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XTH JUBILEE NATIONAL CONFERENCE WITH INTERNATIONAL PARTICIPATION
OF THE OPEN AND UNDERWATER MINING OF MINERALS

НАУЧНО-ТЕХНИЧЕСКИ СЪЮЗ
ПО МИННО ДЕЛО,
ГЕОЛОГИЯ И МЕТАЛУРГИЯ

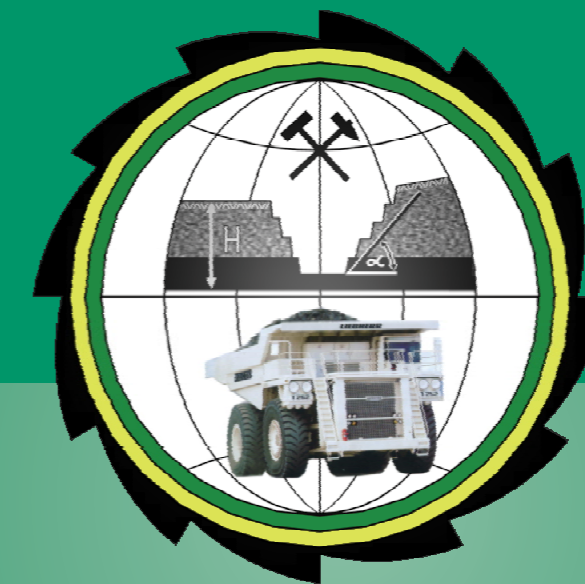


SCIENTIFIC AND TECHNICAL
UNION OF MINING,
GEOLOGY AND METALLURGY

Proceedings

of the

XTH JUBILEE NATIONAL CONFERENCE
WITH INTERNATIONAL PARTICIPATION
OF THE OPEN AND UNDERWATER
MINING OF MINERALS



JUNE 07-11, 2009
INTERNATIONAL HOUSE OF SCIENTISTS "FR. J. CURIE"
VARNA, BULGARIA

PROCEEDINGS of the
XTH JUBILEE NATIONAL CONFERENCE WITH
INTERNATIONAL PARTICIPATION OF THE OPEN AND
UNDERWATER MINING OF MINERALS



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“Мини Марица–изток ЕАД” - европейското лице на българския въгледобив

„Мини Марица-изток” е най-голямата компания за открит въгледобив у нас и едно от най-крупните предприятия в България.

Миньорите от „Марица–изток” добиха 24 690 000 т. въглища през изминалата 2008 г. Това е с над 750 000 т. повече в сравнение с 2007 г. Постижението бележи рекорд в работата на дружеството през новото хилядолетие. Изкопани, транспортирани и насипани през 2008 г. са 97 000 000 куб.м. земна маса /откривка – на технически език/. Постижението е с над 3 000 000 куб.м. повече в сравнение с миналата година.

„Мини Марица-изток” реализира за 2008 г. инвестиционна програма в рамките на 104 млн. лв.

2008-ма беше година на развитието на кадрите и 2440 работници и служители преминаха през различни квалификационни курсове на обучение. Това е повече от ¼ от списъчния персонал на дружеството.

Една от основните задачи на мениджмънта на дружеството е разработването, внедряването, сертифицирането и поддържането на интегрирана система за управление на качеството, околната среда и здравословните и безопасни условия на труд.

За 2009 г. бизнес планът предвижда годишен добив на въглища в обем от 25 250 000 т. въглища и инвестиционна програма в размер на 100 млн. лв.

За 2009 г. ръководството на дружеството разработи антикризисна програма, която дава възможност за гъвкавост и прилагане на различни варианти в зависимост от конкретната пазарна конюнктура.

„Мини Марица-изток ЕАД” си поставя високи цели и подхожда отговорно и професионално към тяхното реализиране. Знае какво е значението на дружеството за страната и региона и това дава самочувствие на работещите в компанията. Следва неотклонно амбицията да бъде европейското лице на българския въгледобив.



