temperature 20°C and 1 ATM) ³¹ | 0.000668 |
| EF_{CH_4} | m ³ /t | Emission factor for fugitive methane emissions from coal mining. | National Inventory Report of Ukraine 1990- 2009, p. 90 ³² (during the monitoring period value can be changed) | 25.67 |
| $N_{Coal,y}^E$ | MWh/t | average electricity consumption per tonne of coal, produced in Ukraine in the year y | Fuel and energy resources of Ukraine, Statistical Yearbook, State Statistics Committee of Ukraine, Kiev 2009-2011 ³³ (during the monitoring period value can be changed) | 2009-0.0905 2010-0.0926 2011-0.0842 2012-0.0842 |
| $EF_{CO_2,EL}$ | tCO ₂ /MWh | Specific carbon dioxide emissions due to production of electricity at TPP and by its consumption | Order of State Environmental Investments Agency #62, 63, 43, 75 http://www.neia.gov.ua/nature/doccatalog/document?id=127171, 127172, 126006, 127498 (during the monitoring period value can be changed) | 2009-1.237 2010-1.225 2011-1.227 2012-1.227 |

Leakages in year y calculated as follows:

$$LE_y = LE_{CH_4,y} + LE_{EL,y} \quad (5)$$

where:

LE_y - leakages in year y, (t CO₂e);

$LE_{CH_4,y}$ - leakages due to fugitive emissions of methane in the mining activities in the year y, (t CO₂e);

$LE_{EL,y}$ - leakages due to consumption of electricity in the mining activities in the year y, (t CO₂e).

Leakages due to fugitive emissions of methane in the mining activities in the year y calculated as follows:

$$LE_{CH_4,y} = - FC_{BE,Coal,y} \cdot EF_{CH_4} \cdot \rho_{CH_4} \cdot GWP_{CH_4} \quad (6)$$

³⁰ IPCC Second Assessment: Climate Change 1995. A Report of the Intergovernmental Panel on Climate Change". Bolin, B. et al. (1995). IPCC website. <http://www.ipcc.ch/pdf/climate-changes-1995/ipcc-2nd-assessment/2nd-assessment-en.pdf>

³¹ http://www.engineeringtoolbox.com/gas-density-d_158.html

³²

http://unfccc.int/files/national_reports/annex_i_ghg_inventories/national_inventories_submissions/application/zip/ukr-2011-nir-08jun.zip

³³ <http://www.ukrstat.gov.ua/>



Where:

$FC_{BE,Coal,y}$ - amount of coal that has been mined in the baseline scenario and combusted for energy use, equivalent to the amount of coal extracted from the waste heaps because of the project activity in the year y , t , (calculated by the formula (2));

EF_{CH_4} - emission factor for fugitive methane emissions from coal mining, m^3/t ;

ρ_{CH_4} - methane density (standard, at room temperature $20^\circ C$ and 1 atm), t/m^3 ;

GWP_{CH_4} - global warming potential for methane, $tCO_2 e / tCH_4$.

Leakages due to consumption of electricity in the mining activities in the year y calculated as follows:

$$LE_{EL,y} = - FC_{BE,Coal,y} \cdot N_{Coal,y}^E \cdot EF_{CO_2,EL} \quad (7)$$

Where:

$FC_{BE,Coal,y}$ - amount of coal that has been mined in the baseline scenario and combusted for energy use, equivalent to the amount of coal extracted from the waste heaps because of the project activity in the year y , t , (calculated by the formula (2));

$N_{Coal,y}^E$ - average electricity consumption per tonne of coal, produced in Ukraine in the year y , MWh/t

$EF_{CO_2,EL}$ - Specific carbon dioxide emissions due to production of electricity at TPP and by its consumption, $tCO_2 e / MWh$

Baseline emissions due to consumption of other types of energy in coal mines are insignificant compared to the emissions due to electricity consumption³⁴, so, due to this fact and for reasons of conservatism, take them equal to zero.

³⁴ *The effective method of electricity consumption control at coal mines. B.A.Gryaduschy, Doctor of Technical Science, DonUGI, G.N.Lisovoy, V.I.Myalkovsky, Chehlaty NA, Cand. Science, NIIGM named M.M.Fedorov, Donetsk, Ukraine www.mishor.esco.co.ua/2005/Thesis/10.doc*



Key information and data used to establish the baseline are provided below in tabular form:

Table 7 - Amount of coal that has been mined in baseline scenario

| | |
|--|---|
| Data/Parameter | $FC_{BE,Coal,y}$ |
| Data unit | t |
| Description | Amount of coal that has been mined in the baseline scenario and combusted for energy use, equivalent to the amount of coal extracted from the waste heaps because of the project activity in year y |
| Time of <u>determination/monitoring</u> | Yearly monitoring. |
| Source of data (to be) used | Project owner calculations |
| Value of data applied (for ex ante calculations/determinations) | Provided by project owner |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | Calculated by the formula (2) Section B.1. |
| QA/QC procedures (to be) applied | According to the project owner policy. |
| Any comment | No |

Table 8 - Amount of sorted fraction (0-30 mm)

| | |
|--|---|
| Data/Parameter | $FR_{Coal,y}$ |
| Data unit | t |
| Description | Amount of sorted fraction (0-30 mm), which is extracted from the dump because of the project activity in the year y |
| Time of <u>determination/monitoring</u> | Yearly monitoring. |
| Source of data (to be) used | Project owner records |
| Value of data applied (for ex ante calculations/determinations) | Provided by project owner |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | Measured for the commercial purposes on site. |
| QA/QC procedures (to be) applied | According to the project owner policy. |
| Any comment | No |



Table 9 - Average ash content of sorted fraction

| | |
|--|--|
| Data/Parameter | $A_{Rock,y}$ |
| Data unit | % |
| Description | Average ash content of sorted fraction (0-30 mm), which is extracted from dump in year y |
| Time of <u>determination/monitoring</u> | Yearly monitoring. |
| Source of data (to be) used | Project owner records |
| Value of data applied (for ex ante calculations/determinations) | Provided by project owner |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | Measured for the commercial purposes on site. |
| QA/QC procedures (to be) applied | According to the project owner policy. |
| Any comment | No |

Table 10 - Average humidity of sorted fraction

| | |
|--|--|
| Data/Parameter | $W_{Rock,y}$ |
| Data unit | % |
| Description | Average humidity of sorted fraction (0-30mm), which is extracted from dump in year y |
| Time of determination/monitoring | Yearly monitoring. |
| Source of data (to be) used | Project owner records |
| Value of data applied (for ex ante calculations/determinations) | Project owner records |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | Measured for the commercial purposes on site. |
| QA/QC procedures (to be) applied | According to the project owner policy. |
| Any comment | No |



Table 11 - Net Calorific Value of coal

| Data/Parameter | NCV_{Coal} |
|--|---|
| Data unit | TJ/kt |
| Description | Net Calorific Value of coal |
| Time of determination/ <u>monitoring</u> | Annual monitoring |
| Source of data (to be) used | Calculations of project owner |
| Value of data applied (for ex ante calculations/determinations) | Project owner records |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | Calculated by the formula (4). Section B1 |
| QA/QC procedures (to be) applied | According to the project owner policy |
| Any comment | Annual monitoring |

Table 12 - High Calorific Value of steam coal

| Data/Parameter | HCV_{Coal} |
|--|--|
| Data unit | kcal/kg |
| Description | High Calorific Value of steam coal |
| Time of determination/monitoring | Fixed ex ante. |
| Source of data (to be) used | Guide of quality, volume of coal production and enrichment products in 2008-2010, Ministry of Coal Industry of Ukraine, State Committee of Ukraine |
| Value of data applied (for ex ante calculations/determinations) | 2009-7641 2010-7641 2011-7641 2012-7641 |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | The default value is set according to the Guide, Ministry of Coal Industry of Ukraine, State Committee of Ukraine |
| QA/QC procedures (to be) applied | According to the Guide, Ministry of Coal Industry of Ukraine, State Committee of Ukraine |
| Any comment | No |



Table 13 - Carbon Oxidation factor of coal

| | |
|--|--|
| Data/Parameter | $OXID_{Coal}$ |
| Data unit | d/l |
| Description | Carbon Oxidation factor of coal |
| Time of determination/monitoring | Fixed ex ante. |
| Source of data (to be) used | National Inventory Report of Ukraine 1990- 2010., p. 459,465,471 (in the monitoring period the value can be changed) |
| Value of data applied (for ex ante calculations/determinations) | 2009-0.963 2010-0.962 2011-0.962 2012-0.962 |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | The default value is set according to the National Inventory. |
| QA/QC procedures (to be) applied | According to the National Inventory. |
| Any comment | No |

Table 14 - Carbon content of coal

| | |
|--|---|
| Data/Parameter | K_{coal}^c |
| Data unit | tC/TJ |
| Description | Carbon content of coal |
| Time of determination/monitoring | Fixed ex ante. |
| Source of data (to be) used | National Inventory Report of Ukraine 1990- 2010., p. 458, 464,470 (in the monitoring period the value can be changed) |
| Value of data applied (for ex ante calculations/determinations) | 2009-25.97 2010-25.99 2011-25.99 2012-25.99 |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | The default value is set according to the National Inventory. |
| QA/QC procedures (to be) applied | According to the National Inventory. |
| Any comment | No |



Table 15 - Probability of waste heap burning.

| Data/Parameter | p_{WHB} |
|--|--|
| Data unit | d/l |
| Description | Probability of waste heap burning. |
| Time of determination/monitoring | Fixed ex ante. |
| Source of data (to be) used | Report on the analyzing the fire danger of waste heaps in Luhansk region, Scientific Research Institute "Respirator", Donetsk, 2012. |
| Value of data applied (for ex ante calculations/determinations) | 0.78 |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | The default value is set according to the Scientific Research Institute "Respirator" |
| QA/QC procedures (to be) applied | According to the Scientific Research Institute "Respirator" |
| Any comment | No |

Table 16 - Average ash content of steam coal

| Data/Parameter | A_{Coal} |
|--|---|
| Data unit | % |
| Description | Average ash content of steam coal that is mined in the Luhansk region of Ukraine |
| Time of <u>determination/monitoring</u> | Fixed ex ante. |
| Source of data (to be) used | Guide of quality, volume of coal production and enrichment products in 2008-2010, Ministry of Coal Industry of Ukraine, State Committee of Ukraine (see Appendix 4) |
| Value of data applied (for ex ante calculations/determinations) | 2009-38.40 2010-38.10 2011-38.10 2012-38.10 |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | The default value established in accordance with Guide Ministry of Coal Industry of Ukraine, State Committee of Ukraine. |
| QA/QC procedures (to be) applied | According to Guide Ministry of Coal Industry of Ukraine, State Committee of Ukraine |
| Any comment | No |



Table 17 - Humidity of steam coal

| | |
|--|---|
| Data/Parameter | W_{Coal} |
| Data unit | % |
| Description | Average humidity of steam coal that is mined in the Luhansk region of Ukraine |
| Time of determination/monitoring | Fixed ex ante. |
| Source of data (to be) used | Guide of quality, volume of coal production and enrichment products in 2008-2010, Ministry of Coal Industry of Ukraine, State Committee of Ukraine (see Appendix 4) |
| Value of data applied (for ex ante calculations/determinations) | 2009-7.40 2010-7.40 2011- 7.40 2012-7.40 |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | The default value established in accordance with Guide Ministry of Coal Industry of Ukraine, State Committee of Ukraine. |
| QA/QC procedures (to be) applied | According to Guide Ministry of Coal Industry of Ukraine, State Committee of Ukraine |
| Any comment | No |

Table 18 - Hydrogen content factor of coal

| | |
|--|--|
| Data/Parameter | k |
| Data unit | d/l |
| Description | Hydrogen content factor of coal |
| Time of determination/monitoring | Fixed ex ante. |
| Source of data (to be) used | State Standard 4083-2002. Coal and anthracite for powdered combustion in thermal power plants. Kyiv. State Standard of Ukraine 2002. |
| Value of data applied (for ex ante calculations/determinations) | 0.21 |
| Justification of the choice of data or description of measurement methods and procedures (to be) applied | The default value established in accordance with State Standard 4083-2002 |
| QA/QC procedures (to be) applied | According to State Standard 4083-2002 |
| Any comment | No |

**B.2. Description of how the anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the JI project:**

The following step-wise approach is used to demonstrate that the project provides reductions in emissions by sources that are additional to any that would otherwise occur:

Step 1. Indication and description of the approach applied

As suggested by Paragraph 44 (b) of the Annex 1 of JISC "Guidance on Criteria for Baseline Setting and Monitoring version 03", the approach to demonstrate additionality will consist of provision of traceable and transparent information that an accredited independent entity has already positively determined that a comparable project (to be) implemented under comparable circumstances (same GHG mitigation measure, same country, similar technology, similar scale) would result in a reduction of anthropogenic emissions by sources or an enhancement of net anthropogenic removals by sinks that is additional to any that would otherwise occur and a justification why this determination is relevant for the project at hand.

Step 2. Application of the approach chosen

The following steps are taken in order to demonstrate additionality of this project:

Step 1: Identify comparable project where an accredited independent entity has already positively determined that it would result in a reduction of anthropogenic emissions by sources or an enhancement of net anthropogenic removals by sinks that is additional to any that would otherwise occur.

The project "WASTE HEAP DISMANTLING BY PE "ARDS-SERVIS" WITH THE AIM OF DECREASING GREENHOUSE GASES EMISSIONS INTO THE ATMOSPHERE". (Project ITL UA1000362)³⁵ is selected as the comparable JI project. Accredited independent entity has already positively determined that it would result in a reduction of anthropogenic emissions by sources or an enhancement of net anthropogenic removals by sinks that is additional to any that would otherwise occur. This determination has already been deemed final by the JISC. Appropriate documentation such as PDD and Determination Report regarding this project is available traceably and transparently on the UNFCCC JI Website

Step 2: Demonstrate that the identified project is a comparable project (to be) implemented under comparable circumstances:

- 1) Both projects propose **same GHG mitigation measure**: The proposed GHG mitigation measure under both projects is coal extraction from the mine's waste heaps. This will prevent greenhouse gas emissions into the atmosphere during combustion of the heaps and will contribute an additional amount of coal, without the need for mining.
- 2) Both projects are implemented within the **same country**: The proposed project and identified comparable project are both located in Ukraine.
- 3) Both projects utilize **similar technology**: The technology utilized by the proposed project and identified comparable project is similar. In both projects the waste heap is dismantled using standard loaders and bulldozers. From dumps the material is sent to a site of sorting. In both projects there is sorting complex, in which the division of carbonaceous rocks into fractions by vibrating occurs. Small fraction at both projects is used for subsequent combustion in local boiler and power station. Therefore, both technologies are similar.
- 4) Both projects have **similar scale**: Both projects are large scale JI projects. Both projects process waste heaps of comparable scale. The proposed and comparable projects consist of one site that will operate during all project period. The scale of extracted coal is limited by content of coal in the dump and the size of the dump and doesn't exceed 50 % for the proposed and compared projects – in both projects the

³⁵ <http://ji.unfccc.int/JIITLProject/DB/XVDE1L6O88BNKAKN29NAZ3WEDEPDSU/details>



quantity of sorted small fraction is ranging from 400 000 to 550 000 tonnes per year (see Table 19) and differ by no more than 50%.

