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Contrast in Gas Sorption at Dartbrook and South Bulli Collieries

P J Crosdale[1]

ABSTRACT

Dartbrook (Hunter Valley and South Bulli (Southern Coalfield) Collieries provide contrasting settings for gas sorption studies. Gas compositions at Dartbrook are dominated by carbon dioxide, with minor methane, while those at South Bulli are dominated by methane with minor carbon dioxide. Total gas contents at Dartbrook are also significantly greater than those at South Bulli. The two collieries are also contrasted in terms of coal composition and mining environment. Dartbrook Colliery mines a relatively small sectionb(4m) of very thick seam (up to mapproximately25m); the coal is vitrinite-rich, high volatile bituminous. South Bulli mines most of the seam thickness, with coal being an intertinite-rich, medium volatile bituminous coal.

Coal samples have been collected from in-seam gas drainage holes for evaluation of relative gas desorption rate (methane versus carbon dioxide). Following adsorption isotherms, petrography, chemistry (proximate and ultimate analysis) and pore structure analysis (carbon dioxide surface area, mercury porosimetry). Bomb desorption studies indicate different behaviours for methane desorption at these two collieries desorbed gas compositions at South Bulli show a small enrichment in methane content. The opposite is observed at Dartbrook. Both collieries show enrichment in CO_2 in the residual content. Adsorption studies show marked variation in adsorbed gas contents for methane and carbon dioxide at each colliery and between collieries. These variations are related to differences in coal pore structure, chemistry and petrology.

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