Dear Ladies and Gentlement,

Dear Colleagues,

Dear Guests,

It is a great honour that the CONFERENCE OF THE OPEN AND UNDERWATER MINING OF MINERALS celebrate its XTH JUBILEE in style. On behalf of the National organizing committee I have the pleasure to greet all of us for participation in this scientific forum. I am particularly proud that **the Scientific and technical Union of mining, geology and metallurgy** host **X-th JUBILEE NATIONAL CONFERENCE WITH INTERNATIONAL PARTICIPATION OF THE OPEN AND UNDERWATER MINING OF MINERALS.**

The objective of the conference is to highlight key developments, stimulate interaction and share knowledge between the Business and the Science, and to expose participants to initiatives, practice and technology that are potential keys to our future.

The experts in the field of the open and underwater mining of minerals will be informed about the new equipment, high technologies, computer systems, new software products and last directions in ecological monitoring.

The forum will be an arena for exchange scientific and practical experience on technologies in open pits and quarries. It will be an outstanding opportunity to meet and exchange new ideas with all already known colleagues, to make new contacts and partnerships.

May I wish that this Jubilee forum will be realized successfully with the interaction of the scientists and create enough motives to pave the way for a tangible industry and academia collaboration.

I shall be glad to great you with the cordial Bulgarian "Welcome" in our country and to wish you fruitful work and pleasant stay at the pearl of Bulgarian Black Sea coast.

Good luck and success!

Dr. Eng. Tzolo Voutov

A handwritten signature in blue ink, appearing to read 'Tzolo Voutov', written in a cursive style.

Chairman of the Organizing committee



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ОТ ПРИРОДАТА - ЗА ХОРАТА, ОТ ХОРАТА - ЗА ПРИРОДАТА!
FROM THE NATURE TO THE PEOPLE, FROM THE PEOPLE TO THE NATURE!

Минно-обогатителен комплекс „Асарел-Медет“ АД е първата, най-голяма и водеща българска минна компания за добив и обогатяване на медни и други руди. От създаването си през 1964 г. традиционно е пионер в отрасъла по внедряването на нови върхови техника и технологии. Компанията е основен фактор за социално-икономическото развитие и облика на община Панагюрище и Пазарджишка област, има структуроопределящо значение и уникално място в българската икономика.

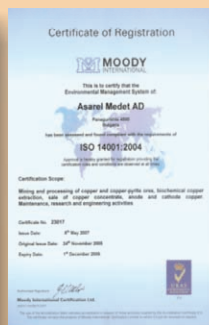
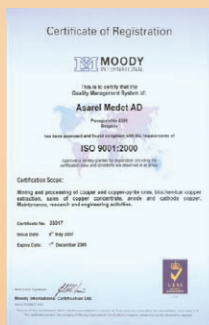
„Асарел-Медет“ АД е първата българска компания от минния бранш и тежката индустрия, сертифицирана по трите основни международни стандарта - за управление на качеството ISO 9001, за опазване на околната среда ISO 14001 и за здравословни и безопасни условия на труд OHSAS 18001. Това е първата българска компания, която през 2005 г. получи Сертификат за Инвеститор Първи клас заради мащабния си проект за модернизация на производството, възлизащ на над 100 млн. щ.д.

За реализацията на инвестиционната си програма през 2007 г. „Асарел-Медет“ беше обявен за Инвеститор на годината в добивната промишленост от Българска агенция за инвестиции. През 2007 г. се нареди и сред най-добрите работодатели в страната в националното проучване на Hewitt, в категорията „Големи компании“. В годишната класация на Българския форум на бизнес лидерите за социално-отговорен бизнес „Асарел-Медет“ бе отличен с трето място в категорията „Инвеститор в околната среда“ заради реализираната екологична програма.

Визията на „Асарел-Медет“ АД е в дългосрочен план да реализира динамично, успешно и устойчиво корпоративно развитие с фокус върху добрите традиции, инициативата, иновациите и екологията. Екипът от около 1300 професионалисти-съмишленици отговорно отстоява новаторското фирмено мото:

Да тръгнем първи, означава да тръгнем навреме!

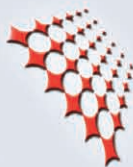
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Orica Mining Services има обширна мрежа от производствени, дистрибуторски и сервизни центрове навсякъде в Европа, Средния Изток, Африка и ОНД.

Продуктите се произвеждат в стратегически места и гъвкавостта на нашите морски, земни и въздушни дистрибуторски средства ни позволява да отговорим на нуждите и промените в този географски разнообразен пазар.