Table 19 – Quantity of extracted fraction (0-30 mm) in the proposed and comparable projects.

| | 2008 | 2009 | 2010 | 2011 | 2012 |
|--|--------|---------|---------|---------|---------|
| Extracted fraction quantity (0-30mm) in proposed project, (t/year) | 0 | 524 750 | 534 712 | 538 680 | 530 000 |
| Extracted fraction quantity (0-30mm) in comparable project, (t/year) | 93 702 | 419 475 | 425 843 | 454 038 | 457 600 |
| Correlation of sorted fraction in both projects, (d/l) | 0* | 1.25 | 1.26 | 1.19 | 1.16 |

* Proposed project started one year later than the comparable project.

** Proposed project ended on 31/03/2012, therefore, for more correct comparison, in the comparable project was taken quantity of extracted fraction for three month.

5) During the period between the beginning of the proposed and the compared projects changes in legislation that could affect the establishment of the baseline didn't take place.

Therefore the criteria identified by the Guidance are satisfied and the identified project is indeed a comparable project implemented under comparable circumstances.

Step 3: Provide justification why determination for a comparable project is relevant for the project at hand .

The project project “WASTE HEAP DISMANTLING BY PE “ARDS-SERVIS” WITH THE AIM OF DECREASING GREENHOUSE GASES EMISSIONS INTO THE ATMOSPHERE” (Project ITL UA1000362) and the proposed project are both implemented within the same geographic region of Ukraine – the Donbas coal mining region. The implementation timeline is quite similar: Kyoto period (2008-2012) is a period where a most extensive work in both projects is carried out.

Both projects will share the same investment profile and market environment. These two projects are implemented by private companies with no utilization of public funds. The investment climate will be comparable in both cases with the coal sector being an almost non-profitable sector in Ukraine³⁶ burdened by many problems. The market for the extracted coal will also be similar for both projects as these are small private companies that will not be able to sell coal in big quantities under long-term contracts. Ukrainian coal sector is largely state-controlled. Energy and Coal Ministry of Ukraine decides production level of state mines, based on their performance. After this, state controlled mines sell their coal to the state Trading Company "Coal of Ukraine". This company also buys coal from private mines and arranges supply of coal to thermal electricity companies. Prices for coal mines differ significantly for public and private mines. In general, prices of state mines are more than 60% higher than the prices for private enterprises³⁷. Both projects also share the investment climate of Ukraine which is far from being favourable. Ukraine is considered to be a high risk country for doing business and investing in. Almost no private capital is available from domestic or international capital markets for mid to long term investments, and any capital that is available has high cost. The table below represents risks of doing business in Ukraine according to various international indexes and studies.

³⁶ http://www.necu.org.ua/wp-content/plugins/wp-download_monitor/download.php?id=126

³⁷ http://www.ier.com.ua/files/publications/Policy_papers/German_advisory_group/2009/PP_09_2009_ukr.pdf

Table 20 - International ratings of Ukraine³⁸

| Organization, which provides rating | Name of rating | Ukraine's place in the rating | Number of countries in the rating |
|---|--------------------------------------|-------------------------------|-----------------------------------|
| Fung Heritage (2010) | Economic Freedom Rating | 162 | 179 |
| Pro UN (2009) | The Human Development Index | 85 | 182 |
| Transparency International (2009) | Index of corruption | 146 | 180 |
| Freedom House (2009) | freedom of Speech | 115 | 195 |
| World Bank, The International Finance Corporation and the Audit Company Price Waterhouse Coopers (2010) | Rating of ease of paying taxes | 181 | 183 |
| World Economic Forum (Davos) (2009-2010) | Rating of global competitiveness | 82 | 133 |
| World Economic Forum (Davos) (2009) | Financial strength rating | 55 | 55 |
| “Alliance for Property Rights” (USA) | Rating of property rights protection | 58 | 70 |

The data above shows that both real and perceived risks of investing in Ukraine are in place and influence the availability of capital in Ukraine both in terms of size of the investments and in terms of capital costs. The comparison of commercial lending rates in Ukraine and in Eurozone for the loans over 5 years in EUR is presented in a figure below:

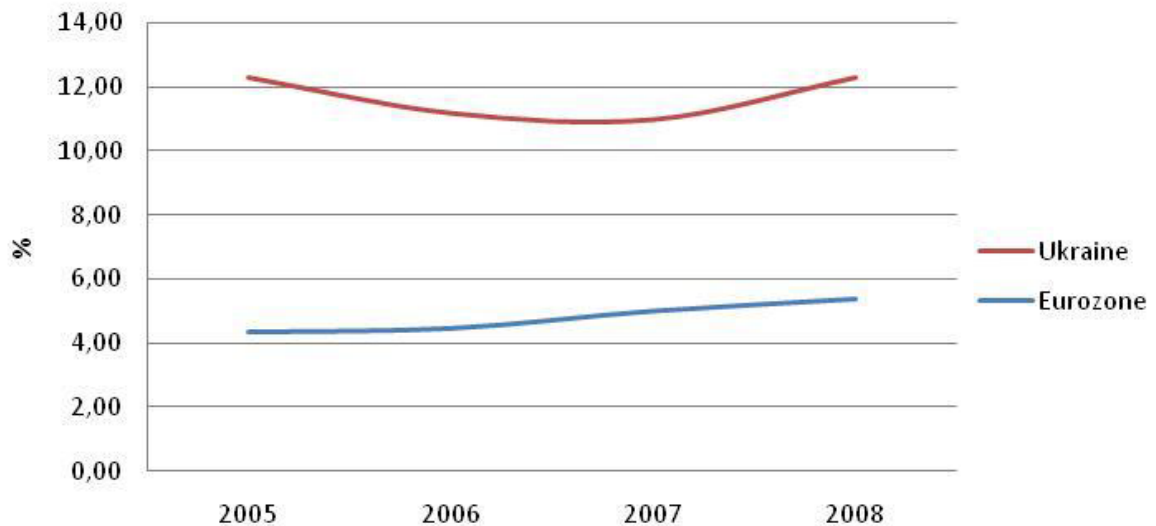


Figure 6 - Commercial lending rates, EUR, over 4 years³⁹

Cost of debt financing in Ukraine is at least twice as high than in the Eurozone. The risks of investing into Ukraine are additionally confirmed by the country ratings provided by the “Moody’s international rating”

³⁸ http://sd.net.ua/2010/06/11/ukraine_ratings.html

³⁹ Data for Ukraine from National Bank of Ukraine [http://www.bank.gov.ua/Statist/Electronic%20bulletin/data/4-Financial%20markets\(4.1\).xls](http://www.bank.gov.ua/Statist/Electronic%20bulletin/data/4-Financial%20markets(4.1).xls)

agency and the associated country risk premium. The table below compares country risk premiums for Russia and Ukraine⁴⁰:

Table 21 - Sovereign Awards for Russia and Ukraine in 2004-2006

| Total Risk Premium, % | 2004 | 2005 | 2006 |
|-----------------------|-------|------|-------|
| Russia | 7.02 | 6.6 | 6.64 |
| Ukraine | 11.59 | 10.8 | 10.16 |

As stated at the OECD Roundtable on Enterprise Development and Investment Climate in Ukraine, the current legal basis is not only inadequate, but to a large extent it sabotages the development of market economy in Ukraine. Voices in the western press can basically be summarized as follows: The reforms in the tax and legal systems have improved considerably with the adoption of the commercial Code, Civil Code and Customs Code on 1 January 2004 but still contain unsatisfactory elements and pose a risk for foreign investors⁴¹. Ukraine is considered to be heading in the right direction with significant reforms having been put into action but still has a long way to go to realize its full potential. Frequent and unpredictable changes in the legal system along with conflicting and inconsistent Civil and Commercial Codes do not allow for a transparent and stable enforced legal business environment. This is perceived as a great source of uncertainty by international companies, which make future predictions of business goals and strategy risky.

The conclusion from the abovementioned is as follows: the investment climate of Ukraine is risky and unwelcoming, private capital is not available from domestic or international sources or available at prohibitively high cost due to real and perceived risks of doing business in Ukraine as shown by various sources. Alternatives markets, such as Russia, offer similar profile of investment opportunities with lower risk and better business environment.

Taking into account the information provided above it is possible to conclude that the determination of the project "WASTE HEAP DISMANTLING BY PE "ARDS-SERVIS" WITH THE AIM OF DECREASING GREENHOUSE GASES EMISSIONS INTO THE ATMOSPHERE" (Project ITL UA1000362) is relevant for the project at hand.

Outcome of the analysis: We have provided traceable and transparent information that an accredited independent entity has already positively determined that a comparable project "Dismantling of waste heap at former mine "WASTE HEAP DISMANTLING BY PE "ARDS-SERVIS" WITH THE AIM OF DECREASING GREENHOUSE GASES EMISSIONS INTO THE ATMOSPHERE" (Project ITL UA1000362) implemented under comparable circumstances (same GHG mitigation measure, same country, similar technology, similar scale) would result in a reduction of anthropogenic emissions by sources or an enhancement of net anthropogenic removals by sinks that is additional to any that would otherwise occur and have provided justification on why this determination is relevant for the project at hand. Therefore, this project is additional.

B.3. Description of how the definition of the project boundary is applied to the project:

Project implementation will take place only on dumps, which officially is in use of CE "Vtormet" Ltd. At the same time, according to baseline, the notional typical mine, which produces coal, replaced by the coal from dismantling of heap, takes part in fugitive emissions. The specific of energy consumption at coal mines is determined by the following main components: power consumption, heat consumption, air consumption, consumption of natural gas and other types of fuel and water, sewage discharges, sewage

⁴⁰Data from Aswath Damodaran, Ph.D., Stern School of Business NYU <http://pages.stern.nyu.edu/~adamodar/>

⁴¹ Foreign Direct Investment in Ukraine – Donbass, Philip Burris, Problems of foreign economic relations development and attraction of foreign investments: regional aspect., ISSN 1991-3524, Donetsk, 2007. p. 507-510

treatment. As a result of the work⁴² is found, that about 90% of the total consumption of energy in coal mines is electricity.

There are several sources of greenhouse gases due to mining:

- Uncontrolled methane emissions as a result of working the coal industry in Ukraine;
- Carbon dioxide emissions due to electricity consumption at the mine;
- Emissions of carbon dioxide due to burning of the new dumps formed due to mining;
- Carbon dioxide emissions due to consumption of other types of fuel at the mine (given the small number and for reasons of conservatism is not considered);

Carbon dioxide emissions due to consumption of electricity produced by burning fossil fuels in power plants of Ukraine and uncontrolled methane emissions as a result of mining activity, are leakages .

The table 22 shows an overview of all sources of emissions in the baseline and project scenarios. The project boundaries depicted in accordance with the provisions of Articles 14, 16, 17 Guidelines Supervisory Committee.

Table 22 - Sources of emissions in the baseline and project scenario.

| Baseline scenario | Source | Gas | Included/ Excluded | Justification / Explanation |
|-------------------|---|------------------|--------------------|--|
| | Waste heap burning | CO _{2e} | Included | Main emission source |
| | Coal consumption | CO _{2e} | Excluded | This coal is displaced in the project activity by the coal extracted from the waste heaps. |
| Project scenario | Coal consumption | CO _{2e} | Excluded | The coal is extracted from waste heap. |
| | Consumption of electricity due to extracting coal from dump | CO _{2e} | Included | Main emission source. |
| | Consumption of fossil fuel(diesel fuel) due to extracting coal from dumps | CO _{2e} | Included | Main emission source. |
| Leakages | Emissions of methane as a result of the coal industry | CH ₄ | Included | These leaks are taking place in the baseline scenario associated with the uncontrolled emissions of methane in the mine |
| | Consumption of electricity due to mining | CO _{2e} | Included | These leaks are taking place in the baseline scenario associated with the mining |
| | Use of other types of energy resources due to mining | CO _{2e} | Excluded | These emissions are not significant ⁴³ ,and also for reasons of conservatism, they are excluded from consideration. |

The baseline scenario

The baseline scenario scenario is the continuation of the current situation. Coal is mined in underground mines, which causes uncontrolled methane emissions. When coal is consumed electricity and other fuels.

⁴² The effective method of electricity consumption control at coal mines. B.A.Gryaduschy, Doctor of Technical. Science, DonUGI, G.N.Lisovoy, V.I.Myalkovsky, Chehlaty NA, Cand. Science, NIIGM named M.M.Fedorov, Donetsk, Ukraine www.mishor.esco.co.ua/2005/Thesis/10.doc

⁴³ The effective method of electricity consumption control at coal mines. B.A.Gryaduschy, Doctor of Technical. Science, DonUGI, G.N.Lisovoy, V.I.Myalkovsky, Chehlaty NA, Cand. Science, NIIGM named M.M.Fedorov, Donetsk, Ukraine www.mishor.esco.co.ua/2005/Thesis/10.doc

Coal is used for energy production. In the process of coal formed a new blade. Dumps heat and often light up, resulting in emissions of carbon dioxide in the atmosphere. The sources of emissions in the baseline scenario are:

-Emissions of carbon dioxide due to burning of coal dump;

The sources of leakages are:

-Uncontrolled methane emissions due to coal mining in the mines;

-Emissions of carbon dioxide due to consumption of electricity and other forms of energy in coal mining in the mine.

Project scenario

By the project scenario dumps are dismantled, and all combustible materials are removed. Thus, emissions due to ignition and burning dumps are reduced. Project implementation includes additional burning diesel fuel due to supply the rock from dumps to the sorting point of coal. For operation of the equipment the electricity is used. Additional amount of coal obtained from the project, reduced the need for its production in the mines. The sources of emissions in the project scenario are:

-Emissions of carbon dioxide from the use of fuel for the operation of the project equipment (tecnic);

-Emissions of carbon dioxide associated with electricity consumption of project equipment;

The following figures show the project boundaries and sources of emissions in the baseline and project scenarios:

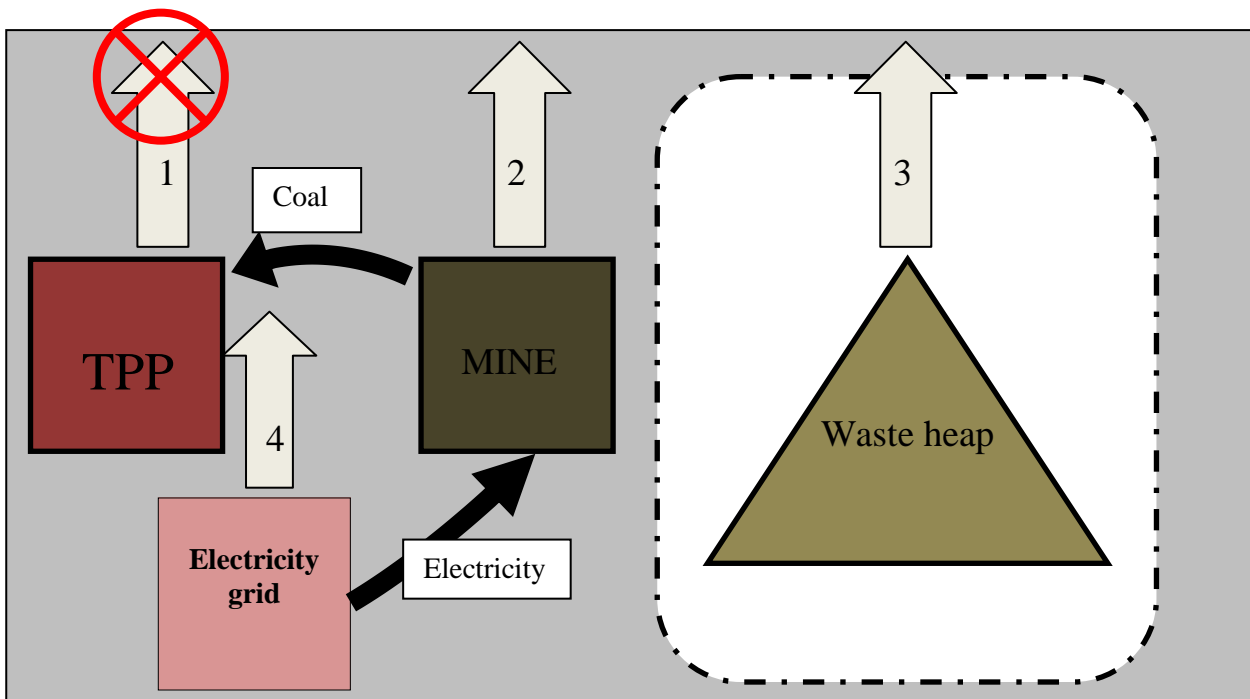


Figure 7 - The boundaries of the project and the sources of emissions in the baseline scenario

