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**Strengthening Building of CBM Safety Standards and Promoting Standardized and Orderly Development of CBM**

Pei Wentian  
(State Administration of Work Safety, Beijing 100713)

**Abstract:** Currently, shortage of standards for safe production of coalbed methane has greatly constrained the safety development of CBM industry. Based on the need of practical work, the State Administration of Work Safety I now organized all the related departments to formulate...
“Safety Regulations for Prevention of Fire and Explosion in Extraction of CBM” and “Safety Regulations for CBM Collection and Delivery”. The paper describes in details the important significance, the necessity and urgency in formulation of these two regulations.

**Keywords:** CBM; Safety standards

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**Study on the Prospect of CBM Resources in Tianshan Jurassic System Coal-bearing Basin**

Ning Zhengwei

(China United Coalbed Methane Co. Ltd., Beijing 100011)

**Abstract:** The Badaowan Formation of Lower Series and Xishanyao Formation of the Middle Series of Jurassic System of the Tianshan Coal-bearing Basin contain 2-48 coal-bearing seams. The cumulative thickness is 15-110m. The thickness of seams generally varies from 30-60m. The coal-bearing area is 24260km². The total CBM resource to a depth of 2000m is 16261.50×10⁸m³. It has a broad prospect for exploration and development of coalbed methane. Based on overall consideration of the geological settings of CBM in the coal-bearing zone, the geological occurrence conditions of CBM and variation of all the parameters, the coal-bearing areas fall into two categories: namely, the favorable area, including Yining and Yanqi coal-bearing areas, and the fairly favorable area, including Nileke, Zhaosu, Gonglixinyuan, Kelake coal-bearing areas, Youerdus coal-bearing area and Kumish coal-bearing area.

**Keywords:** Tianshan coal-bearing basin; prospect of CBM resources; evaluation for exploration and development

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**Experimental Research on Permeation Characteristics of Single Phase Gas in CBM Reservoir**

He Yingfu

(1. Daqing Oilfield Co. Ltd., Heihongjiang 163712)

**Abstract:** The paper studies stress sensitivity and slip effect of CBM reservoir by using low speed permeation experimental unit, and compares the differences of the test results between cores taken from CBM reservoir and sandstone samples. The results show that coal measures with well developed fissures belong to substances with strong stress sensitivity, and that with the increase of the effective stress, the permeability rate decrease, and when the pressure of the surrounding rock increases to 10Mpa, the dimensionless permeability rate of the cores is less than 10%. The single phase gas permeation of CBM reservoir has a slip effect. The authors have determined the slip coefficient and permeability equation. However, when the difference of permeability is not great, its slip effect is weaker than that of sandstone reservoir with low permeability.

**Keywords:** CBM reservoir; stress sensitivity, slip effect, permeation characteristics

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**Analysis of Gushan Coal Mine in Xinggong Coalfield Coalbed Methane Accumulation Process of Integration**
Wei Qingxi
(Henan Polytechnic University, Henan 454000)

Abstract: Based on adsorption potential theory, the variable history of gas content in Xinggong coalfield was resumed. According to the history of gas content, there were hydrocarbon generation twice in the investigated area, the biggest adsorption capacity will not surpass 9.22 m³/t under the condition of temperature and pressure which induced the second hydrocarbon generation. The coalbed methane which can not be adsorbed was preserved as free gas state (unabsorbed) in the porosity of coal beds and wall rocks or as a solute in groundwater, and the other dissipated by the micro-fracture. The coalbed methane content actually achieved 35m³/t nowadays. Through the theoretical analysis, the adsorbed coalbed methane content which generated during the process of the second hydrocarbon generation accounts for 26.34%, the free gas were less than 43.65%, the solute gas accounts for 1.86%, the migrated gas which were from the shallow part were more than 28.15% approximately.

Keywords: Gushan Mine; adsorption potential theory; the formation of CBM reservoir; gas content evolution

Study on Dominant Characteristics and Rules for CBM Enrichment in Huangling Mining Area in Shaanxi

Zheng Guiqiang
(China University of Geoscience, Beijing 100083)

Abstract: Based on the overall evaluation of the characteristics of CBM reservoir in Huangling mining area, the authors have analyzed the controlling characteristics of CBM enrichment in Huangling mining area in Shaanxi, discussed mode and rules of CBM enrichment and predicted the zone of enrichment in this mining area. The results of research indicate that CBM enrichment in this mining area is mainly controlled by development characteristics of coal seams and dynamic conditions of water at the depths. The mining area can be divided into four predicted CBM enrichment zones based on the controlling characteristics.