Нашият BBS-екип включва най-голямата и най-опитна група от взривни технологии в региона и може да подпомага клиентите от рудници, кариери и строителство за оптимизиране взривните резултати.

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Дружеството, широко известно с досегашното име Дино НитроМед, е джойнт-венчър на Орика Майнинг Сървисиз и Асарел-Медет.

Регистрирано е през 1996, в работа е от 01.07.1997 и настоящем е най-големия производител на експлозиви и инициращи системи за промишлена употреба в България. Фирмената политика е озаглавена "Да изпълним обещаното".

два от разделите са "Ценете хората и природата" и "Творчески решения за нашите клиенти".



Орика Мед България



ЕКСПЛОЗИВПРОГРЕС ГЕМ ООД

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"Експлозивпрогрес- ГЕМ" ООД е основано в началото на 1999 г. като дъщерна фирма на "Геотехмин" ООД. Дружеството е специализирано в консултантски и инженерингови услуги главно в областта на пробивно - взривните работи. То разполага с апаратура, инструментариум и програмни продукти за извършване на взривосейзмични измервания, определяне на зърнометричния състав на взривената минна маса, измерване на скоростта на детонация на взривни вещества в сондажи и в патронирани проби.



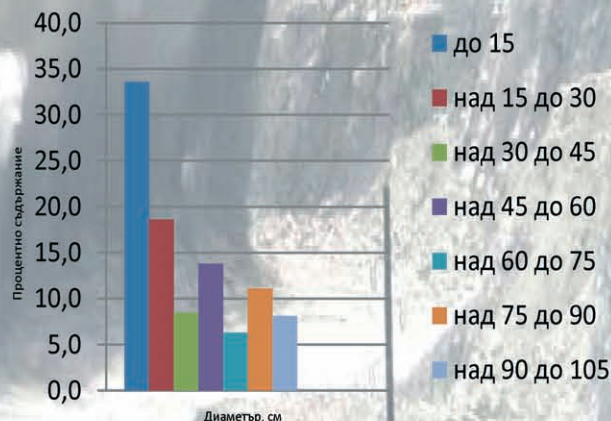
Апаратура за измерване на скоростта на детонация.

"Експлозивпрогрес-ГЕМ" ООД осъществява търговска дейност с продуктите на взривна фабрика „Елаците“:

- Водоустойчиви емулсионни взривни вещества-търговски марки "Елацит 710" /чувствителен към капсул детонатор/ и "Елацит 1100" /нечувствителен към капсул детонатор/.
- Полуфабрикатът за производство на "Елацит 1100"- матрица разтвор N.O.S.
- Взривно вещество с търговска марка "АНФО Е", представляващо смес на висококачествен поръозен амониев нитрат и дизелово гориво.
- В най-скоро време на потребителите ще бъде предложен нов продукт - водоустойчиво емулсионно взривно вещество търговска марка "Тежко Анфо 501 Е", представляващо смес на матрица- разтвор и АНФО.



Апаратура за извършване на взривосейзмични измервания.



Зърнометрична характеристика на взривена минна маса



МИНСТРОЙ ХОЛДИНГ АД

В хармония с природата !

Минстрой осъществява проектиране, строителство, доставка и монтаж на оборудване, производство на нестандартни метални конструкции и съоръжения и пълен инженеринг на обекти "под ключ" в областта на промишленото и гражданско строителство, минната промишленост, инженерната инфраструктура и магистралните тръбопроводи.



Особено голям дял напоследък фирмата има в строителството на моделни хотелски комплекси и инфраструктурни обекти. В състава на фирмата е и "Институт по строителство и минно дело", оборудван със съвременна техника и едни от най-добрите специалисти в областта на строителството и минното дело. Изпълнява проучвателни и проектни работи във всички нива на проектирането - от идейни до работни проекти.

Организационната структура на холдинговата компания дава възможност за привличане на подходящи изпълнители от системата, в зависимост от спецификата и териториалното разположение на проектите, както и на допълнителни ресурси от други дружества. Освен в република България, Минстрой осъществява проектна, строителна и търговска дейност в чужбина: Германия, Русия, Сирия, Алжир, Тунис, Нигерия, Македония и др.

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SCIENTIFIC AND TECHNICAL UNION OF MINING, GEOLOGY AND METALLURGY

The Scientific and technical Union of mining, geology and metallurgy is a voluntary, non-governmental, politically uncommitted, uncommercial professional association.