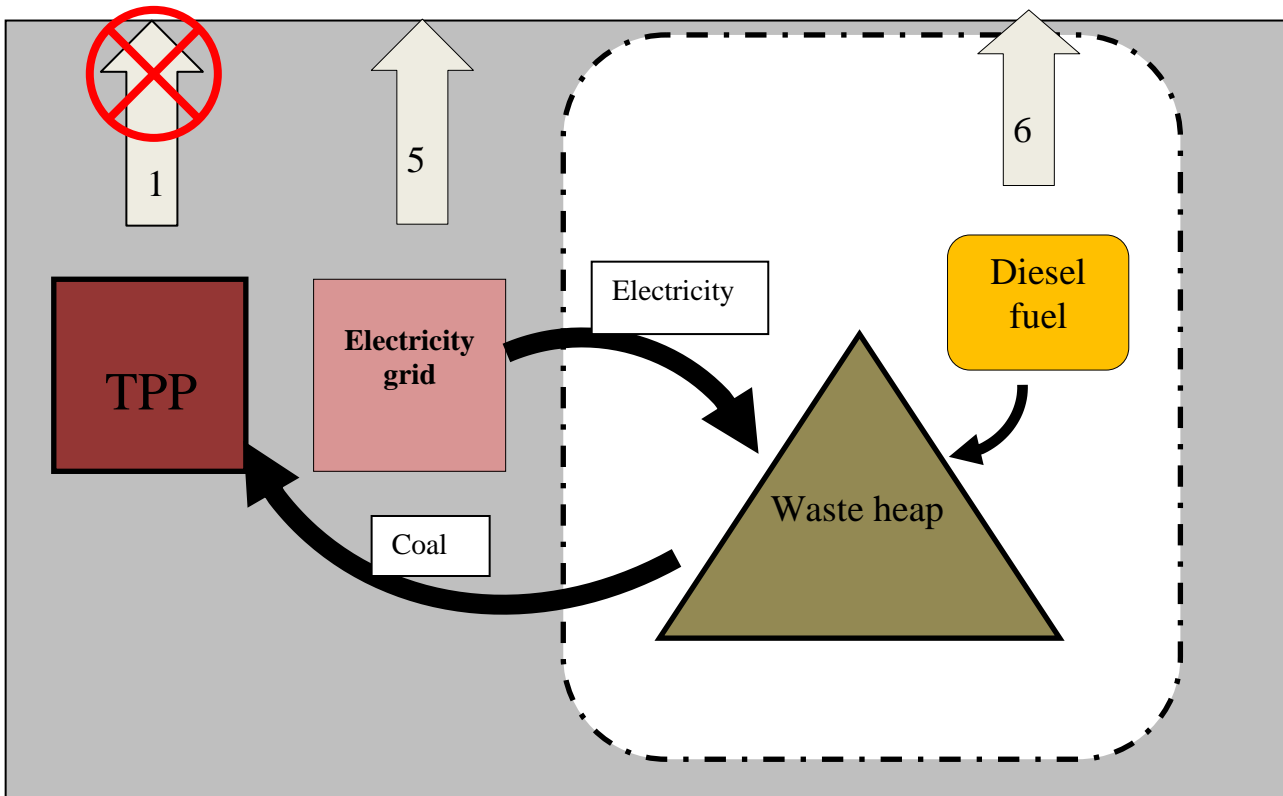
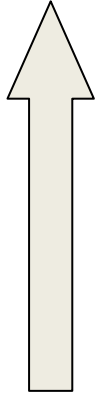



Figure 8 - The boundaries of the project and the source of emissions in the project scenario

Sources of greenhouse gas emissions at schemes

- 
1. Carbon dioxide due to burning of coal
 2. Leakages of methane due to mining
 3. Carbon dioxide due to burning coal
 4. Leakages of carbon dioxide due to consumption of electricity in mine.
 5. Carbon dioxide due to consumption of electricity during dismantling the dump.
 6. Carbon dioxide due to consumption of diesel fuel during dismantling the dump
- 
- Emissions due to burning of coal excluded from consideration

B.4. Further baseline information, including the date of baseline setting and the name(s) of the person(s)/entity(ies) setting the baseline:

Date of determination the baseline scenario: 22/08/2012

Name of person / organization, determining the baseline scenario:

Klavinsh Gints, Project manager at SIA "Vidzeme Eko", tel.+371-29228458, e-mail: siltisilti@gmail.com

"Vidzeme Eko" – project participant , contact details are available in Annex 1.

**SECTION C. Duration of the project / crediting period****C.1. Starting date of the project:**

The date of commencement of the project is December 1, 2008 (from this date the installation of equipment begins according to the order of installation works implementation # 302 from 01/12/2008).

C.2. Expected operational lifetime of the project:

The life cycle of the project will last from 02/01/2009 to 31/12/2012. Thus, the project life cycle is 4 years or 48 months.

C.3. Length of the crediting period:

Four years (48 months). From 02/01/2009 to 31/12/2012. On 02/01/2009 generation of first emission reductions in the project begins.

**SECTION D. Monitoring plan****D.1. Description of monitoring plan chosen:**

The proposed monitoring procedures coincide with standard procedures in projects that were determined: SIA “Antracit”, SIA “Monolit”, “Temp” Ltd and others. The projects developer is Global Carbon BV.

In order to provide a detailed description of the monitoring plan chosen, a step-wise approach is used:

Step 1. Indication and description of the approach chosen for realizing of monitoring.

Option (a) provided by the Guidelines For The Users Of The Joint Implementation Project Design Document Form, Version 04⁴⁴ is used: JI specific approach is used in this project and therefore will be used for establishment of monitoring plan.

Among other things, the monitoring plan includes the following:

- Collecting and archiving all relevant data needed for evaluation and measurement of anthropogenic emissions by sources of emissions that occur within the project during the crediting period;
- Collecting and archiving all relevant data necessary for determining the baseline of anthropogenic emissions by sources of GHGs within the project during the crediting period;
- Identify all potential sources and collect and archive data regarding the enhancement the level of anthropogenic emissions by sources of emissions outside the project, which is significant and which can be attributed to the project during the crediting period.
- Procedures to ensure quality control and process monitoring;
- Procedures for periodic calculation reductions of anthropogenic emissions from sources in the proposed JI project, and procedures for calculating the effects of leakage, if any.

Step 2. Application of the approach chosen.

All data collected during monitoring should be archived and stored for at least 2 years after the last application for ERU.

These should be checked, unless otherwise indicated in the following sections. All measurements must be executed with calibrated measurement equipment according to industry standards for the branch.

Baseline scenario

⁴⁴ <http://ji.unfccc.int/Ref/Documents/Guidelines.pdf>



The baseline scenario is the continuation of the current situation. Coal is mined in underground mines, which causes uncontrolled methane emissions. Due to mining the electricity and other types of fuel are consumed. Coal is used for energy production. A new dump formed in the process of coal mining. Dumps are heated and often are ignited, resulting in emissions of carbon dioxide in the atmosphere.

The sources of emissions in the baseline scenario are:

-Emissions of carbon dioxide due to burning of coal dump;

The sources of leakages are:

-Uncontrolled methane emissions due to coal mining in the mines;

-Emissions of carbon dioxide due to consumption of electricity and other forms of energy in coal mining in the mine.

Project scenario

In the project scenario dumps are dismantled, and all combustible materials are removed. Thus, emissions due to ignition and burning dumps are reduced. Project implementation includes additional burning diesel fuel to supply the mining of rock dumps to the point of sorting coal. For operation of the equipment the electricity is used. Additional coal obtained from the project, reducing the need for its production in the mines. The sources of emissions in the project scenario are:

- Emissions of carbon dioxide due to consumption of fuel for the operation of the project equipment (mining machinery);

- Emissions of carbon dioxide due to consumption of electricity by project equipment;

During any period of monitoring must be collected and recorded data on the following parameters:

1. Additional electricity consumed in the same period as a result of implementation of project activities

To measure this parameter the commercial data of company are used. Also monthly electricity bills are available. This parameter is recorded by special energy meter. Meter is located in the buildings of substation near the project location. The meter records all electricity consumed in the project because access to the electricity supply is only through it. Indications used for commercial accounts with energetic company. Account checking is made on the basis of theoretical calculation of sorting complex power consumption according to the technical characteristics and timing of work time.

2. Amount of diesel fuel was consumed in the appropriate period as a result of a project activity.

To determine this parameter the commercial data of company are used. To confirm the consumed amount of fuel checks and other accounting documents are used. The fuel consumption, which is related to a project activity, is taken into account. Information summary report is based on accounts. In the industrial site there is not any additional equipment, but if such equipment is used, fuel consumption of this equipment is also considered. If the data in these documents are in litres instead of tonnes, these data must be converted using factor of 0.85 kg / l⁴⁵. For purpose of control a theoretical calculation of diesel fuel consumption is

⁴⁵ GOST 305-82 Diesel Fuel. Specifications. 0,85 kg/l is taken as an average between two suggested types of diesel: summer and winter

<http://elarus.ru/info/standards/gost-305-82/>



made on basis of technical specifications and actual record of machinery work. **3. Amount of coal, which is in the appropriate period was extracted from the dump and combusted for obtaining the energy, used for activities under the project, equal to the amount of coal that was in the baseline scenario produced from the mine and combusted for obtaining the energy.**

3.1. Amount of fraction (0-30mm).

To determine this parameter the commercial data of company are used. To confirm the amount of fraction (0-30 mm) checks and documents from customers are used. Taken into account and refers to the project activity only product which delivered to the customer. Weighing takes place on site using certified scales. Regular cross-inspections with customers are executed. Information of summarized reports is based on these delivery data.

3.2. Ash content and moisture of fraction (0-30mm).

For sampling for further analysis of ash content and moisture the following procedure is realized:

On-site interim storage at achieving volume fraction of about 100 tons sampling is made around the perimeter of the accumulated volume. Total volume of the collected sample is approximately 10-15 kg. Selected sample is brought and treated by Technical Control Division (TCD). Sample is treated at upgraded LSM (Laboratory Sample-processing Machine). The sample is crushed to the size of 0-3 mm. Then it is imparted to a conic form and reduced by divisor (this process is carried out three times) until the sample weight becomes below 2-3 kg. Then the sample is pressed to a disk with thickness of 2 cm and covered tightly with bars to divide into squares. Then in a chessboard order the sample is gathered with weight not less than 500 grams. Then two accompanying certificate are written, which shall include:

- Number of certificate;
- Date;
- Mark, class;
- Supplier;
- Name of the desired analysis.

One certificate is placed in the can with sample. The second is attached to the can using special threads or wires. The lid closed so that the eyes of lid and cans are combined. Wire fastened into two bundles and sealed, so that it has not silted. Usually two cans are used:

- One - into the lab for testing;
- Second - to arbitration for two months storage.

Ash content and moisture of fraction (0-30mm) measured regularly with registration decade reports.

To measure the ash content and humidity of sorted fractions (0-30mm)- is used procedure in GOST 11022-95 " Solid mineral fuel. Methods for determining the ash content"⁴⁶, and GOST 11014-2001 " Brown coal, hard coal and oil shale. Rapid method for determination of humidity "⁴⁷. Analysis of ash content and is made in the laboratory. Acceptance inspector opens bank sample in the laboratory, verifies the identity and puts down all data in the "Journal of receiving

⁴⁶ <http://vsesnip.com/Data1/16/16768/index.htm>

⁴⁷ <http://vsesnip.com/Data1/40/40907/index.htm>



samples for laboratory testing ". Laboratory technician takes a sample on the analytical work, and humidity. Evaporation occurs in the low-temperature laboratory furnaces CHOJI-100/350 at 160 ° C, weighing – at the laboratory electronic scales grade 4 accuracy AXIS A-2500. The process of ashing occurs in the high laboratory furnace SNOL-7, 2/1100 at 815 ° C, weighing - on the laboratory electronic scales grade 2 accuracy ANG-200C.

Measuring devices

The method of measurement, chosen for this project, is based on the measurement of some parameters to be monitored - extracted coal and electricity consumed, and the study of accounting documents and reports on other parameters (used fuel). For measuring procedures in the project the following equipment is used:

- For electricity consumed - electronic counter NIK 2303 ART 1, device, manufactured by LLC "NIK-electronics" which is a multifunction device for measuring electric power, accuracy 1.0 when measuring active energy in SS GOST 8.391:2008⁴⁸, frequency of testing 6 years.

- For weighing the sorted fraction (0-30mm) - electronic truck gage scales VTA-60, produced by JV "Ukrestmarkinvest" accuracy "Medium" (III) (measurement error with standard truck load of + / - 0.25%) frequency of testing 12 months;

- To measure the ash content and moisture content of sorted fraction (0-30mm) - procedure due to GOST 11022-95 "Mineral solid fuel. Methods of determination the ash content"⁴⁹, and GOST 11014-2001 "Brown coal, hard coal and oil shale. Accelerated methods for determining the moisture"⁵⁰. Analysis of ash content and moisture produced in the laboratory. Acceptor unseal the can with sample in laboratory, validates the certificate and puts all data in the "History of taking samples for laboratory tests." Laboratory assistant takes the sample for analytical and work moisture. Evaporation occurs in the low-temperature laboratory furnaces SNOL-100/350 at 160 ° C, weighing is at scales of 4 laboratory accuracy AXIS A-2500. The process occurs in the laboratory furnace SNOL-7, 2/1100 at 815 ° C, weighing is carried out on the scales of 2 laboratory accuracy ANG-200C.

- To measure the fuel consumption will be using information from the accounting department: receipts for purchased fuel and accounting documents concerning the spent fuel.

Archiving, data storage and record handling procedure

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.

⁴⁸ <http://lindex.net.ua/shop/bibl/501/doc/4205>

⁴⁹ <http://vsesnip.com/Data1/16/16768/index.htm>

⁵⁰ <http://vsesnip.com/Data1/40/40907/index.htm>

**Training of monitoring personnel**

The project will utilize technology that requires skills and knowledge in heavy machinery operation, coal washing technology operation, electric equipment operation etc. This kind of skills and knowledge is available locally through the system of vocational training and education. This system is state-supervised in Ukraine. Professionals who graduate from vocational schools receive a standard certificate in the field of their professional study. Only workers with proper training can be allowed to operate industrial equipment like. Management of the project host will ensure that personnel of the project have received proper training and are eligible to work with the prescribed equipment.

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 scope of the trainings, training intervals, forms of training, knowledge checks etc. The project host management will maintain 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 Kyoto Protocol, JI projects and monitoring from the project participant - SIA "Vidzeme Eko".

Procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting

In cases if any errors, fraud or inconsistencies 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.

The project host management will also establish a communication channel that will make it possible to submit suggestions, improvement proposals and project ideas for more accurate future monitoring for every person involved in the monitoring activities. These actions occur through close cooperation with SIA "Vidzeme Eko", external CE "Vtormet" Ltd. on JI projects.

