European experience in longwall gas emission control applied to New South Wales longwall mines

by C. Jeger
Consultant

ABSTRACT

Many aspects of gas emission and migration in NSW longwalls are similar to those existing in Continental European coal mines. Deep understanding of these phenomena results from measurements and studies made in these mines, particularly in France and Germany. This understanding has enable an improvement of gassiness prediction, choice of places for safer monitoring, and particularly methods and characteristics for more efficient control (mining designs, ventilation pressures repartition, and mostly drainage adapted to general and peculiar migration ways of gas). This paper, takes into account observations and measurements made in several NSW mines (Tahmoor, Westcliff, Pacific) by various authors, and by selecting similar European mining conditions (stratigraphy, gas content, output level), transmits some of the above major knowledge adapted to NSW mines. Also the paper suggests some measurements to confirm the existence of the evocated phenomenon, and indicates several ways to improve gas control particularly by drainage. Most part of this improvement results from a better knowledge of gas migration.

At first, we examine some characteristics concerning the sources of gas flowing to the longwalls, their emission rate, their total emission: influenced coal and rockstrata, even, if CO2, water flowing from strata; initial content but mostly emission rate and residual coal according to the nature and the position of the source in the stratigraphy according to th dimensions of the longwall, its age and position in the panel, its rate of advance, and the size and age of the laterally previously mined panels. Peculiar factors, some influencing the progressive growth of g as emission, and other the peaks of this emission will be taken into consideration for monitoring gas emission, and controlling by the rate of advance and by drainage.

These late considerations involve taking into account not only the form, the dimensions and their variations of the degasifying volume above and below the mined zone, but particularly the migration ways of the gas flowing from this volume: frontal and lateral cracks, bed separations and voids in the lower part of caving. To understand some emission penculiarites and adjust drainage, we have to consider evolution of this flow network during mining, as well as factors disturbing this network or flow of gas through it, like watertable, watered clay or mud layers.

Migration of gas in this network as well as in the goafs and surrounding crack networks of the previously mined lateral panels is of importance for the safety monitoring and for adjusting ventilation and particularly efficient drainage. Tracer gas were efficiently used to detect the ways followed by the gas flow, and the effects of some adjustments of ventilation and drainage.

But this knowledge is particularly useful to adjust post drainage; various type of post-drainage methods can be deduced, and particularly efficient layout, orientation, length, sealing of drainage boreholes, depending on observed or measured characteristics. So, not only more efficient, but less expensive drainage can be obtained.

Editors note: Please note this abstract is a translated attempt of a faxed version.