About 1800 scientists, engineers, technician and other specialist in the field of mining, geology and metallurgy participate in the Union. Many juridical persons from the country and abroad who are working in this field are members of this association. The Union is an association in private favour and realizes its activity in favour of its members. The Scientific and technical union of mining, geology and metallurgy is a regular member of the FEDERATION OF THE SCIENTIFIC ENGINEERING UNIONS.

14 regional organizations, 34 scientific-technical associations and clubs and 6 incorporated associations function within the Union.

There are 25 collective members at present - juridical persons from mining and metallurgical branches and geology.

Governing bodies of the Union are the General meeting, the Managing committee and the Control committee. The latter two are elected by the General meeting and are authorized for 3 years.

The Scientific and technical union of mining, geology and metallurgy cooperates on problems in these fields with **the Ministry of economy, the Ministry of regional development and public works, the Ministry of environment and water, the Ministry of energy and energy resources, the Bulgarian mining chamber, the Bulgarian academy of sciences, the University of mining and geology, the University of chemical technology and metallurgy, the Union of scientists in Bulgaria** and other organizations and firms very actively.

The Union is member of 19 related international social organizations and academies. The most important are:

- The World Mining Congress
- The Academy of mining sciences of Russia
- The International Academy of Ecology & Life Protection Sciences
- The International Academy of mineral resources

The Balkan associations:

- The Balkan union of metallurgists
- The Balkan committee of mineral processing
- The Balkan geophysical association
- The Balkan association of mining experts "BALKANMINE" and others.

The Union is a co-founder of the publishing house "Earth93" and a co-publisher of the journal "Mining and geology". Useful information about national and international publications and activities in these fields is accumulating and exchanged in the Secretariat of the Union.

National and international scientific-technical publications and literature keep coming in (the journal "**Mining and geology**", "**Geology and mineral resources**", the magazine "**Science and society**", "**Mining Journal**", "**Mining magazine**", the Russian journals "**Non-ferrous metals**", "**Ferrous metals**", "**Coal**" etc.).

The Union is the basic organizer of scientific-technical conferences, symposia, discussions and other initiatives on national and international level. The union members participate in the preparation and discussion of bills, normative and others documents in the field of mining and metallurgical branches and geology.

By its national and regional structures the Union is ready for collaboration with international and national authorities and organizations on problems of geology, mining and metallurgy.

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THEMATIC TOPICS

- 1. High technologies and systems in opencast quarrying of coal, ore, industrial raw materials, ornamental rocks and building materials.**
- 2. Drilling and blasting technique, transport and work safety**
- 3. Information technologies, computer systems, software products in geological prospecting, mine surveying and mining activity.**
- 4. New machines and equipments – drilling, excavator, means of transport, spoil and recultivation machinery. Methods and devices for electrification and automation facilities of the processes. Repair activities.**
- 5. Draining, stability and consolidation of slopes in opencast mines. Quarries waste dumps and tailings pools.**
- 6. Ecological monitoring. Recycling and waste utilization. Reclamation of broken lands.**
- 7. Organization and management of the technological processes and production works in the mining of minerals. Markets and realization of the products.**
- 8. The mining legislation and his harmonization with European normative base. Education, qualification and specialization of mining experts of opencast and underwater mining of minerals.**



HOMOGENIZED DUMP COAL IN REK BITOLA

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ABSTRACT

In reflection of the continually changing conditions and demands of the market with fuel, dynamic adaptation is an imperative toward modern trends in the process of exploitation of coal in mines and their further storage. One possible way is a selective exploitation of the mine and further homogenization of the coal mixtures like layers. The homogenization of fuel (coal) in this case, the quality regularization of average physical-chemical characteristics of the exploited coal are implied.

Major theme of the paper is the useful and necessary machinery and the method of storage of coal, which will serve the possible homogenization of exploited coal-fuel in the mines Suvodol and Brod Gneotino. Those objects will enable measuring the contents of ash, the quantity of transported coal and caloric value of the coal, which will be used in the given location and is distributed in the thermal-electrical plant “Bitola” dump. Part of this is the transfer of measured values from individually measured places in the mines Suvodol, Brod Gneotino, and the dump of fuel in power plant Bitola in the dispatch center, their concentration and visualization of the information system.