Emergency preparedness for cases where emergencies can cause unintended emissions

The project operation does not foresee any factors or emergencies that can cause unintended GHG emissions. Safe operation of equipment and personnel is ensured by systematic safety training. Procedures for dealing with general emergencies such as fire, major malfunction etc., are developed as part of the mandatory business regulations and are in accordance with local requirements.



Table 23 - List of parameters and constants used in the calculations of emissions

| <i>Data / Parameter</i> | <i>Data unit</i> | <i>Description</i> | <i>Data Source</i> | <i>Value</i> |
|-------------------------|--------------------------------------|--|--|--|
| GWP_{CH_4} | tCO ₂ e/ tCH ₄ | Global Warming Potential of Methane | IPCC Second Assessment Report | 21 |
| ρ_{CH_4} | t/m ³ | Methane density | Standard (at room temperature 20°C and 1 ATM) | 0.000668 |
| HCV_{Coal} | kcal/kg | High Calorific Value of steam coal | Guide of quality, volume of coal production and enrichment products in 2008-2010, Ministry of Coal Industry of Ukraine, State Committee of Ukraine (see Annex 4) (during the monitoring period the value can be changed) | 2009-7641 2010-7641 2011-7641 2012-7641 |
| NCV_{Diesel} | TJ/kt | Net Calorific Value of diesel fuel | National Inventory Report of Ukraine 1990- 2010, p. 473,476, 479 (during the monitoring period the value can be changed) | 2009-42.3 2010-42.5 2011-42.5 2012-42.5 |
| $OXID_{Coal}$ | d/l | Carbon Oxidation factor of coal | National Inventory Report of Ukraine 1990- 2010, p.459,465,471 (during the monitoring period the value can be changed) | 2009-0.963 2010-0.962 2011-0.962 2012-0.962 |
| $OXID_{Diesel}$ | d/l | Carbon Oxidation factor of diesel fuel | National Inventory Report of Ukraine 1990- 2010, p. 475,478, 481 (during the monitoring period the value can be changed) | 2009-0.99 2010-0.99 2011-0.99 2012-0.99 |
| K_{Coal}^c | tC/TJ | Carbon content of coal | National Inventory Report of Ukraine 1990- 2010, p.458, 464, 470 (during the monitoring period the value can be changed) | 2009-25.97 2010-25.99 2011-25.99 2012-25.99 |
| K_{Diesel}^c | tC/TJ | Carbon content of diesel fuel | National Inventory Report of Ukraine 1990- 2010, p.474, 477, 480 (during the monitoring period the value can be changed) | 2009-20.2 2010-20.2 2011-20.2 2012-20.2 |

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| | | | | |
|-----------------|-------------------------|--|--|--|
| EF_{CH_4} | m ³ /t | Emission factor for fugitive methane emissions from coal mining. | National Inventory Report of Ukraine 1990- 2009, p. 90 | 25.67 |
| $EF_{CO_2,EL}$ | t CO _{2e} /MWh | Specific carbon dioxide emissions due to production of electricity at TPP and by its consumption | Order of State Environmental Investments Agency № 62, 63, 43, 75 http://www.neia.gov.ua/nature/doccatalog/document?id=127171, 127172, 126006, 127498 (during the monitoring period the value can be changed) | 2009-1.237 2010-1.225 2011-1.227 2012-1.227 |
| A_{Coal} | % | The average ash content of coal produced in Luhansk region of Ukraine | Guide of quality, volume of coal production and enrichment products in 2008-2010, Ministry of Coal Industry of Ukraine, State Committee of Ukraine (see Annex 4) (during the monitoring period the value can be changed) | 2009-38.40 2010-38.10 2011-38.10 2012-38.10 |
| W_{Coal} | % | The average moisture of coal produced in Luhansk region of Ukraine | Guide of quality, volume of coal production and enrichment products in 2008-2010, Ministry of Coal Industry of Ukraine, State Committee of Ukraine (see Annex 4) (during the monitoring period the value can be changed) | 2009-7.40 2010-7.40 2011-7.40 2012-7.40 |
| p_{WHB} | d/1 | Probability of waste heap burning. | <i>Report on the analyzing the fire danger of waste heap in Luhansk region</i> , Scientific Research Institute “Respirator”, Donetsk, 2012. | 0.78 |
| $NE_{Coal,y}^E$ | MWh/t | average electricity consumption per tonne of coal, produced in Ukraine in the year y | Fuel and energy resources of Ukraine, Statistical Yearbook, State Statistics Committee of Ukraine, Kiev, 2009-2011. | 2009-0.0905 2010-0.0926 2011-0.0842 2012-0.0842 |
| k | d/1 | Hydrogen content factor of coal | State Standard 4083-2002. Coal and anthracite for powdered combustion in thermal power plants. Kyiv. State Standard of Ukraine 2002. The standard will be provided by an independent expert organization. | 0.21 |

**D.1.1. Option 1 – Monitoring of the emissions in the project scenario and the baseline scenario:****D.1.1.1. Data to be collected in order to monitor emissions from the project, and how these data will be archived:**

| ID number (Please use numbers to ease cross-referencing to D.2.) | Data variable | Source of data | Data unit | Measured (m), calculated (c), estimated (e) | Recording frequency | Proportion of data to be monitored | How will the data be archived? (electronic/paper) | Comment |
|---|---|-------------------------------------|-----------|---|---------------------|------------------------------------|---|---------|
| P1 | $EC_{PE,y}$ – Additional amount of electricity, consumed in project in year y | Company records, electricity meters | MWh | M | Monthly | 100% | In paper and electronic form | |
| P2 | $FC_{PE,Diesel,y}$ – Amount of diesel fuel, consumed in project in year y | Company records | t | C | Monthly | 100% | In paper and electronic form | |
| P3 | $EF_{CO_2,EL}$ - Specific carbon dioxide emissions due to production of electricity at TPP and by its consumption | See section D.1. Fixed ex ante | tC/MWh | E | Fixed ex ante | 100% | In electronic form | |
| P4 | NCV_{Diesel} – Net Calorific Value of diesel fuel | See section D.1. Fixed ex ante | TJ/kt | E | Fixed ex ante | 100% | In electronic form | |
| P5 | $OXID_{Diesel}$ - Carbon Oxidation factor of diesel fuel | See section D.1. Fixed ex ante | d/l | E | Fixed ex ante | 100% | In electronic form | |
| P6 | K_{Diesel}^C - Carbon content of diesel fuel | See section D.1. Fixed ex ante | tC/TJ | E | Fixed ex ante | 100% | In electronic form | |

**D.1.1.2. Description of formulae used to estimate project emissions (for each gas, source etc.; emissions in units of CO₂ equivalent):**

Emissions from the project activity are calculated as follows:

$$PE_y = PE_{EL,y} + PE_{Diesel,y} \quad (8)$$

where:

PE_y - project emissions due to project activity in the year y (tCO₂ equivalent),

$PE_{EL,y}$ - project emissions due to consumption of electricity from the grid by the project activity in the year y (tCO₂ equivalent),

$PE_{Diesel,y}$ - project emissions due to consumption of diesel fuel by the project activity in the year y (tCO₂ equivalent).

The Project emissions due to consumption of electricity from a grid in a year y are calculated as follows:

$$PE_{EL,y} = EC_{PE,y} \cdot EF_{CO_2,EL} \quad (9)$$

where:

$EC_{PE,y}$ - additional amount of electricity, consumed in project in year y, MWh;

$EF_{CO_2,EL}$ - Specific carbon dioxide emissions due to production of electricity at TPP and by its consumption, tCO₂/MWh;

Project emissions due to consumption of diesel fuel by the project activity in the year y are calculated as follows:

$$PE_{Diesel,y} = \frac{FC_{PE,Diesel,y}}{1000} \cdot NCV_{Diesel} \cdot OXID_{Diesel} \cdot K_{Diesel}^C \cdot 44/12, \quad (10)$$

where:

$FC_{PE,Diesel,y}$ - amount of diesel fuel, consumed in project in year y, t;

NCV_{Diesel} - Net Calorific Value of diesel fuel, TJ/kt;

$OXID_{Diesel}$ - carbon Oxidation factor of diesel fuel, d/l;

K_{Diesel}^C - carbon content of diesel, tC/TJ;

44/12 - stoichiometric relationship between the molecular weight of carbon dioxide and carbon.

1/1000 - conversion factor from tons in kilotonnes, d / 1



| D.1.1.3. Relevant data necessary for determining the <u>baseline</u> of anthropogenic emissions of greenhouse gases by sources within the project boundary, and how such data will be collected and archived: | | | | | | | | |
|--|---|-----------------------------------|------------------|--|----------------------------|---|---|---|
| ID number (Please use numbers to ease cross-referencing to D.2.) | Data variable | Source of data | Data unit | Measured (m), calculated (c), estimated (e) | Recording frequency | Proportion of data to be monitored | How will the data be archived? (electronic/ paper) | Comment |
| <i>B1</i> | $FC_{BE,Coal,y}$ - Amount of coal that has been mined in the baseline scenario and combusted for energy use in year y | Company records | t | <i>C</i> | Annually | 100% | In paper and electronic form | Equil $FC_{PE,Coal,y}$ Calculated using formula (2) |
| <i>B2</i> | $FR_{Coal,y}$ - amount of sorted fraction (0-30mm), which is extracted from the dumps because of the project activity in a year y | Company records, scales | t | <i>M</i> | Permanently at boot | 100% | In paper and electronic form | |
| <i>B3</i> | HCV_{Coal} - High Calorific Value of coal | See section D.1. Fixed ex ante | kcal/kg | <i>O</i> | Fixed ex ante | 100% | In electronic form | |
| <i>B4</i> | NCV_{Coal} - Net Calorific Value of coal | Company records | TJ/kt | <i>P</i> | Annually | 100% | In paper and electronic form | Calculated using formula (14) |



| | | | | | | | | |
|-----|---|--------------------------------|-------|----------|---------------|------|------------------------------|-----------------|
| B5 | $OXID_{Coal}$ - Carbon Oxidation factor of coal | See section D.1. Fixed ex ante | d/l | <i>E</i> | Fixed ex ante | 100% | In electronic form | |
| B6 | K_{Coal}^c - Carbon content of coal | See section D.1. Fixed ex ante | tC/TJ | <i>E</i> | Fixed ex ante | 100% | In electronic form | |
| B7 | p_{WHB} - Probability of waste heap burning | See section D.1. Fixed ex ante | d/l | <i>E</i> | Fixed ex ante | 100% | In electronic form | |
| B8 | A_{Coal} - The average ash content of coal produced in Luhansk region of Ukraine | See section D.1. Fixed ex ante | % | <i>E</i> | Fixed ex ante | 100% | In electronic form | |
| B9 | W_{Coal} - The average humidity of coal produced in Luhansk region of Ukraine | See section D.1. Fixed ex ante | % | <i>E</i> | Fixed ex ante | 100% | In electronic form | |
| B10 | $A_{Rock,y}$ - The average ash content of sorted fractions (0-30mm), which is extracted from dump in year y | Company records | % | <i>M</i> | Monthly | 100% | In paper and electronic form | Laboratory data |
| B11 | $W_{Rock,y}$ - The average humidity of sorted fractions (0-30mm), which is extracted from dump in year y | Company records | % | <i>M</i> | Monthly | 100% | In paper and electronic form | Laboratory data |
| B12 | k - Hydrogen content factor of coal | See section D.1. Fixed ex ante | d/l | <i>E</i> | Fixed ex ante | 100% | In electronic form | |

**D.1.1.4. Description of formulae used to estimate baseline emissions (for each gas, source etc.; emissions in units of CO₂ equivalent):**

Emissions in the baseline scenario are calculated as follows:

$$BE_y = BE_{WHB,y} \quad , \quad (11)$$

Where:

BE_y – baseline emissions in the year y (tCO₂ equivalent),

$BE_{WHB,y}$ - baseline emissions due to burning of the waste heap in the year y (tCO₂ equivalent) ,

Baseline emissions due to burning dumps in year y calculated by the formula:

$$BE_{WHB,y} = \frac{FC_{BE,Coal,y}}{1000} \cdot p_{WHB} \cdot NCV_{Coal} \cdot OXID_{Coal} \cdot K_{Coal}^c \cdot 44/12 \quad (12)$$

where:

$FC_{BE,Coal,y}$ - amount of coal that has been mined in the baseline scenario and combusted for energy use, equivalent to the amount of coal extracted from the waste heap because of the project activity in the year y, t;

p_{WHB} - probability of waste heap burning , d/l;

NCV_{Coal} - net Calorific Value of coal, TJ/kt;

$OXID_{Coal}$ - carbon Oxidation factor of coal, d/l;

K_{Coal}^c - carbon content of coal, tC/TJ;

1/1000 - conversion factor from tons in kilotonnes, d / 1

44/12 - stoichiometric relationship between the molecular weight of carbon dioxide and carbon.

The amount of coal produced in mines in the baseline scenario is calculated by the formula:

$$FC_{BE,Coal,y} = FR_{Coal,y} \cdot \left(1 - \frac{A_{Rock,y}}{100} - \frac{W_{Rock,y}}{100}\right) / \left(1 - \frac{A_{Coal}}{100} - \frac{W_{Coal}}{100}\right), \quad (13)$$

where:

$FR_{Coal,y}$ - amount of sorted fraction (0-30mm), which is extracted from the dumps because of the project in a year y, that came to blending with further combustion in thermal power plants, t;

$A_{Rock,y}$ - the average ash content of sorted fractions (0-30mm), which is extracted from dump in year y, %



$W_{Rock,y}$ - the average humidity of sorted fractions (0-30mm), which is extracted from dump in year y, %;

A_{Coal} - the average ash content of coal, mined in Luhansk region of Ukraine, %;

W_{Coal} - the average humidity of coal, mined in Luhansk region of Ukraine, %;

100 - conversion factor from percent to fraction, d/l.

Net Calorific Value of steam coal is calculated by the formula:

$$NCV_{Coal} = \left\{ HCV_{Coal} * \left(1 - \frac{A_{Coal}}{100} \right) * \left(1 - \frac{W_{Coal}}{100} \right) - 2.442 * \left[\frac{W_{Coal}}{100} + k * \left(1 - \frac{A_{Coal}}{100} \right) * \left(1 - \frac{W_{Coal}}{100} \right) \right] \right\} * 4.187/1000 \quad (14)$$

where:

HCV_{Coal} - High Calorific Value of coal, kcal/kg

A_{Coal} - The average ash content of coal produced in Luhansk region of Ukraine, in year y, %

W_{Coal} - The average moisture of coal produced in Luhansk region of Ukraine, in year y, %

k - Hydrogen content factor of coal, d/l

100 - Conversion factor from percent to a fraction, d/l

4.187 - conversion factor from calories to kilojoules, kcal/KJ

1/1000 - conversion factor from KJ / kg to TJ/kt

D.1.2. Option 2 – Direct monitoring of emission reductions from the project (values should be consistent with those in section E.):

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D.1.2.1. Data to be collected in order to monitor emission reductions from the project, and how these data will be archived:

| ID number (Please use numbers to ease cross- referencing to D.2.) | Data variable | Source of data | Data unit | Measured (m), calculated (c), estimated (e) | Recording frequency | Proportion of data to be monitored | How will the data be archived? (electronic/ paper) | Comment |
|--|---------------|-------------------|-----------|---|------------------------|--|---|---------|
|--|---------------|-------------------|-----------|---|------------------------|--|---|---------|

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D.1.2.2. Description of formulae used to calculate emission reductions from the project (for each gas, source etc.; emissions/emission reductions in units of CO₂ equivalent):

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**D.1.3. Approach to reduce leakage in the monitoring plan:**

The result of this project is the net change (reduction) uncontrolled methane emissions due to of mining activity. As in the baseline scenario the supplying of coal is solely from mine, it leads to uncontrolled methane emissions. These emissions are calculated by applying the default emission factor for the country to the amount of coal extracted from the rock dumps in the project scenario (which is the same amount of coal extracted from mines in the baseline scenario). Carbon dioxide emissions due to electricity consumption in the coal mine way in an amount equivalent to the project amount of coal - a leakage, that can be taken into account at the base of State Statistics Committee⁵¹ data on specific consumption of electricity at coal mines in Ukraine in the relevant year. These leakages are significant and will be included in the monitoring plan and calculating emission reductions for the project.

