

论文

柳林地区煤层气井排采过程中产水特征及影响因素

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摘要:

以实际生产数据为基础, 结合流体包裹体测试分析, 从古今水文地质特征、排采模式、压裂工艺等方面综合研究了柳林地区煤层气井排采过程中的产水特征及其影响因素。结果表明: 柳林地区煤储层产水特征是多种因素共同作用的结果, 山西组煤层顶板砂岩含水层中古流体呈现滞留特征, 富水性相对较弱, 其现今产水量的高低与岩层中裂隙的发育程度有直接关系。太原组煤层顶板灰岩含水层在早期与地表淡水发生了沟通, 富水性较强。当以不同的模式进行排采时, 受压裂强度和煤层与顶板含水层差异沟通的影响, 表现出D, A, B, C四种模式的产水量逐渐增大的规律。进一步指出, 为降低水动力的影响, 适当区域可选用水平井开采; 煤层气开发由东北向南西逐步推进, 有利于煤层的排水降压; 储层改造过程中应降低压裂缝的规模, 尤其是纵向缝的高度。

关键词: 柳林地区; 煤层气; 排采; 产水特征; 水动力; 压裂

Characteristics of water yield and its influence factors during coalbed methane production in Liulin area

Abstract:

On the basis of actual producing data, combined with the fluid inclusion studies, this paper analyzed the characteristics of water yield and its influence factors during CBM production in Liulin area from the paleo and present hydrogeology, production model and fracturing technology. The results show that the water yield in Liulin area comes from the common action of many factors. The coal seam roof sandstone aquifer of Shanxi Formation, in which the paleo fluid presents detained feature, has relatively weak water yield property and its present water yield has a direct relationship with the distribution of fracture. The coal seam roof limestone aquifer of Taiyuan Formation has a communication with surface fresh water in the early stages, which has relatively strong water yield property. During the production by different model, under the influence of fracturing strength and the differential communication of coal seam with roof aquifer, the water yield shows gradual increasing by the order of model D, A, B, and C. We further point out that in order to depress influence of hydrogeology, some horizontal wells can be selected in proper area, the production of CBM can be carried out from northeast to southwest which is favorable for drainage and pressure lowering of coal seam, and fracture size can be decreased, especially the height of vertical fractures.

Keywords: Liulin area; coalbed methane; production; characteristics of water yield; hydrodynamic; fracturing

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