Key words: *homogenization, coal, power plant, storage, exploitation*

1.0. Introduction

The global changes of the conditions and demands of the fuel market, necessary require dynamic adaptation toward the contemporary technical technological trends of the process for coal exploitation in the mines and also its storage in other words depositing in the dump coals. The primary homogenization of the coal (selective excavation and homogenization of the coal quality during the excavation itself with the excavator units) and secondary homogenization during depositing in the coal dump, with important factor in the saving of this fossil un-renewable fuel, in the era of high price of the fuels and the energy of them.

2.0. SUBJECT OF THE PROGRAM FOR MONITORING AND HOMOGENIZATION OF THE COAL IN THE REK BITOLA MINES

Subject of the program for monitoring and homogenization of the coals of REK Bitola mines, (in the first phase only for the mine “Suvodol”, and in the second phase also the coal from “Brod-Gneotino”) is placing of analysts for monitoring of the quantitative - qualitative parameters of the coal of the other working units in the mines and at the dump coal itself in front of the power plants, and all with aim of reaching homogenized coal with quality anticipated by the projects of the thermal power plants. (fig.1) The whole homogenization process (primary and secondary), will be monitored and regulated by software through the main dispatcher center.

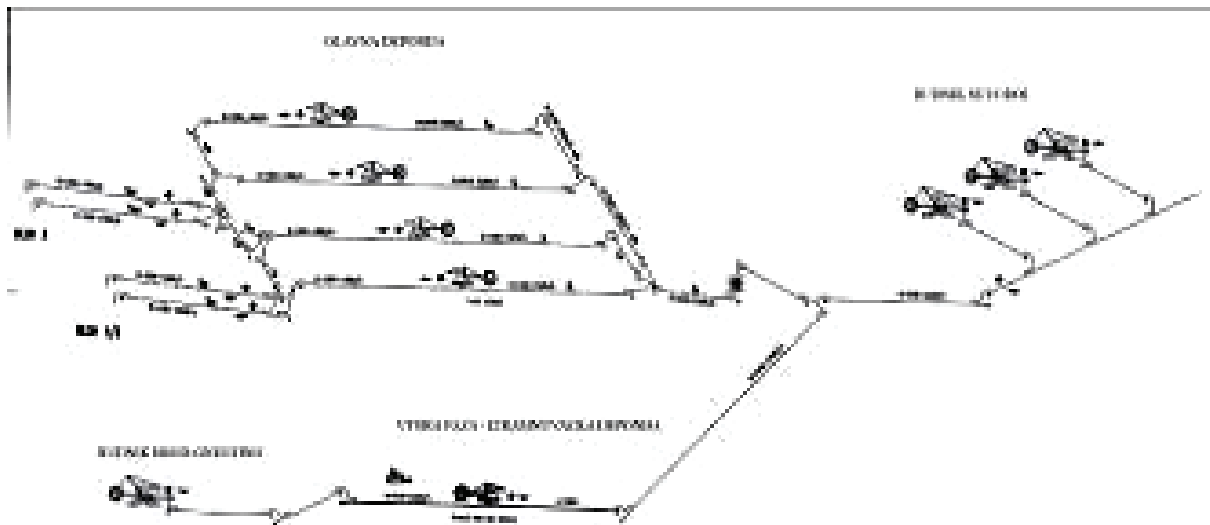


Fig. 1

3.0 PRESENT SITUATION

The excavation of the coal is done of the main coal seam in the mine “Suvodol” with three excavator units (two excavator units SRs-630 and one KU-300), with annual capacity of 6.000.000 (t³) (fig.1). The excavator units are equipped only with weighers with which a quantitative control by excavators is made. Weight flow meter with qualitative analyst is performed on the haulage conveyor in front of the dump coal entrance in the thermal power plants.

Four excavator units at the dump coal (combined – for depositing and excavation of coal) are without instruments – weighers for measuring the excavated coal. That means the coal that is transported to the bins in the TPP is not measured neither quantitatively nor qualitatively.

This way does not give possibility about quantity and quality control of the coal that is burned in the TE. The coal quantities and the heating capacity consumed in the thermal power plants are established reversible. That means they are established on the basis of the produced el. Energy and the average heating capacity of the excavated coal.