D.1.3.1. If applicable, please describe the data and information that will be collected in order to monitor leakage effects of the project:

| ID number (Please use numbers to ease cross-referencing to D.2.) | Data variable | Source of data | Data unit | Measured (m), calculated (c), estimated (e) | Recording frequency | Proportion of data to be monitored | How will the data be archived? (electronic/paper) | Comment |
|---|---|--------------------------------|--------------------------------------|---|---------------------|------------------------------------|---|------------------------------|
| B1 | $FC_{BE,Coal,y}$ - Amount of coal that has been mined in the baseline scenario and combusted for energy use in year y | Company records | t | C | Annually | 100% | In paper and electronic form | Calculated using formula (2) |
| L1 | $N_{Coal,y}^E$ - Average electricity consumption per tonne of coal, produced in Ukraine in the year y | See section D.1. Fixed ex ante | MWh/t | E | Fixed ex ante | 100% | In electronic form | |
| L2 | GWP_{CH_4} - Global Warming Potential of Methane | See section D.1. Fixed ex ante | tCO ₂ e/ tCH ₄ | E | Fixed ex ante | 100% | In electronic form | |

⁵¹ <http://www.ukrstat.gov.ua/>



| | | | | | | | |
|----|---|--------------------------------|------------------------|----------|---------------|------|--------------------|
| L3 | EF_{CH_4} - Emission factor for fugitive methane emissions from coal mining. | See section D.1. Fixed ex ante | m ³ /t | <i>E</i> | Fixed ex ante | 100% | In electronic form |
| L4 | ρ_{CH_4} - Methane density at standart conditions | See section D.1. Fixed ex ante | t/m ³ | <i>E</i> | Fixed ex ante | 100% | In electronic form |
| P3 | $EF_{CO_2,EL}$ - Specific carbon dioxide emissions due to production of electricity at TPP and by its consumption | See section D.1. Fixed ex ante | tCO ₂ e/MWh | <i>E</i> | Fixed ex ante | 100% | In electronic form |

D.1.3.2. Description of formulae used to estimate leakage (for each gas, source etc.; emissions in units of CO₂ equivalent):

Leakages in year y are calculated as follows:

$$LE_y = LE_{CH_4,y} + LE_{EL,y} \quad (15)$$

де:

LE_y - leakages in year y, (t CO₂e);

$LE_{CH_4,y}$ - leakages due to fugitive emissions of methane in the mining activities in the year y, (t CO₂e);

$LE_{EL,y}$ - leakages due to consumption of electricity from a grid at coal mine in a year y, (t CO₂e);

Leakages due to fugitive emissions of methane in the mining activities in the year y are calculated as follows:

$$LE_{CH_4,y} = - FC_{BE,Coal,y} \cdot EF_{CH_4} \cdot \rho_{CH_4} \cdot GWP_{CH_4} \quad (16)$$

де:

$LE_{CH_4,y}$ - leakages due to fugitive emissions of methane in the mining activities in the year y, (t CO₂e);

$FC_{BE,Coal,y}$ - amount of coal that has been mined in the baseline scenario and combusted for energy use, equivalent to the amount of coal extracted from the waste heaps because of the project activity in the year y, t, calculated as (2);

EF_{CH_4} - emission factor for fugitive methane emissions from coal mining., m³/t;

ρ_{CH_4} - methane density at standart conditions t/m³;

GWP_{CH_4} - Global Warming Potential of Methane, tCO₂/ tCH₄.



Leakages due to consumption of electricity from a grid at coal mine in a year y are calculated as follows:

$$LE_{EL,y} = - FC_{BE,Coal,y} \cdot N_{Coal,y}^E \cdot EF_{CO_2,EL,y} \quad (17)$$

де:

$LE_{EL,y}$ - leakages due to consumption of electricity from a grid at coal mine in a year y , (t CO₂e);

$FC_{BE,Coal,y}$ - amount of coal that has been mined in the baseline scenario and combusted for energy use, equivalent to the amount of coal extracted from the waste heaps because of the project activity in the year y , t, calculated as (2);

$N_{Coal,y}^E$ - Average electricity consumption per tonne of coal, produced in Ukraine in the year y , MWh/t;

$EF_{CO_2,EL}$ - Specific carbon dioxide emissions due to production of electricity at TPP and by its consumption, tCO₂/ MWh/t;

. Leakages due to consumption of other types of energy in coal mines are the minor in comparison to the leakages due to electricity consumption⁵², so in connection with this, and for reasons of conservatism, take them equal to zero.

D.1.4. Description of formulae used to estimate emission reductions for the project (for each gas, source etc.; emissions/emission reductions in units of CO₂ equivalent):

The annual emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y, \quad (18)$$

where:

ER_y - emissions reductions of the JI project in year y (tCO₂e);

BE_y - baseline emission in year y (tCO₂e);

PE_y - project emission in year y (tCO₂e);

LE_y - leakages in year y , (tCO₂e).

⁵² The effective method of electricity consumption control at coal mines. B.A.Gryaduschy, Doctor of Technical. Science, DonUGI, G.N.Lisovoy, V.I.Myalkovsky, Chehlaty NA, Cand. Science, NIIGM named M.M.Fedorov, Donetsk, Ukraine www.mishor.esco.co.ua/2005/Thesis/10.doc

**D.1.5. Where applicable, in accordance with procedures as required by the host Party, information on the collection and archiving of information on the environmental impacts of the project:**

Collection and archiving of the information on the environmental impacts of the project will be done based on the approved EIA in accordance with the Host Party legislation - *State Construction Standard DBN A.2.2.-1-2003 : "Structure and Contents of the Environmental Impact Assessment Report (EIR) for Designing and Construction of Production Facilities, Buildings and Structures"*⁵³ State Committee Of Ukraine On Construction And Architecture, 2004 (see Section F.1).

D.2. Quality control (QC) and quality assurance (QA) procedures undertaken for data monitored:

| Data (Indicate table and ID number) | Uncertainty level of data (high/medium/low) | Explain QA/QC procedures planned for these data, or why such procedures are not necessary. |
|---|---|--|
| B1-B4 | Low | These data are used in commercial activities of the company. Calculated on the basis of parameters that were taken from regular sources. |
| B2 | Low | These data are used in commercial activities of the company. The weights will be calibrated according to the procedures of the Host Party. Calibration interval is 1 year. |
| B3,B5,B6, B8,B9, B12 | Low | These data are fixed values and standard constants taken from regular sources |
| B7 | Medium | These data are fixed values and standard constants taken from regular sources |
| B10, B11 | Low | This data are used in the commercial activity of the company. Laboratory data |
| P1 | Low | The electricity meters are calibrated according to the procedures of the Host Party. Calibration interval is 6 years. |
| P2 | Low | This data are used in the commercial activity of the company. Accounting documentation will be used. |
| P3-P6 | Low | These data are fixed values and standard constants taken from regular sources |
| L1-L3 | Low | These data are fixed values and standard constants taken from regular sources |

If the expected data are unavailable or lost, the calculations of emissions will be carried out by the most conservative option.

⁵³ <http://document.ua/proektuvannja.-sklad-i-zmist-materialiv-ocinki-vpliviv-na-na-nor3146.html>



D.3. Please describe the operational and management structure that the project operator will apply in implementing the monitoring plan:

CE “Vtormet” Ltd, the owner of the project, which will implement the provisions of this monitoring plan with its organizational and management structure. Leadership, headed by the director of the company is responsible for performance of monitoring, data collection, registration, visualization, storage and reporting of data that were monitored, and periodic inspection of measuring instruments. Detailed structure and senior staff members of the Management Group will be submitted in the monitoring before the initial and first periodic verification. The basic structure demonstrated by the following block diagram:

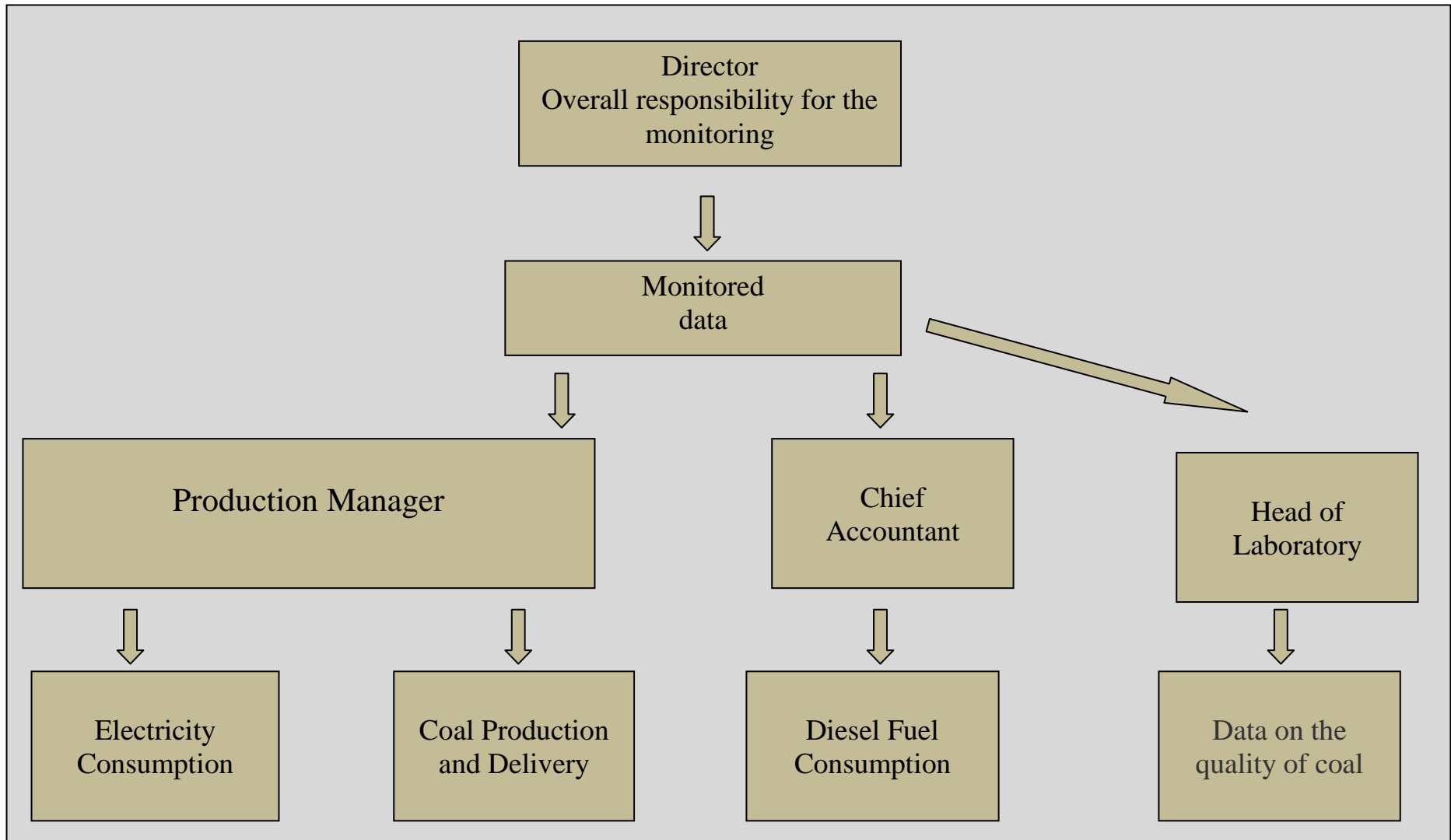


Figure 9 - Monitoring flowchart



D.4. Name of person(s)/entity(ies) establishing the monitoring plan:

Gints Klavinsh, Project manager at SIA “Vidzeme Eko”, which is the project participant, tel.+371-29228458, fax371-29228458, e-mail: siltisilti@gmail.com . Please, refer to Annex 1 for contact details.

**SECTION E. Estimation of greenhouse gas emission reductions**

This section contains the assessment of GHG emissions reductions. Calculations carried out using the formulas described in detail in Section D of this document.

E.1. Estimated project emissions

Table 23 - Estimated project emissions during the crediting period

| | | 2009 | 2010 | 2011 | 2012 | Total | |
|----------|---|--------------------|---------------|-------|-------|-------|-------|
| 1 | Project Emissions due to consumption of electricity from the grid by the project activity | tCO ₂ e | 4880 | 5101 | 5034 | 5031 | 20046 |
| 2 | Project Emissions due to consumption of diesel fuel by the project activity | tCO ₂ e | 11011 | 11271 | 11501 | 11390 | 45173 |
| | Total | tCO ₂ e | 15891 | 16372 | 16535 | 16421 | 65219 |
| | Total for 2009-2012 | tCO ₂ e | 65 219 | | | | |

E.2. Estimated leakage:

Table 24 – Estimated leakages during crediting period

| | | 2009 | 2010 | 2011 | 2012 | Total | |
|----------|---|--------------------|-----------------|---------|---------|---------|---------|
| 1 | Leakages due to fugitive emissions of methane in mining activity | tCO ₂ e | -88120 | -92665 | -90247 | -88793 | -359825 |
| 2 | Leakages due to consumption of electricity from grid in mining activity | tCO ₂ e | -27313 | -29103 | -25815 | -25399 | -107630 |
| | Total for year | tCO ₂ e | -115433 | -121768 | -116062 | -114192 | -467455 |
| | Total in 2009-2012 | tCO ₂ e | -467 455 | | | | |

**E.3. The sum of E.1. and E.2.:**

Table 25 - Estimated total project emissions during the crediting period

| | | 2009 | 2010 | 2011 | 2012 | Total | |
|---|---|--------------------|--------|---------|--------|--------|---------|
| 1 | Total Project emissions during the crediting period | tCO ₂ e | -99542 | -105396 | -99527 | -97771 | -402236 |

E.4. Estimated baseline emissions:

Table 26 - Estimated baseline emissions during the crediting period

| | | 2009 | 2010 | 2011 | 2012 | Total | |
|--|---|--------------------|------------------|--------|--------|--------|---------|
| | Baseline Emissions due to burning of the waste heap in the year y | tCO ₂ e | 317124 | 335021 | 326279 | 321021 | 1299445 |
| | Total for 2009-2012 | tCO ₂ e | 1 299 445 | | | | |

E.5. Difference between E.4. and E.3. representing the emission reductions of the project:

Table 27 - Estimated emission reductions during the crediting period

| | | 2009 | 2010 | 2011 | 2012 | Total | |
|--|--|--------------------|------------------|--------|--------|--------|---------|
| | Emission reductions during the crediting period | tCO ₂ e | 416666 | 440417 | 425806 | 418792 | 1701681 |
| | Total Emission reductions during the crediting period | tCO ₂ e | 1 701 681 | | | | |
| | Average annual emission reductions over the crediting period | tCO ₂ e | 425 420 | | | | |

**E.6. Table providing values obtained when applying formulae above:**

Table 28 - Estimated balance of emissions under the proposed project during the crediting period

| Year | Estimated Project Emissions (tonnes CO ₂ equivalent) | Estimated Leakage (tonnes CO ₂ equivalent) | Estimated Baseline Emissions (tonnes CO ₂ equivalent) | Estimated Emissions Reductions (tonnes CO ₂ equivalent) |
|--|---|---|--|--|
| 2009 | 15891 | -115433 | 317124 | 416666 |
| 2010 | 16372 | -121768 | 335021 | 440417 |
| 2011 | 16535 | -116062 | 326279 | 425806 |
| 2012 | 16421 | -114192 | 321021 | 418792 |
| Total (tCO ₂ equivalent) | 65 219 | -467 455 | 1 299 445 | 1 701 681 |
| Average expected emission reductions over the crediting period (tCO ₂ equivalent) | | | 425 420 | |

**SECTION F. Environmental impacts****F.1. Documentation on the analysis of the environmental impacts of the project, including transboundary impacts, in accordance with procedures as determined by the host Party:**

CE "Vtormet" Ltd. is undertaken under the current legislation of Ukraine, in particular, according to the Laws of Ukraine "On Environmental Protection", "On Ecological Expertise", "On Air Protection", "On Waste" and other applicable rules and regulations⁵⁴.