Keywords: Coalbed methane; predominant characteristics; rules of enrichment, Huangling Mining Area

Elementary Analysis of CBM Reservoir-forming Conditions in Kaiping Coal Basin in Hebei Province

Sun Yijuan  Zhang Xinsheng
(Physical Survey Geological Team of Hebei Province Coalfield Geology Bureau, Hebei 054000)

Abstract: The authors describe the evolution and formation process of coalbed methane in Kaiping coal basin in aspect of sedimentation and occurrence of coal measures, evolution of coal and gas-formation as well as transformation and finalization of gas reservoir. The authors make a further analysis of characteristics and enrichment conditions of the CBM reservoir. On the whole Kaiping coalfield is an asymmetrical syncline structure. Coal formation and sedimentation in later
stage are favorable to formation and evolution of CBM reservoir. The coalfield possesses conditions for CBM enrichment, formation, storage and preservation of CBM. The major target seams are Nos. 7, 8, 9 and 12 seams, which are thick and regularly distributed. Especially the northwest limb of the syncline has good CBM-forming conditions, which can be regarded as favorable block and priorities can be given to this part of syncline in arrange reconnaissance of CBM.

**Keywords**: CBM; reservoir characteristics, reservoir-forming conditions, asymmetrical syncline in Kaiping coal basin

### Investigation and Research on Coal Mine Ventilation Coefficient for Dafosi Mine in Bingchang Mine Area in Shaanxi Province

Chui Hongke  Yuan Desheng  
Shaanxi Bingchang Mining Group Ltd. Co.

**Abstract**: Based on the measured statistic figures of air quantities in main downcast and upcast air shafts, in coal work face and heading faces and the gas outflow from one fully mechanized coal face and two full mechanized heading faces in Dafosi Mine in Bingchang mine area for half year and based on the research work, the authors have obtained a ventilation coefficient suitable for this mine, and the irregular factor of gas emission from the coal mining and heading faces. This is of great importance to the strengthening of coal mine ventilation management, rational distribution of air quantity and improvement of effective air quantity rate in this mine. It is also can be used for reference in ventilation management in mines to be developed within this mine area and in coal enterprises with similar conditions.

**Keywords**: Ventilation coefficient, irregularity factor of gas emission, effective air quantity

### Countermeasures for Enhancing Gas Drainage from Single Thick Coal Seam with Low Permeability

Xu Longcang  
(The Research Institute of Hebi Coal Mining (Group) Co., Henan 458000)

**Abstract**: Hebi Mine Area mainly extracts No.1 seam of Shanxi Formation 2 of Permian System, which is a single thick seam with low permeability. The gas of seam No. 1 is very difficult to pre-drain and the pre-drainage rate is low. Technical counter-measures are, therefore, proposed for further improving the mine gas drainage results. They are: keeping coal wining coordinated with development, intensifying overall gas drainage, improving the sealing quanlity of the boreholes, improving gas drainage system and strengthening management of gas drainage.

**Keywords**: CMM; low permeability; drainage results; counter-measures

### Analysis of Dynamic Balance of Gas Flow and Production System of Gas Well

Yao Jinfang
Abstract: Based on analysis of the gas well production system, the author considers that there are certain quantitative relations among gas drainage, collection and transmission. Based on the parameter, i.e., variation of pressure at all nodal points of a gas well, the author has simulated all the production links with a mathematic model and established a complete system composition. The inflow and outflow sections of a gas well are predicted by simulation respectively. The production system of the gas well is optimized, and the dynamic characteristics of the gas well are rational determined and the practical problems met in production process are studied.

Keywords: Dynamic curve, nodal point, system analysis

The Feasibility Study of Dual-loop Supplement of Electricity Generated by CMM in Small Mines of Guizhou Province

Wang Cheng, Yang Shengqiang, Peng Jigang
(School of Safety Engineering, China University of Mining and Technology, Jiangsu 221008)

Abstract: Guizhou is rich in coal resource with a large amount of coalbed methane in coal seams. It is feasible that power from coalbed methane that are drained in small coal mines supplied one of the dual-loop. It not only can improve the safety of coal production, but also generate economic and social benefits.
Keywords: Gas power generation, dual-loop, feasibility

Analysis of Power Consumption of the Liquefaction Technology for Separation of CMM at Low Temperature

Tao Pengwan
(Southwest Chemical Research Institute, Chengdu 610225)

Abstract: The paper analyzes the power consumption of liquefaction technologies for low temperature separation of CMM under oxygen-containing condition and de-xidation conditions. The results indicate that the power consumption of the former technology is higher than the latter. The main reason is that the upper limit of CMM explosion increases remarkably with the increase of the pressure. Due to safety reasons, separation of N2 and CH4 must be carried out under lower pressure. The order of magnitude of refrigerating capacity necessary for separation is in the order of liquefied nitrogen temperature. While for the latter technology, since oxygen is removed, the pressure can be higher, and separation can be carried in the order of liquefied methane temperature. The thermal efficiency of the latter is twice as high as the former.
Keywords: CMM; low temperature separation; liquefaction of LNG; power consumption

Comparison and Analysis of CBM Development Models and Countermeasures

Zhang Shengyou¹ Feng Lijie¹² Wang Jinfeng¹
Abstract: With the rapid development of CBM industry in China, it has gradually formed three CBM development models: “Production Sharing Model”, “Joint-venture Model” and “Independent Development Model”. This paper provides a systematic summary of the three models and makes a scientific comparison of their features and shortcomings. It also proposes many related countermeasures for improvement. This paper will provide a basis of decision making for enterprises or managers to choose a suitable CBM development model, and provide helps to improve the present development models.

Keywords: CBM; development model; countermeasures