4.0. TECHNICAL SOLUTION ABOUT COAL QUALITY AND QUANTITY CONTROL AND ITS HOMOGENIZATION

The system for coal quality and quantity control that is planned to be used, will have an aim to optimize the process of primary homogenization (homogenization during the coal excavation itself out of the working blocks with the excavating units) and secondary homogenization (depositing and excavation of the coal out of the coal dump in the thermal power plant). The qualitative and quantitative parameters will be monitored through the commanding dispatcher center from where the analyses will be performed and will be reacted about the coal quality. (Fig. 2)

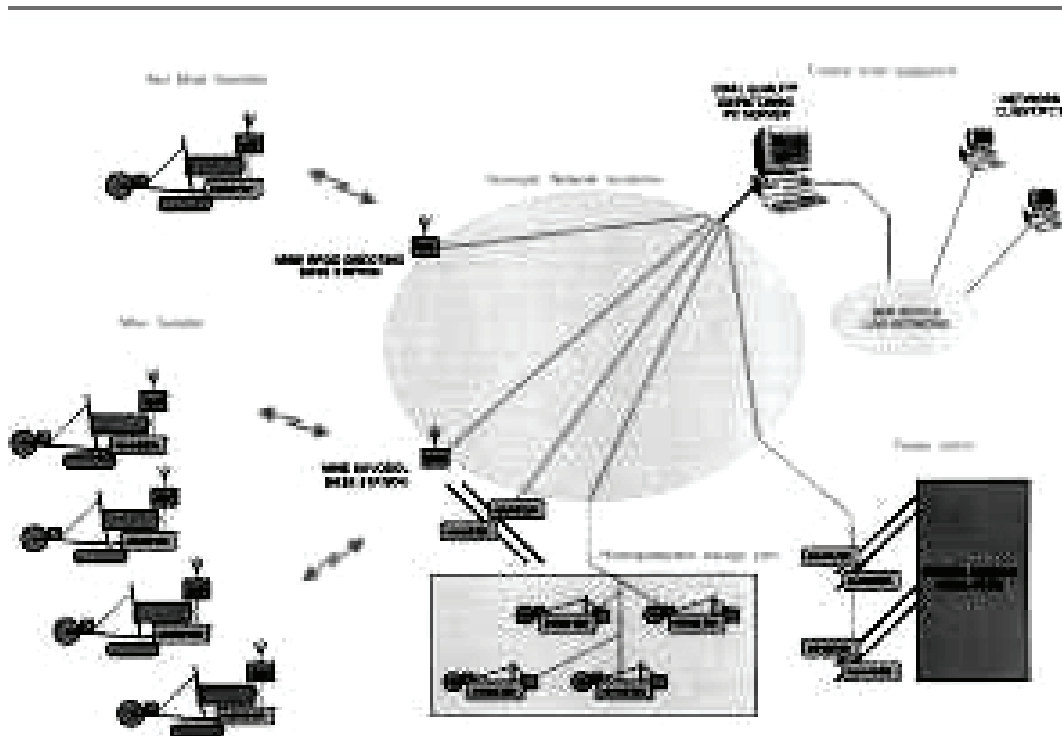


Fig. 2

4.1. Primary homogenization

The primary homogenization will be made on the very place of the coal excavation with dredging units on the excavation sites in the mine. Each of the three excavators shall be equipped with balance for monitoring the weight flow and analyst of heating capacity of the excavated coal (Fig. 3). This type of analyses shall be performed with apparatus that uses radioactive bodies whose limits of safety zones are not surpassing the conveyor sizes, and the height of radioactive radiation is in the scope of all international limits of maximal allowed height of radioactivity for such type of apparatus.

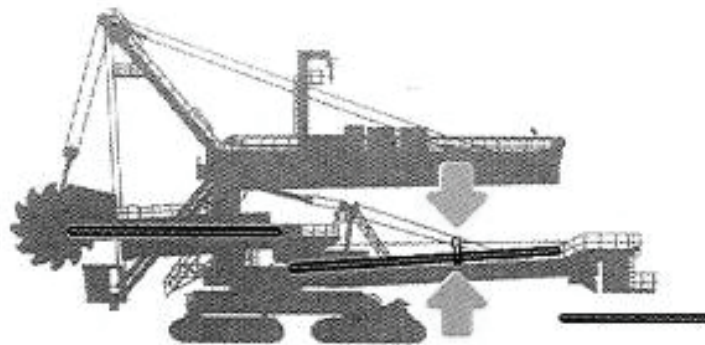


Fig. 3



The data for measured parameters are transferred with wireless connection to the dispatcher center, from where the regime of work of each dredger unit separately is established, in dependence with the heating capacity of the coal of each excavation site separately.