The Host Party for this project is Ukraine. Environmental Impact Assessment (EIA) is the part of the Ukrainian project planning and permitting procedures. Implementation regulations for EIA are included in the Ukrainian State Construction Standard DBN A.2.2.-1-200347 (Title: "Structure and Contents of the Environmental Impact Assessment Report (EIR) for Designing and Construction of Production Facilities, Buildings and Structures").

Annex F of this standard contains a list of "types of projects or activities which constitute higher environmental risk" for which full EIA is mandatory, and the Ministry of Environment being the competent authority. Project activity, which is the utilization of coal mining waste and production of coal, is included in this list.

The full scope EIA in accordance with the Ukrainian legislation has been conducted for the proposed project in 2008. Key findings of this EIA are summarized below:

- Impact on air is the main environmental impact of the project activity. Dust emissions due to the erosion and project activity such as loading and offloading operations of input rock and processed coal will be limited. Also emissions from transport will be present during the project operation stage. The impact will not exceed maximum allowable concentration at the edge of the sanitary zone;
- Impact on water is minor. The project activity will use water in a closed cycle without discharge of waste water. The possible discharge of the processed water will not have negative impact on the quality of water in the surface reservoirs;
- Impacts on flora and fauna are insignificant. The design documentation demands re-cultivation of the landscape. Grass and trees will be planted on the re-cultivated areas in order to prevent flora and fauna degradation. No rare or endangered species will be impacted. Project activity is not located in the vicinity of national parks or protected areas;
- Noise impact is limited. Main source of noise will be located at the minimum required distance from residential areas, mobile noise sources (automobile transport) will be in compliance with local standards;
- Impacts on land use are positive. Significant portions of land will be freed from the waste heaps and will be available for development. Fertile soil will be used to recultivate the land lot;
- Transboundary impacts are not observed. There are no impacts that manifest within the area of any other country and that are caused by a proposed project activity which wholly physically originates within the area of Ukraine.

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

Assessment of impact on the environment under the laws of Ukraine was held for the proposed project in 2008.

According to Ukrainian laws and regulations, preparation of reports on evaluation of environmental impact and the positive conclusions of the State Department of Environment and Natural Resources in Luhansk region is the procedure of environmental impact assessment.

⁵⁴ <http://www.budinfo.org.ua/>

**SECTION G. Stakeholder's comments****G.1. Information on stakeholders' comments on the project, as appropriate:**

The project meets the applicable standards and requirements, set forth in Ukraine. The Host Party does not put forward the requirement to consult with stakeholders to JI projects. Stakeholders' comments will be collected during the publication of the project documents on the Internet during the determination process.

Annex 1**CONTACT INFORMATION ON PROJECT PARTICIPANTS**

| | |
|------------------|--|
| Organisation: | CE "Vtormet" Ltd. |
| Street/P.O.Box: | Guli Korolovoi |
| Building: | 4/40 |
| City: | Dnipropetrovsk |
| State/Region: | Dnipropetrovsk |
| Postal code: | 49026 |
| Country: | Ukraine |
| Phone: | (056) 789-07-10 |
| Fax: | (056) 789-07-10 |
| E-mail: | ppraktik2007@rambler.ru |
| URL: | |
| Represented by: | Nadiya Novychyhina |
| Title: | Director |
| Salutation: | Mrs. |
| Last name: | Novychyhina |
| Middle name: | Ivanivna |
| First name: | Nadiya |
| Department: | |
| Phone (direct): | (056) 789-07-10 |
| Fax (direct): | (056) 789-07-10 |
| Mobile: | (095) 790-00-68 |
| Personal e-mail: | |

| | |
|------------------|---|
| Organisation: | SIA "Vidzeme Eko" |
| Street/P.O.Box: | Zolitudes |
| Building: | 46 k-2 -76 |
| City: | Riga |
| State/Region: | |
| Postal code: | LV-1029 |
| Country: | Latvia |
| Phone: | +371 29518171 |
| Fax: | +371 67284770 |
| E-mail: | info@ekoji.lv |
| URL: | http://www.holdings.lv |
| Represented by: | Mikus Vilsons |
| Title: | Director |
| Salutation: | Mr |
| Last name: | Vilsons |
| Middle name: | |
| First name: | Mikus |
| Department: | |
| Phone (direct): | |
| Fax (direct): | |
| Mobile: | +371 29518171 |
| Personal e-mail: | |



| | |
|------------------|--|
| Organisation: | SIA "Vidzeme Eko" |
| Street/P.O.Box: | Zolitudes |
| Building: | 46 k-2 -76 |
| City: | Riga |
| State/Region: | |
| Postal code: | LV-1029 |
| Country: | Latvia |
| Phone: | +371 29518171 |
| Fax: | +371 67284770 |
| E-mail: | fridkinsal@inbox.lv |
| URL: | http://www.holdings.lv |
| Represented by: | Aleksandrs Fridkins |
| Title: | Finance director |
| Salutation: | Mr. |
| Last name: | Fridkins |
| Middle name: | |
| First name: | Aleksandrs |
| Department: | |
| Phone (direct): | |
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| Mobile: | +371 29442040 |
| Personal e-mail: | |

| | |
|------------------|--|
| Organisation: | SIA "Vidzeme Eko" |
| Street/P.O.Box: | Zolitudes |
| Building: | 46 k-2 -76 |
| City: | Riga |
| State/Region: | |
| Postal code: | LV-1029 |
| Country: | Latvia |
| Phone: | +371 29518171 |
| Fax: | +371 67284770 |
| E-mail: | fridkinsal@inbox.lv |
| URL: | http://www.holdings.lv |
| Represented by: | Viktor Tkachenko |
| Title: | Official representative in Ukraine |
| Salutation: | Mr |
| Last name: | Tkachenko |
| Middle name: | |
| First name: | Viktor |
| Department: | |
| Phone (direct): | +38095 272 45 74 |
| Fax (direct): | |
| Mobile: | |
| Personal e-mail: | |



| | |
|------------------|--|
| Organisation: | SIA "Vidzeme Eko" |
| Street/P.O.Box: | Zolitudes |
| Building: | 46 k-2 -76 |
| City: | Riga |
| State/Region: | |
| Postal code: | LV-1029 |
| Country: | Latvia |
| Phone: | +371 29518171 |
| Fax: | +371 67284770 |
| E-mail: | info@ekoji.lv |
| URL: | http://www.holdings.lv |
| Represented by: | Ivanenko Gennadiy |
| Title: | Project Manager |
| Salutation: | Mr. |
| Last name: | Klavinsh |
| Middle name: | |
| First name: | Gints |
| Department: | |
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| Fax (direct): | +371-29228458 |
| Mobile: | |
| Personal e-mail: | siltisilti@gmail.com |



Annex 2

BASELINE INFORMATIONTable 30 – The key elements of the baseline (including variables, parameters and data sources)

| # | <i>Parameter</i> | Data unit | Data sources |
|----|---|------------------|---|
| 1 | $FC_{BE,Coal,y}$ - Amount of coal that has been mined in the baseline scenario and combusted for energy use in year y | t | Customer data, calculated using formula (2) |
| 2 | $FR_{Coal,y}$ - amount of sorted fraction (0-30mm), which is extracted from the dumps because of the project activity in a year y | t | Customer data (weight scales) |
| 3 | HCV_{Coal} - High Calorific Value of steam coal | kcal/kg | Guide of quality, volume of coal production and enrichment products in 2008-2010, Ministry of Coal Industry of Ukraine, State Committee of Ukraine (see Annex 4) |
| 4 | NCV_{Coal} - Net Calorific Value of coal | TJ/kt | State Standard 4083-2002. Coal and anthracite for powdered combustion in thermal power plants. Kyiv. State Standard of Ukraine 2002. The standard will be provided by an independent expert organization. |
| 5 | $OXID_{Coal}$ - Carbon Oxidation factor of coal | d/l | National Inventory Report of Ukraine 1990- 2010, p.459,465,471 |
| 6 | K_{Coal}^C - Carbon content of coal. | tC/TJ | National Inventory Report of Ukraine 1990- 2010, p.458, 464, 470 |
| 7 | p_{WHB} – Probability of waste heap burning | d/l | <i>Report on the analyzing the fire danger of waste heap in Luhansk region</i> , Scientific Research Institute “Respirator”, Donetsk, 2012. |
| 8 | A_{Coal} - The average ash content of coal produced in Luhansk region of Ukraine | % | Guide of quality, volume of coal production and enrichment products in 2008-2010, Ministry of Coal Industry of Ukraine, State Committee of Ukraine (see Annex 4) |
| 9 | W_{Coal} - The average moisture of coal produced in Luhansk region of Ukraine | % | Guide of quality, volume of coal production and enrichment products in 2008-2010, Ministry of Coal Industry of Ukraine, State Committee of Ukraine (see Annex 4) |
| 10 | $A_{Rock,y}$ - The average ash content of sorted fractions (0-30mm), which is extracted from dump in year y | % | Customer data (laboratory) |
| 11 | $W_{Rock,y}$ - The average humidity of sorted fractions (0-30mm), which is extracted from dump in year y | % | Customer data (laboratory) |
| 12 | k - Hydrogen content factor of coal | d/l | State Standard 4083-2002. Coal and anthracite for powdered combustion in thermal power plants. Kyiv. State Standard of Ukraine 2002. The standard will be provided by an independent expert organization. |

Annex 3**MONITORING PLAN**

See section D in PDD for monitoring plan description

Table 31 - Data on measuring geares of the project:

| Parameter | measuring geare | Data unit | Producer | The type | serial number | Accu racy class | The date of instalation | He date of the last calibration |
|----------------------------|--------------------------|-----------|---------------------------|---|---------------|-----------------|-------------------------|---------------------------------|
| Consumption of electricity | NIK 2303 ART 1 | kWh | "NIK-Electronics» Ukraine | Electronic meter of electricity consumption | 0081698 | ±1% | 16/11/2011 | 19/10/2011 |
| The amount of coal | Automobile scales VTA-60 | t | "Ukrestmarkinvest" Ltd | Automobile Scales-tensometric | 064757938 | ±25 kg | 24/12/2007 | 01/11/2011 |

See section D



Annex 4

AN EXTRACT OF “GUIDE OF QUALITY, VOLUME OF COAL PRODUCTION AND ENRICHMENT PRODUCTS IN 2008-2010”

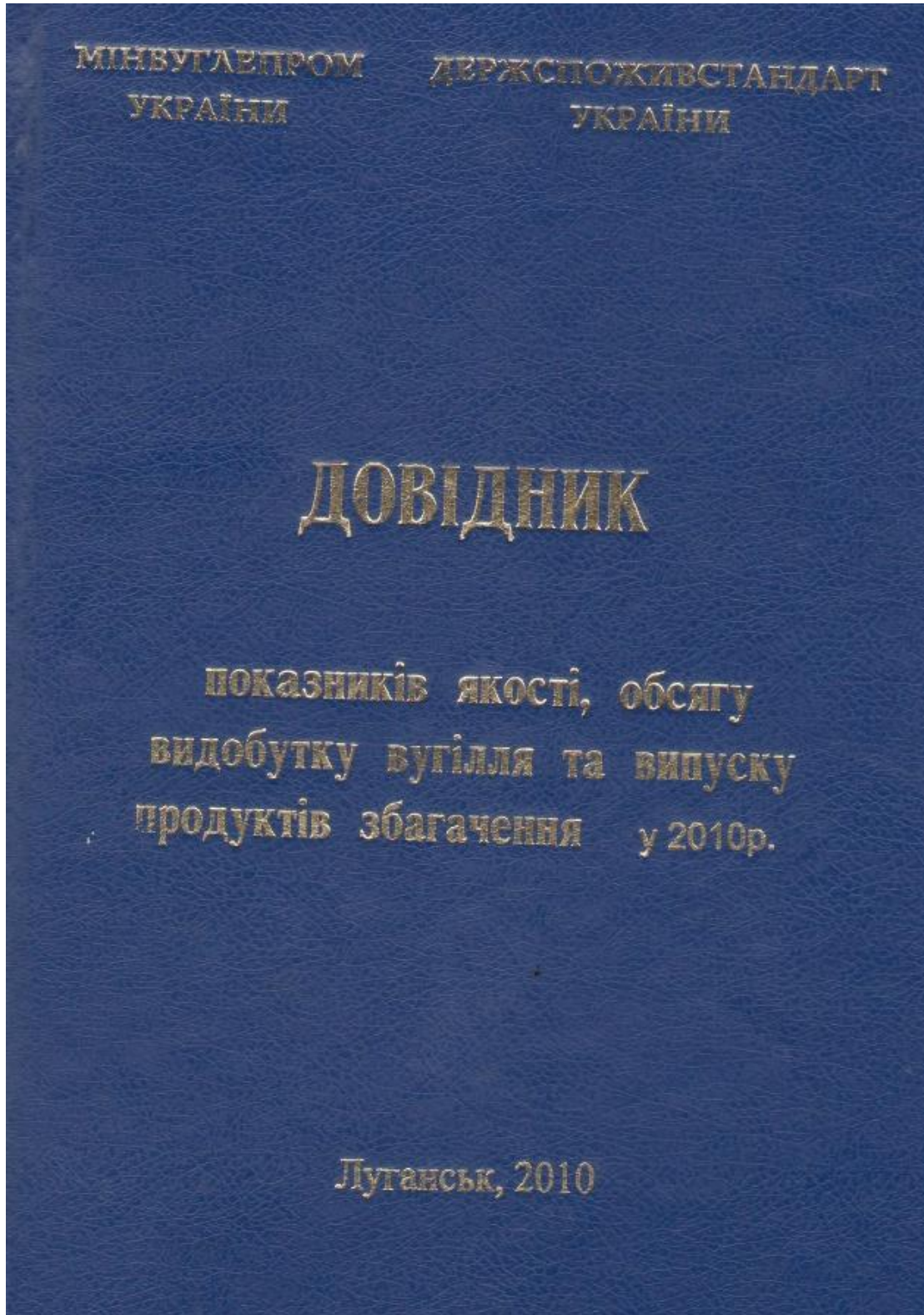




Table 32- Coal mined at mines and sections - 2010.

