

## Summaries

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*RYSZARD MIKOSZ*

**The evolution of legal regulation concerning using of the mineral resources located inside the Earth in the context of the constitutional changes in Poland** • Kwartalnik Górnictwo i Geoinżynieria • z. 3, 2010

The article concerns the most important legal changes, which after the Lear 1989 on hale taken place in the field of using the natural resources, located inside the Earth. Its main aim is to present the connection between these changes and the transformation of the legal system in Poland. This connection seems to be indubitable, although one often does not realize it clearly or to the satisfactory extent. The matter is considered on the example of the evolution of the regulation of the geological and mining law concerning: property of mineral deposits, licensing on searching and excavation of these deposits, as well as charges and liability for damages connected with this activity.

**Keywords:** *Constitution, Geological and mining law, property of mineral deposits, charges, liability for damages*

*MAREK NIEĆ*

**International Resources/reserves classifications** • Kwartalnik Górnictwo i Geoinżynieria • z. 3, 2010

Three main resources and reserves classifications, internationally recognized are: United Nations Framework Classification of Resources/Reserves (UNFC), CRIRSCO for solid mineral commodities and PRMS for hydrocarbons. The most universal is UNFC formulated within UN Economic Commission of Europe. It allows comparison of varied used national and institutional classifications and present resources data in uniform manner. Its application is recommended by UN Economic and Social Commission (ECOSOC resolution 2004/233). In the UNFC resources are classified on the basis of three criteria: economic and social viability (E), feasibility status (F) and geological assurance (G). Each of them is categorized using numerical coding system. The combinations of particular categories form classes of resources designed by three digit symbol representing EFG categories respectively. Polish classification is based on similar rules as UNFC, CRIRSCO and PRMS and with some assumptions respective classes of UNFC can be found. The substantial difference is the mode of presentation of resources and reserves data: hierarchical in the polish classification and complementary in UNFC (as well CRIRSCO and PRMS). In polish resources inventory, according to international rules should be presented separately: industrial, not industrial resources and supposed economic (balance) resources not subdivided to industrial and not industrial.

**Keywords:** *Mineral resources and reserves, classification systems*

*ALICJA BYRSKA-RAPAŁA*

**Risk and uncertainty versus the integrated reservoir management** • Kwartalnik Górnictwo i Geoinżynieria • z. 3, 2010

Risk and uncertainty are associated with each part of the projects' life, from exploration, by development, production to abandon. Level of risk and uncertainty result from owned knowledge about deposit and state of reconnaissance in investment projects' surroundings. The main aim of this article is to discuss the concepts of reservoir and value management. The integrated reservoir management concept is based on integration of technology (seismic, geologic, geostatistics, drilling, environmental ect.), people (management, geoscientists, engineers), tools (from

seismic to computer hardware and software) and data (geological, geophysical, financial). Risk and uncertainty management is strongly related with value-based management and value creation for shareholders. In the article, the author tries to assign each level of risk estimation stage of investment project realization as well as tools of analysis, which are allowing quantifying level of risk and uncertainty.

**Keywords:** *integrated reservoir management, level of uncertainty, value-based management, value creation for shareholders*

HENRYK PASZCZA

**Restructuring processes of hard coal sector in Poland in the aspect of realized transformation and changes in reserve base** • Kwartalnik Górnictwo i Geoinżynieria • z. 3, 2010

The article presents selected issues of hard coal sector restructuring process in the last twenty years, particularly the processes of organizational changes, activities aimed at excessive production capacity and overfull employment reduction. Individual governmental programmes have been presented in details and the analysis of effectiveness of their implementation in mining sector has been conducted. The comparison of functioning of the sector to the assumptions of these programmes has been done. The evaluation of compliance of realized activities with the directions of governmental programmes has been done in conclusions as well as the basic technical and economic indexes of mining activity in the previous decades have been presented.

**Keywords:** *hard coal, governmental strategy, restructuring programmes, restructuring aims*

ZDZISŁAW KULCZYCKI, ARTUR SOWA

**Development of resources of hard coal** • Kwartalnik Górnictwo i Geoinżynieria • z. 3, 2010

In the paper, on background of changing of law regulation, the authors showed the general principles of development of resources of hard coal in period 1989-2009. They indicated the part of state mining authority in process extraction of deposits of hard coal. In the analysis of maintaining of the records of the economically viable geological resources and industrial resources were showed as resulting of mining activity. The authors presented changes of economically viable geological resources and industrial resources from actualizing deposits development plan by entrepreneurs.

