Coal bed methane (CBM), just as its name implies, exist in coal beds, which perform the role of source rocks and reservoirs. CBM absorbed by coal beds in physical way is the main existing forms of coal gas reservoir. CBM can be expelled from reservoir only after water expulsion and the accompanying pressure reduction. So, it would take a long time for CBM to reach the production peaks and low exhaust pressure is essential to enhance recovery. Since coal beds reservoirs are much tighter than normal gas reservoirs, CBM exploitation cannot become profitable unless the reservoirs are full of cracks. According to the particularity of geological conditions of pool forming, special method must be used to estimate CBM resource.

Considering the unique mechanism of reservoir forming and occurrence, CBM reserves estimation is actually calculation of reserves of gas which is absorbed by coal beds. Volumetric method is one of the traditional estimation methods, whose calculation object is fluid or gas restored in reservoir space. However, since CBM is absorbed by coal beds, its resource estimation is quite similar to solid mineral resources’, which means that traditional estimation methods are not applicable anymore.

The occurrence of CBM can be classified into three types of state: free, absorbed and dissolved. First of all, in cracks of coal beds, CBM is free and can move to anywhere under the force of formation water pressure and buoyancy. Secondly, most CBM, 70 to 95 percent, is absorbed in coal beds. Whether or not can gas accumulated in coal beds, depend on absorption instead of traditional trap. Furthermore, there is a small part of gas dissolved in coal beds water. Anyway, all three states of gas combined to CBM, which should be calculated separately while estimation. An optimized calculation specifically for China’s CBM resources estimation is put forward.

Considering CBM has the character of both solid and fluid mineral, a new technique called “CBM well controlled method” is introduced in this article, which has been regarded as the most suitable method during the stage of exploration. The boundary conditions of “CBM well controlled method” is restricted by the characteristics of coal beds, exploitation and development. Reserve classified by “CBM well controlled method” is consistent with the internationally accepted standards.

Rules about the acquisition of various parameters as well as the basic methods of technical and economic recoverable reserves are introduced in detail. This research may provide a firm foundation for new standard of domestic CBM reserves estimation work. “CBM well controlled method” is a comprehensive appraisal method, which may help to optimize prospecting area, calculate economic recoverable reserves and estimate CBM resources.

References