I ВИДОБУТОК ВУГІЛЛЯ ШАХТАМИ ТА РОЗРІЗАМИ

| Найменування шахти | Дольова участь в видобутку вугілля по шахті у 2010 році, % | Марка вугілля ДСТУ 3472-96 | | Фактичний видобуток родового вугілля у 2009 році | | Видобуток родового вугілля, що планується у 2010 році | | | | Класифікаційні параметри | | | |
|-----------------------------|--|----------------------------|--------|--|------------------------------|---|------------------------------|--------------------------|---------------------------|---|--------------------------------|---|---|
| | | кокс. | енерг. | тис. т | Зольність А ⁴ , % | тис. т | Зольність А ⁴ , % | Сірка S ⁴ , % | Волога W ⁴ , % | Середній показник відбиття втривиття R _с , % | Товщина пластичного шару Y, мм | Вихід летючих речовин на сухий стан Y ⁴⁴ , % | Щільність теплової Q _с , ккал/кг |
| МІНВУГЛЕПРОМ УКРАЇНИ | | | | 72522,5 | 38,6 | 76204,5 | 38,9 | 2,0 | 7,7 | - | - | 26,5 | 8166 |
| <i>у тому числі:</i> | | | | | | | | | | | | | |
| <i>енергетичне вугілля</i> | | | | | | | | | | | | | |
| | | | | 50458,0 | 39,2 | 52135,8 | 38,9 | 2,0 | 8,2 | - | - | 24,5 | 8025 |
| | | Д | | 273,2 | 49,0 | 200,0 | 42,1 | 2,4 | 13,5 | 0,57 | 0 | 39,5 | 7487 |
| | | ДГ | | 13663,1 | 39,9 | 15455,7 | 39,4 | 1,7 | 11,7 | 0,58 | 8 | 41,5 | 8089 |
| | | Г | | 12929,9 | 42,5 | 12775,1 | 41,4 | 2,7 | 7,6 | 0,77 | 12 | 38,4 | 7586 |
| | | Ж | | 435,1 | 35,3 | 316,0 | 43,0 | 3,3 | 4,0 | 0,88 | 23 | 36,1 | 8365 |
| | | П | | 7806,1 | 35,2 | 8303,0 | 36,4 | 2,8 | 5,5 | 2,43 | 0 | 8,4 | 8520 |
| | | А | | 15350,6 | 37,6 | 15086,0 | 37,7 | 1,3 | 6,6 | 4,55 | 0 | 3,7 | 8059 |
| | | | | 22064,5 | 37,2 | 24068,7 | 39,0 | 2,1 | 6,7 | - | - | 30,9 | 8470 |
| <i>коксівне вугілля</i> | | | | | | | | | | | | | |
| | | ДГ | | 567,4 | 32,8 | 53,3 | 33,2 | 1,2 | 10,2 | 0,61 | 9 | 39,6 | 8210 |
| | | Г | | 2855,0 | 34,9 | 4532,7 | 36,1 | 2,2 | 6,9 | 0,77 | 14 | 38,3 | 8364 |
| | | Ж | | 8388,1 | 37,5 | 9807,7 | 39,0 | 2,4 | 6,6 | 0,96 | 22 | 33,0 | 8383 |
| | | К | | 9430,9 | 38,1 | 8694,0 | 40,8 | 1,6 | 6,7 | 1,23 | 18 | 26,1 | 8605 |
| | | ПС | | 823,1 | 35,3 | 981,0 | 35,7 | 2,8 | 6,4 | 1,61 | 10 | 18,2 | 8650 |

| Найменування шахти | Дольова участь в видобутку вугілля по шахті у 2010 році, % | Марка вугілля ДСТУ 3472-96 | | Фактичний видобуток родового вугілля у 2009 році | | Видобуток родового вугілля, що планується у 2010 році | | | | Класифікаційні параметри | | | |
|---------------------------------------|--|----------------------------|--------|--|------------------------------|---|------------------------------|--------------------------|---------------------------|---|--------------------------------|---|---|
| | | кокс. | енерг. | тис. т | Зольність А ⁴ , % | тис. т | Зольність А ⁴ , % | Сірка S ⁴ , % | Волога W ⁴ , % | Середній показник відбиття втривиття R _с , % | Товщина пластичного шару Y, мм | Вихід летючих речовин на сухий стан Y ⁴⁴ , % | Щільність теплової Q _с , ккал/кг |
| Підпорядковані Мінвуглепрому | | | | 38395,5 | 39,6 | 39066,0 | 39,7 | 2,1 | 7,1 | - | - | 21,0 | 8193 |
| <i>у тому числі:</i> | | | | | | | | | | | | | |
| <i>енергетичне вугілля</i> | | | | | | | | | | | | | |
| | | | | 31265,0 | 40,0 | 32171,0 | 40,0 | 2,1 | 7,2 | - | - | 19,4 | 8123 |
| | | Д | | 273,2 | 49,0 | 200,0 | 42,1 | 2,4 | 13,5 | 0,6 | 0 | 39,5 | 7487,0 |
| | | ДГ | | 2748,8 | 43,1 | 3205,0 | 41,2 | 2,6 | 9,9 | 0,61 | 8 | 40,6 | 7915 |
| | | Г | | 9645,4 | 43,6 | 10332,0 | 43,5 | 2,8 | 7,4 | 0,78 | 12 | 38,1 | 8174 |
| | | Ж | | 435,1 | 35,3 | 316,0 | 43,0 | 3,3 | 4,0 | 0,90 | 23 | 36,1 | 8365 |
| | | П | | 2811,9 | 36,8 | 3032,0 | 37,9 | 2,7 | 6,6 | 2,30 | 0 | 8,6 | 8503 |
| | | А | | 15350,6 | 37,6 | 15086,0 | 37,7 | 1,3 | 6,6 | 4,55 | 0 | 3,7 | 8059 |
| <i>коксівне вугілля</i> | | | | | | | | | | | | | |
| | | | | 7130,5 | 37,8 | 6895,0 | 38,5 | 2,5 | 6,7 | - | - | 28,2 | 8523 |
| | | Г | | 1452,5 | 35,5 | 1360,0 | 37,0 | 1,8 | 6,6 | 0,80 | 14 | 36,6 | 8385 |
| | | Ж | | 2358,0 | 35,4 | 2150,0 | 37,2 | 2,6 | 6,8 | 1,02 | 21 | 32,4 | 8437 |
| | | К | | 2496,9 | 42,1 | 2404,0 | 41,7 | 2,7 | 6,7 | 1,33 | 21 | 23,6 | 8625 |
| | | ПС | | 823,1 | 35,3 | 981,0 | 35,7 | 2,8 | 6,4 | 1,61 | 10 | 18,2 | 8650 |
| Непідпорядковані Мінвуглепрому | | | | 34127,0 | 37,4 | 37138,5 | 38,1 | 1,9 | 8,3 | - | - | 32,4 | 8136 |
| <i>у тому числі:</i> | | | | | | | | | | | | | |
| <i>енергетичне вугілля</i> | | | | | | | | | | | | | |
| | | | | 19193,0 | 37,9 | 19964,8 | 37,2 | 1,9 | 9,8 | - | - | 32,7 | 7867 |
| | | ДГ | | 10914,3 | 39,0 | 12250,7 | 38,9 | 1,4 | 12,2 | 0,6 | 8 | 41,8 | 8135 |
| | | Г | | 3284,5 | 39,3 | 2443,1 | 32,5 | 2,6 | 8,3 | 0,7 | 11 | 39,6 | 5096 |
| | | П | | 4994,2 | 34,4 | 5271,0 | 35,5 | 2,8 | 4,9 | 2,5 | 0 | 8,3 | 8530 |
| | | | | 14934,0 | 36,9 | 17173,7 | 39,1 | 2,0 | 6,7 | - | - | 32,0 | 8449 |
| <i>коксівне вугілля</i> | | | | | | | | | | | | | |
| | | | | 567,4 | 32,8 | 53,3 | 33,2 | 1,2 | 10,2 | 0,6 | 9 | 39,6 | 8210 |
| | | ДГ | | 1402,5 | 34,3 | 3172,7 | 35,6 | 2,4 | 7,1 | 0,7 | 13 | 39,0 | 8355 |
| | | Г | | 6030,1 | 38,3 | 7657,7 | 39,5 | 2,3 | 6,5 | 0,9 | 22 | 33,1 | 8368 |
| | | Ж | | 6934,0 | 36,6 | 6290,0 | 40,5 | 1,3 | 6,7 | 1,2 | 18 | 27,0 | 8597 |
| | | К | | 34127,0 | 37,4 | 37138,5 | 38,1 | 1,9 | 8,3 | - | - | 32,4 | 8136 |



| Найменування шахти | Дольова участь в видобутку вугілля по шахті у 2010 році, % | Марка вугілля ДСТУ 3472-96 | | Фактичний видобуток рідкого вугілля у 2009 році | | Видобуток рідкого вугілля, що планується у 2010 році | | | | Класифікаційні параметри | | | |
|---------------------------------------|--|----------------------------|--------|---|------------------------------|--|------------------------------|--------------------------|---------------------------|--|----------------------------------|---|---|
| | | кокс. | енерг. | тис. т | Зольність А ^д , % | тис. т | Зольність А ^д , % | Сірка S ^д , % | Волога W ^д , % | Середній показник відбиття втринити R _с , % | Товщина пластинчатого шару Y, мм | Вихід легких речовин на сухий стан V ^л , % | Вища теплота згорання Q _с ^н , ккал/кг |
| Донецька область | | | | 32159,6 | 38,1 | 32038,5 | 38,3 | 2,2 | 6,9 | - | - | 25,6 | 8389 |
| у тому числі | | | | | | | | | | | | | |
| Підпорядковані Мінеулепрому | | | | 17919,6 | 40,0 | 18344,0 | 39,9 | 2,4 | 7,1 | - | - | 27,6 | 8307 |
| Непідпорядковані Мінеулепрому | | | | 14240,0 | 35,6 | 13694,5 | 36,2 | 2,0 | 6,6 | - | - | 22,9 | 8499 |
| у тому числі: | | | | | | | | | | | | | |
| енергетичне вугілля | | | | 16921,1 | 39,5 | 18025,0 | 38,7 | 2,4 | 6,6 | - | - | 22,3 | 8294 |
| | | Д | | 273,2 | 49,0 | 200,0 | 42,1 | 2,4 | 13,5 | 0,57 | 0 | 39,5 | 7487 |
| | | ДГ | | 1460,3 | 44,7 | 1575,0 | 41,8 | 2,6 | 8,7 | 0,63 | 8 | 41,2 | 8017 |
| | | Г | | 6431,7 | 42,1 | 6906,0 | 40,1 | 2,5 | 7,3 | 0,80 | 12 | 37,8 | 8194 |
| | | П | | 7074,8 | 35,1 | 7458,0 | 36,3 | 2,7 | 5,4 | 2,44 | 0 | 8,4 | 8519 |
| | | А | | 1681,1 | 42,3 | 1886,0 | 40,2 | 1,0 | 6,6 | 4,17 | 0 | 3,5 | 8091 |
| коксівне вугілля | | | | 15238,5 | 36,4 | 14013,5 | 37,9 | 2,0 | 7,2 | - | - | 29,7 | 8511 |
| | | Г | | 2037,5 | 35,1 | 1985,8 | 36,6 | 2,5 | 6,8 | 0,79 | 17 | 35,3 | 8408 |
| | | Ж | | 4497,7 | 34,6 | 4757,7 | 36,2 | 2,4 | 7,4 | 0,99 | 21 | 33,6 | 8476 |
| | | К | | 7944,3 | 37,9 | 6394,0 | 39,7 | 1,4 | 7,2 | 1,20 | 17 | 26,7 | 8551 |
| | | ПС | | 759,0 | 35,9 | 876,0 | 36,5 | 2,7 | 6,3 | 1,58 | 10 | 18,4 | 8643 |
| Луганська область | | | | 23401,7 | 38,8 | 25802,0 | 39,3 | 2,1 | 6,9 | - | - | 17,6 | 7873 |
| у тому числі | | | | | | | | | | | | | |
| Підпорядковані Мінеулепрому України | | | | 17246,7 | 38,3 | 17502,0 | 38,4 | 1,9 | 7,3 | - | - | 11,1 | 8062 |
| Непідпорядковані Мінеулепрому України | | | | 6155,0 | 40,4 | 8300,0 | 41,1 | 2,5 | 6,0 | - | - | 31,3 | 7473 |

| Найменування шахти | Дольова участь в видобутку вугілля по шахті у 2010 році, % | Марка вугілля ДСТУ 3472-96 | | Фактичний видобуток рідкого вугілля у 2009 році | | Видобуток рідкого вугілля, що планується у 2010 році | | | | Класифікаційні параметри | | | |
|---------------------------------|--|----------------------------|--------|---|------------------------------|--|------------------------------|--------------------------|---------------------------|--|----------------------------------|---|---|
| | | кокс. | енерг. | тис. т | Зольність А ^д , % | тис. т | Зольність А ^д , % | Сірка S ^д , % | Волога W ^д , % | Середній показник відбиття втринити R _с , % | Товщина пластинчатого шару Y, мм | Вихід легких речовин на сухий стан V ^л , % | Вища теплота згорання Q _с ^н , ккал/кг |
| у тому числі: | | | | | | | | | | | | | |
| енергетичне вугілля | | | | 17960,6 | 38,4 | 18347,0 | 38,1 | 1,9 | 7,4 | - | - | 12,7 | 7641 |
| | | ДГ | | 812,5 | 43,1 | 1040,0 | 42,5 | 3,0 | 12,0 | 0,56 | 8 | 41,8 | 7792 |
| | | Г | | 2747,3 | 44,1 | 3262,0 | 40,1 | 3,7 | 9,2 | 0,66 | 11 | 40,7 | 8690 |
| | | П | | 731,3 | 36,7 | 845,0 | 36,7 | 3,3 | 6,7 | 2,36 | 0 | 9,0 | 8531 |
| | | А | | 13669,5 | 37,1 | 13200,0 | 37,3 | 1,4 | 6,6 | 4,61 | 0 | 3,7 | 8055 |
| коксівне вугілля | | | | 5441,1 | 40,2 | 7455,0 | 42,2 | 2,4 | 5,6 | - | - | 29,7 | 8443 |
| | | Ж | | 3890,4 | 40,8 | 5050,0 | 41,7 | 2,3 | 5,8 | 0,93 | 22 | 32,4 | 8295 |
| | | К | | 1486,6 | 39,2 | 2300,0 | 43,9 | 2,4 | 5,2 | 1,29 | 22 | 24,4 | 8755 |
| | | ПС | | 64,1 | 29,2 | 105,0 | 29,3 | 3,6 | 7,6 | 1,81 | 8 | 17,0 | 8705 |
| Дніпропетровська область | | | | 13732,0 | 38,0 | 15144,0 | 38,2 | 1,6 | 11,2 | - | - | 41,5 | 8172 |
| у тому числі | | | | | | | | | | | | | |
| енергетичне вугілля | | | | 12347,1 | 38,5 | 12543,8 | 38,8 | 1,5 | 12,1 | - | - | 41,7 | 8140 |
| | | ДГ | | 10914,3 | 39,0 | 12250,7 | 38,9 | 1,4 | 12,2 | 0,57 | 8 | 41,8 | 8135 |
| | | Г | | 1432,8 | 34,4 | 293,1 | 33,0 | 2,1 | 7,9 | 0,75 | 10 | 40,1 | 8334 |
| коксівне вугілля | | | | 1384,9 | 33,8 | 2600,2 | 35,5 | 2,0 | 7,0 | - | - | 40,6 | 8326 |
| | | Г | | 567,4 | 32,8 | 53,3 | 33,2 | 1,2 | 10,2 | 0,61 | 9 | 39,6 | 8210 |
| | | ДГ | | 817,5 | 34,5 | 2546,9 | 35,6 | 2,0 | 7,0 | 0,75 | 11 | 40,6 | 8329 |
| Волинська область | | | | | | | | | | | | | |
| енергетичне вугілля | | | ДГ | 476,0 | 38,2 | 590,0 | 37,2 | 2,1 | 9,3 | 0,64 | 7 | 37,1 | 7857 |
| Львівська область | | | | | | | | | | | | | |
| енергетичне вугілля | | | | 2753,2 | 45,0 | 2630,0 | 47,6 | 2,3 | 5,8 | - | - | 36,7 | 8348 |
| | | Г | | 2318,1 | 46,8 | 2314,0 | 48,3 | 2,2 | 6,1 | 0,9 | 14 | 36,8 | 8345 |
| | | Ж | | 435,1 | 35,3 | 316,0 | 43,0 | 3,3 | 4,0 | 0,9 | 21 | 36,1 | 8365 |