**Keywords:** *hard coal mining, management of resources*

JACEK JAROSZ

**Legal and economic aspects of coal mine closure in Poland** • Kwartalnik Górnictwo i Geoinżynieria • z. 3, 2010

The paper presents two methods of assessing closure cost of a mining operation in order to calculate the resources that need to be accumulated in a Mine Closure Fund (MCF), which is regarded as a reserve equity fund. The methods differ in the scope of mine closure activities that the law requires to be financed from the MCF. The first method is, in essence, based of the Accounting Law Act of 1994 (with subsequent amendments) and is currently used by some mining companies. In this method the algorithm used to estimate the cost of mine closure takes into account more activities than is the case in the second method. Subsequently, the cost of mine closure estimated using the first method is higher. The second method of mine closure cost estimation is used by some mining companies as a consequence of them applying International Accounting Standards (IAS). The standards are used by public listed companies and the companies that voluntarily decided to apply them. In the paper presented are the results of mine closure cost assessments done with the use of both methods for three operating mines. As it turns out, the costs of mine closures calculated in line with the IAS rules are substantially lower (as much as 15%), which allows the mines to lower the MCF premiums or shorten the time needed to accumulate the required funds. This is more favourable for the current operations but may give rise to concern as to the sufficiency of the accumulated funds to provide financing for proper mine closures.

**Keywords:** *Hard coal mines, mine closure fund, closure cost estimation, IAS*

RYSZARD UBERMAN

**Legal and financial aspects of surface mines liquidation** • Kwartalnik Górnictwo i Geoinżynieria • z. 3, 2010

The paper shows complexity of surface mine liquidation in terms of time and costs to be comparable to the construction of a new open-pit mine. Considering that the liquidation of surface mines differs from liquidation of underground or borehole mines only the technical, legal and financial problems that refer only to surface mining have been discussed. Presented were trends in reclamation and management of post-mining barrens, evolution of legal regulations on the process of mine liquidation as well as methods and sources of financial support for such undertakings. Shortcomings of the present regulations and insufficient financing have been indicated. New conclusions and postulates aimed at improving legal aspects of surface mines liquidation were given based on existing experiences and solutions used abroad.

**Keywords:** *open-pit mines, liquidation, legal regulations, financial sources*

WOJCIECH NAWORYTA

**Selected issues of surface mines liquidation costs based on own experiences** • Kwartalnik Górnictwo i Geoinżynieria • z. 3, 2010

Commercialization and privatization of mining corporations forced them to create financial reserves for future liquidation purposes. In the paper, based on own experiences, presented were problems related to estimation of costs of mines liquidation and post-mining barrens reclamation. The presented issues refer to surface mining. The importance of liquidation conception for the costs assessment has been underlined. It was shown that the existing conceptions of liquidation should be often verified as the conditions of mines functioning and their strategies may change. Factors affecting accuracy of costs estimation have been indicated. It was shown that due to temporal variability of certain cost-making factors and due to influence of the financial reserve on the current situation of mining enterprise verification and actualization of liquidation costs should be carried out frequently.

**Keywords:** *mines liquidation, liquidation costs, financial reserve*

LESZEK JURDZIAK, WITOLD KAWALEC

**The optimization study of technological schedules for the Legnica lignite surface mine** • Kwartalnik Górnictwo i Geoinżynieria • z. 3, 2010

Technological schedules of the planned Legnica lignite mine placed in area of fields: West, East and North, have been analyzed with the application of open pit optimization methods. A special methodology of lignite deposit modelling which contain: lignite deposit classification according to current economic criterion, block model construction according to accepted recognition of lithological structures, block modelling of lignite quality construction based on zonal interpolation of selected parameters and creation the alternative economic models for analyzed scenarios. Several ultimate pits have been generated (using the Lerchs-Grossmann pit optimization algorithms) for every scenario on the basis of preliminary estimations of mining costs and applied lignite price formulae. The influence of lignite price variability on economic results has been analyzed. The long-term schedules studies of the mine development have been presented.

**Keywords:** *lignite mining, lignite deposit modeling*

WOJCIECH GLAPA, MARIOLA STEFANICKA

**Management of mineral deposits, based on the example of LKB „Księginki” SA** • Kwartalnik Górnictwo i Geoinżynieria • z. 3, 2010

This paper, basing on the example of the basalt quarry, describes various issues related to increasing the quantity of the resources of exploited mineral deposits, change of property concentration, management activities and the types of products offered in the period of economic transformation in the years 1989-2009. State of important geological-mining assets especially connected with changes of: resources of deposits (documentation of deposits, purchase of quarry),

restructuring of machinery, implementation of innovative technologies and activities for natural environment were described. In the results of these changes, new qualitative mineral aggregates by PN-EN standards are being produced and supply on the market. Lusatian Basalt Quarry "Księginki" JSC in Lubań was established in 2001 as a worker cooperative, in the result of privatization of state-owned undertaking. Currently, productive activity in three quarries operating on the deposits: Księginki Północ, Księginki I and Bukowa Góra (total basalt reserves about 123 Mt) is being realised.

