Badin and Thar Coals: Potential Candidates for Cbm

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Coal Bed Methane (CBM) is expected to play an important role in the world energy sector as well as in Pakistan. Asia has estimated 2,100 Tcf of CBM reserves and about 10% of the world's coal deposits are in Sindh, Pakistan which may be promising for CBM potential of the country. Although there is little chance of the presence of thermogenic methane in Thar coal because of its low rank, however the possibility of the presence of biogenic methane cannot be ruled out. SanFilipo (1994), based on desorption measurements carried out on cores from Thar coal reported the presence of low concentration of methane. Normally the high ranking coals are considered favorable for CBM, but Tertiary lignite of Barmer Basin India is considered as CBM source in IHS Inc. study. Lignite coals of Powder River Basin, USA are producing biogenic CBM on commercial scale.

In the present paper, factors necessary for the presence of CBM and their relevance with Thar and Badin coals are discussed. The main geological criteria for CBM prospectivity includes coal seam thickness, rank and composition, overburden, presence of aquifers with abnormally high fluid pressure and structural deformation, which may have potentially enhanced coal porosity and permeability. Coal composition has a significant effect on adsorption capacity. Vitrinite macerals have more adsorption affinity to methane than liptinite and inertinite. Quantitative organic petrographic analysis shows that on the average Thar coal is composed (mineral matter free) of 91.0% huminite (vitrinite), 6.75% liptinite and only 2.7% inertinite. High ash content dilutes the CBM adsorption capacity of coals. Thar coals have relatively low ash content, so these coals are expected to have high adsorption capacity. Thickness of the main coal seam is about 23m with a number of other coal seams above and below. The total overburden is around 150 to 230 m. Hydrogeological data indicates that confined water aquifer is present below the main seam which may provide required hydrostatic head. Moreover, the gas is trapped in coal as free gas or adsorbed gas in the micropores and cleats. Petrographic studies on Thar core samples reveal the presence of significant network of cleats and matrix porosity with micropores generally smaller than 5μm. The chances for CBM occurrence in Naukot and Badin areas are higher as these coals are present at relatively greater depth.

The desorption results of Cambay Basin coals, which from a depositional standpoint is more-or-less an extension of the Thar field, gives fairly high CBM content (200 ft3/ton). It is assumed that even if the CBM content of Thar coals is half that of Cambay coals (100ft3/ton), it may produce about 18.0 Tcf of gas. However, for proving the CBM potential, systematic appraisal of Badin and Thar coals is required.