Table 33- Coal mined at mines and sections - 2008

I ВИДОБУТОК ВУГІЛЛЯ ШАХТАМИ ТА РОЗРІЗАМИ

| Найменування шахти | Дольова участь виластів у видобутку вугілля по шахті у 2007 році, % | Марка вугілля ДСТУ 3472-96 | | Фактичний видобуток родового вугілля у 2007 році | | Видобуток родового вугілля, що планується у 2008 році | | | | Класифікаційні параметри | | | |
|---------------------------------------|---|----------------------------|--------|--|------------------------------|---|------------------------------|--------------------------|---------------------------|---|--------------------------------|--|---|
| | | кокс. | енерг. | тис. т | Зольність А ⁴ , % | тис. т | Зольність А ⁴ , % | Сірка S ⁴ , % | Волога W ⁴ , % | Середній показник вібриття вітриніту R _в , % | Товщина пластичного шару У, мм | Вихід летючих речовин на сухий стан V ⁴ , % | Висота теплоти згорання Q _н ⁴ , ккал/кг |
| МІНВУГЛЕПРОМ УКРАЇНИ | | | | 75095,4 | 38,1 | 78343,6 | 38,4 | 2,1 | 8,0 | - | - | 28,1 | 8243 |
| <i>у тому числі</i> | | | | | | | | | | | | | |
| <i>Підпорядковані Мінвуглепрому</i> | | | | 42152,3 | 40,1 | 46000,0 | 39,2 | 2,2 | 7,1 | - | - | 24,0 | 8195 |
| <i>Непідпорядковані Мінвуглепрому</i> | | | | 32943,1 | 35,5 | 32343,6 | 37,2 | 2,1 | 9,4 | - | - | 33,9 | 8311 |
| <i>у тому числі:</i> | | | | | | | | | | | | | |
| <i>енергетичне вугілля</i> | | | | 49145,3 | 39,0 | 53103,0 | 38,6 | 2,1 | 8,6 | - | - | 25,8 | 8153 |
| | | | Д | 270,2 | 48,9 | 365,0 | 40,5 | 2,4 | 13,0 | 0,50 | 0 | 41,2 | 7700 |
| | | | ДГ | 8241,5 | 41,6 | 8465,0 | 40,1 | 1,9 | 11,2 | 0,61 | 8 | 42,6 | 8011 |
| | | | Г | 16608,8 | 41,8 | 18780,0 | 41,8 | 2,6 | 8,4 | 0,76 | 10 | 40,7 | 8176 |
| | | | Ж | 290,5 | 28,6 | 165,0 | 33,5 | 2,9 | 5,4 | 0,87 | 23 | 36,0 | 8377 |
| | | | П | 7012,4 | 34,5 | 7183,0 | 34,4 | 2,7 | 5,6 | 2,40 | 0 | 10,1 | 8543 |
| | | | А | 16502,5 | 37,0 | 17290,0 | 36,8 | 1,3 | 6,5 | 4,10 | 0 | 5,6 | 8088 |
| | | | Б | 219,4 | 24,9 | 855,0 | 24,5 | 3,8 | 55,6 | 0,35 | 0 | 60,6 | 6999 |
| <i>коксівне вугілля</i> | | | | 25950,1 | 36,3 | 25240,6 | 37,9 | 2,2 | 6,7 | - | - | 33,0 | 8449 |
| | | | Г | 3228,4 | 35,4 | 3600,0 | 36,3 | 1,6 | 7,5 | 0,72 | 12 | 40,9 | 8386 |
| | | | Ж | 11879,0 | 35,5 | 12657,6 | 37,3 | 2,8 | 6,5 | 0,93 | 25 | 35,0 | 8480 |
| | | | К | 10141,9 | 37,5 | 8103,0 | 39,6 | 1,5 | 6,8 | 1,24 | 19 | 27,8 | 8400 |
| | | | ПС | 701,8 | 38,6 | 890,0 | 36,3 | 3,0 | 6,8 | 1,65 | 10 | 20,0 | 8613 |

9

| Найменування шахти | Дольова участь виластів у видобутку вугілля по шахті у 2007 році, % | Марка вугілля ДСТУ 3472-96 | | Фактичний видобуток родового вугілля у 2007 році | | Видобуток родового вугілля, що планується у 2008 році | | | | Класифікаційні параметри | | | |
|---|---|----------------------------|--------|--|------------------------------|---|------------------------------|--------------------------|---------------------------|---|--------------------------------|--|---|
| | | кокс. | енерг. | тис. т | Зольність А ⁴ , % | тис. т | Зольність А ⁴ , % | Сірка S ⁴ , % | Волога W ⁴ , % | Середній показник вібриття вітриніту R _в , % | Товщина пластичного шару У, мм | Вихід летючих речовин на сухий стан V ⁴ , % | Висота теплоти згорання Q _н ⁴ , ккал/кг |
| Донецька область | | | | 33790,3 | 38,6 | 34598,6 | 38,2 | 2,3 | 7,0 | - | - | 28,5 | 8341 |
| <i>у тому числі</i> | | | | | | | | | | | | | |
| <i>Підпорядковані Мінвуглепрому</i> | | | | 19249,1 | 42,1 | 22270,0 | 39,8 | 2,4 | 7,1 | - | - | 31,1 | 8292 |
| <i>Непідпорядковані Мінвуглепрому</i> | | | | 14541,2 | 34,1 | 12328,6 | 35,3 | 2,1 | 6,8 | - | - | 24,0 | 8430 |
| <i>у тому числі:</i> | | | | | | | | | | | | | |
| <i>енергетичне вугілля</i> | | | | 16282,4 | 40,4 | 19033,0 | 38,8 | 2,4 | 6,9 | - | - | 26,1 | 8280 |
| | | | Д | 270,2 | 48,9 | 365,0 | 40,5 | 2,4 | 13,0 | 0,50 | 0 | 41,2 | 7700 |
| | | | ДГ | 2089,3 | 48,5 | 2265,0 | 41,9 | 2,2 | 8,9 | 0,69 | 8 | 41,6 | 7950 |
| | | | Г | 5759,2 | 41,7 | 7760,0 | 40,7 | 2,7 | 7,4 | 0,85 | 13 | 39,9 | 8221 |
| | | | П | 6302,3 | 35,1 | 6403,0 | 34,7 | 2,6 | 5,6 | 2,42 | 0 | 10,0 | 8540 |
| | | | А | 1863,4 | 43,9 | 2240,0 | 40,6 | 1,0 | 6,3 | 3,73 | 0 | 6,5 | 8172 |
| <i>коксівне вугілля</i> | | | | 17507,9 | 37,0 | 15565,6 | 37,5 | 2,1 | 7,1 | - | - | 31,5 | 8416 |
| | | | Г | 657,0 | 37,2 | 870,0 | 35,0 | 1,2 | 6,0 | 0,92 | 12 | 39,0 | 8365 |
| | | | Ж | 7133,9 | 36,6 | 6867,6 | 36,0 | 2,8 | 7,3 | 0,99 | 25 | 35,3 | 8457 |
| | | | К | 9064,9 | 37,1 | 7003,0 | 39,3 | 1,5 | 7,0 | 1,24 | 17 | 28,2 | 8360 |
| | | | ПС | 652,1 | 39,0 | 825,0 | 36,4 | 3,0 | 6,7 | 1,66 | 10 | 20,2 | 8607 |
| Луганська область | | | | 25208,7 | 36,7 | 27075,0 | 37,7 | 2,1 | 6,8 | - | - | 18,6 | 8192 |
| <i>у тому числі</i> | | | | | | | | | | | | | |
| <i>Підпорядковані Мінвуглепрому України</i> | | | | 19387,6 | 37,1 | 20185,0 | 37,2 | 1,9 | 7,2 | - | - | 13,7 | 8075 |
| <i>Непідпорядковані Мінвуглепрому України</i> | | | | 5821,1 | 35,0 | 6890,0 | 39,3 | 2,6 | 5,5 | - | - | 33,1 | 8531 |

7

Annex 5:

Reference of the State Statistics Service of Ukraine “The actual costs of electricity production per one tonne of coal stone agglomerated”



ДЕРЖАВНА СЛУЖБА СТАТИСТИКИ УКРАЇНИ
(Держстат України)

вул. Шота Руставелі, 3, м. Київ, 01601
тел. (044) 287-24-22, факс (044) 235-37-39, телетайп 132-168, E-mail: office@ukrstat.gov.ua,
www.ukrstat.gov.ua

29.05.2012р. № 15/1-20/692/11 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. Смеляна В.П.,
тел.287-36-81

Annex 6:**Report on the propensity for spontaneous ignition of the waste heap at
“Novopavlovsk” mine**

НАУЧНО-ИССЛЕДОВАТЕЛЬСКИЙ ИНСТИТУТ ГОРНОСПАСАТЕЛЬНОГО ДЕЛА
И ПОЖАРНОЙ БЕЗОПАСНОСТИ «РЕСПИРАТОР»

83048, Донецк, ул. Артема, 157
Телефон: 311-69-52. Факс 311-69-43
niigd@ukrpost.ua

03.08.12 № 10/1165

УТВЕРЖДАЮ
Заместитель директора
НИИГД «Респиратор»
по научной работе,
канд. техн. наук
А.С. Чумак
2012 г.

**ЗАКЛЮЧЕНИЕ
О СКЛОННОСТИ К САМОВОЗГОРАНИЮ ОТВАЛЬНОЙ МАССЫ,
породного отвала шахты «Новопавловская»**

ИСПОЛНИТЕЛЬ: НИИГД «Респиратор»
ЗАКАЗЧИК: ООО «КП «ВТОРМЕТ»

Основание для проведения испытаний: договор № 1951210955.03


Научно-исследовательским институтом горноспасательного дела и пожарной безопасности «Респиратор» на основании проведенных испытаний представленных проб угля отвальной массы в соответствии с КД 12.01.04.009-2000 «Склонность к самовозгоранию углей, шахтных пород и отходов углеобогащения. Методика определения», утвержденным Минтопэнерго Украины 2000-09-26, выдается настоящее заключение о том, что отвальная масса, породного отвала шахты «Новопавловская»

СКЛОННА К САМОВОЗГОРАНИЮ

Результаты испытаний представлены в протоколе № 45/4-В-12 от 03.08.2012 г. научно-исследовательским институтом горноспасательного дела и пожарной безопасности «Респиратор».

Ответственность за соответствие порядка отбора проб, представленных в НИИГД «Респиратор» на исследование, требованиям КД 12.01.04.009-2000 «Склонность к самовозгоранию углей, шахтных пород и отходов углеобогащения. Методика определения» несет руководитель Заказчика.

Заведующий ОБЭПШПО
НИИГД «Респиратор»


Е.А. Головченко



НАУЧНО-ИССЛЕДОВАТЕЛЬСКИЙ ИНСТИТУТ ГОРНОСПАСАТЕЛЬНОГО ДЕЛА
И ПОЖАРНОЙ БЕЗОПАСНОСТИ «РЕСПИРАТОР»

83048, Донецк, ул.Артема,157

УТВЕРЖДАЮ
Заместитель директора
НИИГД «Респиратор»
по научной работе,
канд. техн. наук,



А.С. Чумак
2012 г.

ПРОТОКОЛ № 45/4-В-12
экспериментального определения склонности к самовозгоранию отвальной массы,
породного отвала шахты «Новопавловская»

Краткая характеристика отвальной массы: зольность 67,2%, содержание серы 0,48 %, влажность 34,3 %, выход летучих 2,4 %.

Исполнитель: НИИГД «Респиратор»
Заказчик: ООО «КП «ВТОРМЕТ»
Согласно с договором № 1951210955.03

Цель испытаний: установление степени склонности к самовозгоранию.
Испытания проведены в соответствии с КД 12.01.04.009-2000 «Склонность к самовозгоранию углей, шахтных пород и отходов углеобогащения. Методика определения», утвержденным Минтопэнерго Украины 2000-09-26.

Акты отбора проб для испытаний от 15.07.2012 г.

Дата получения проб угля для испытаний 15.07.2012 г.

Название и основные характеристики средств измерений:
термометр ТЛ-2, зав.№ 99 (пределы измерений 0-250 °С, цена деления 1 °С, ГОСТ 215-73);
барометр-анероид, зав.№ 679 (пределы измерений 81-105 кПа, цена деления 0,1 кПа, ГОСТ 6466-73); секундомер механический «Агат», зав.№ 5854 (цена деления 0,2 с, ТУ 25-1819.0021-90);
гигрометр психометрический ВИТ-2, зав.№ 149 (пределы измерений 10-100 %, погрешность измерений ±3 %, ТУ 25-11.1645-84); весы технические ВТ-1000, зав.№ 881 (диапазон взвешивания 0,1-1000 г, цена деления 1 мг, ТУ 64-1-990-77Е); линейка измерительная металлическая (граничное измерение до 300 мм, цена деления 1 мм, ГОСТ 427-75), рег.№ 2.

Название и основные характеристики испытательного оборудования:
хроматограф газовый с детектором по теплопроводности ЛХМ-72, зав.№ 90 (предел рабочих температур 50-300 °С, предел детектирования $5,0 \cdot 10^{-9}$ г/с (пропан), среднее квадратическое отклонение площади пика ±2 %, ГОСТ 8.485-83).



Дата испытаний 30.07.2012 г.

Условия проведения испытаний:

температура 25 °С

атмосферное давление 99,5 кПа

относительная влажность 52 %

Результаты определения склонности угля к самовозгоранию

1. Результаты исследований физико-химических свойств угля

| Номер пробы | Дробимость, D | Критическая температура, $T_{кр}$, К | Константа скорости сорбции кислорода, $K_{кр}$, $m^3/(mоль \cdot c)$ | Энергия активации, кДж/моль | Значение максимально возможной температуры, К |
|-------------|---------------|---------------------------------------|---|-----------------------------|---|
| 1 | 26,8 | 366 | $6,81 \cdot 10^{-9}$ | 13,95 | 410 |
| 2 | 26,8 | 365 | $6,82 \cdot 10^{-9}$ | 13,93 | 409 |

2. Из проведенных лабораторных исследований видно, что отвальная масса, породного отвала шахты «Новопавловская» склонна к самовозгоранию.

ЗАКЛЮЧЕНИЕ

В результате выполненных исследований установлено:

Отвальная масса, породного отвала шахты «Новопавловская» склонна к самовозгоранию.

Примечания:

1. Не разрешается снимать копии с протокола в целом или с его отдельных страниц без разрешения НИИГД «Респиратор»

Испытания проводил:

Инженер 1 категории ОБЭПШПО
НИИГД «Респиратор»

А.М. Луганский