4.2. Secondary homogenization

The secondary homogenization in the first phase (until the start of operation of the new mines “Brod-Gneotino” and “Floor series”) shall be performed with homogenization of the coal during depositing in the existing coal dump in front of the thermal power plants. In the coal dump the coal shall be deposited in accordance to the quality by established regime for homogenization with aim to get the values most close to the necessary minimal heating capacity for the thermal power plants. Final homogenization of the coal shall be performed during the excavation itself with combined dredgers that service the coal dump.

The technology of depositing the coal could be with method of depositing with movement (windrow) and subsequent cross sectional excavation, and all this operationally guided from the commanding dispatcher center.

4.3. Homogenization system characteristics

The qualitative parameters will be measured with apparatus for measurement GE 3000, which at the same time gives data about excavated coal quality and quantity. This apparatus uses the axial radioactive bodies which radiate, during which the limits of the safety zones did not exceed the dimensions of the conveyor belts. The apparatus shall be installed on the discharging conveyors of the excavation units.

The data transfer of the measuring places shall be done with support of optical lines (Ethernet) as well as over wireless way (WHF/UHF), (Fig.4). The system comprises complete software solution about homogenization by Windrow method.

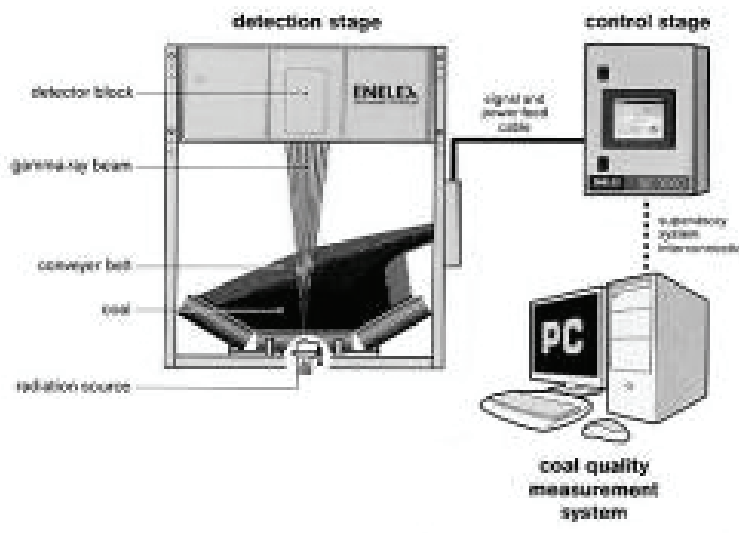


Fig. 4

4.4. System for assessment and visual review and serving



Measured information of the technological process of getting shall be transferred in the central server of the system for regulation of quality in the data base. From here they will be processed through processing block and here they will be archived for further use in a one minute cycle.

The program block processing of data through on-line connection take over measured data and information about the technology condition of the conveyed coal, basic excavation units and combined dump coal dredgers.

The program block visualization of the actual condition of the depositing technology, as a user program has a possibility for inclusion of free number of PC, during which the information shall be reviewed in a form of present schemes about the condition of the depositing technology, tables and other interactive forms.

Ideographic script of the operational panel in the cabin of the excavation units shall be in alphanumeric display.

5.0 CONCLUSION

The necessity of savings of the energetic resources and the price that they reach at the market, lead to necessity of consideration in REK Bitola, of consideration about different treatment of the basic energetic fuel for the thermal power plants. The previous only quantitative treatment of the coal lead to situation to consume quantitatively more coal without taking into consideration about its heating capacity. That means that it is consumed coal with bigger heating capacity than that which is with project anticipated for the needs of the thermal power plants, during that not to be diluted with less quality, with which will attain exploitation of the coals from the mine with lower caloric value and with that also greater degree of reserves exploitation.

6.0 LITERATURE

- [1] Study about homogenization of the coal in REK Bitola (2009),
Bitola