**Keywords:** reserves of deposits, crushed aggregates, basalt quarry

*BORYS BORÓWKA*

**Assessment of technical possibilities for exploitation of out-of-balance resources in a hard coal mine** • Kwartalnik Górnictwo i Geoinżynieria • z. 3, 2010

The paper describes an attempt that has been undertaken to assess mining-geological conditions, development possibilities, and technology selection for mining out-of-balance resources (plots). The research works have been made in coal mine "X", which is located in northern part of Upper Silesian Coal Basin. Methodology being adopted in this work included verification of formal reasons for reclassification of selected parts of mineral reserves into out-of-balance resources, determination of technical possibilities of their development, characteristics and assessment of mining-geological conditions in these parts of coal beds, and characteristic of requirements for selection of mining technology. Verification procedure has proved that certain part of analyzed out-of-balance resources could be eventually mined out with use of mechanization system based on mining ploughs.

**Keywords:** hard coal mine, out-of-balance resources, mining – geological conditions, technical possibilities for exploitation

*JACEK MUCHA, MONIKA WASILEWSKA-BŁASZCZYK, TOMASZ SEKUŁA*

**Reliability of resources and quality predicting of hard coal seams in Dąb area (Upper Silesian Coal Basin)** • Kwartalnik Górnictwo i Geoinżynieria • z. 3, 2010

The accuracy of estimation of hard coal resources and parameters describing coal seams quality (thickness, calorific value, sulphur and ash contents, coal density) in non-developed Dąb deposit of Upper Silesian Coal Basin has been analyzed. Three data sets have been used for assessment of the accuracy: data from drill holes in the vicinity of area Dąb, data from Dąb area and the both types of data. Using geostatistical procedure of ordinary kriging it was stated that the calorific value and coal density are estimated with the high accuracy, seam thickness and coal resources with moderate accuracy and sulphur and ash contents with low accuracy. In a case of moderate variability of seam thickness (coefficient of variation <40%), the accurate of coal resources estimation on the basis of 4-8 drill holes from the neighbourhood of Dąb deposit is sufficient with kriging standard errors lesser than 20%.

**Keywords:** hard coal resources, resources predicting, coal seams quality

*EUGENIUSZ J. SOB CZYK*

**Identification of parameters have an effect on the effectiveness of heading development in hard coal mines** • Kwartalnik Górnictwo i Geoinżynieria • z. 3, 2010

The work includes an analysis of heading development process in selected Polish hard coal mines. An analysis of average tunnel development face advance and cost was done for 838 headings driven in coal mines in the years 2003-2008. A new methodology for conducting development work efficiency assessments at hard coal mines was proposed. Two structural models of heading development work efficiency were determined: the first one basing on the achieved face advance rates, the second - on the achieved financial results. The results served to formulate aggregate indexes (Wp - aggregate face advance index, We - aggregate cost index), which comprehensively measure the influence natural hazards, deposit parameters and technological parameters have on limiting tunnel face advance rates achieved as well as on development costs. An attempt was made to calculate the optimal heading drive rate at a minimum cost for each range of the efficiency index We. Average face

advance and average face financial results were also described. In analysis a cost structure of heading development with the division into coal, coal-stone and stone face was taken into consideration.

**Keywords:** *geological and mining conditions, Analytic Hierarchy Process AHP, multidimensional compare analysis, natural hazard, deposit parameters, development work*

*ARKADIUSZ KUSTRA*

**Application of bonds in financing of mining-geological projects in the world markets** • *Kwartalnik Górnictwo i Geoinżynieria* • z. 3, 2010

In the paper, it was presented the changes in financing of mining-geological projects which occurred in the world markets in the light of financial crisis. Particularly, it was paid attention on the record debt of mining sector and shown the practical directions of changes through secondary equity issues, convertible bonds and common bonds. It was presented the largest issuers of bonds in 2009 and parameters of issues like coupons and terms to maturity. Disclosed conclusions confirm the decrease financial leverage and risk in mining enterprises. The financing was matched to cash flows from existing and future mining-geological projects. According to Ernst&Young, the level of debt in mining sector will come back to historical value when debt to equity ratio was average 20-40%.

**Keywords:** *mining-geological projects, financing, structure of debt, equity, convertible bonds, common bonds*

*ARTUR DYCZKO, MICHAŁ KOPACZ, AGNIESZKA STOPKOWICZ*

**Influence of low mineralisation zones on economic effectiveness of mining on example of Polish copper mines** • *Kwartalnik Górnictwo i Geoinżynieria* • z. 3, 2010

The paper presents researches over existence of low mineralisation zones among exploitation areas which are, on one hand - technical restriction, but on the other - they affects economics effectiveness of mining production. Undertaking mining activity in low mineralisation zones is usually economically ineffective, otherwise can increase a level of stress in rock mass. Geomechanic issues were presented on example of numerical calculations of a different zone sizes located in surrounding of mine-out areas. The calculation of economic effectiveness was undertaken in an attempt to obtain economic value of panel X in mine Y.

**Keywords:** *copper ore deposit, room and pillar system, dilution, economic effectiveness*