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Resource and Risk Evaluation of two Coal Seams at Kriel Colliery

Nel, L.¹ Roopa, S.² and van Deventer, P. W.³



¹ School for Geo- and Spatial Sciences, North-West University, Potchefstroom Campus, Hofman Street Potchefstroom, luannel1903@gmail.com



During the energy crisis of 2007 Eskom ordered dedicated domestic mines to overproduce, resulting in more coal being mined than was budgeted for. With Kriel Colliery currently facing a tonnage deficit, a project had to be undertaken in order to investigate potential future resources. The main reason for undertaking this research project was to find a suitable supplement for the No. 4 Seam production shortages. This was done by evaluating additional No. 4 and No. 2 Seam resources, within the Pit 6 Extension. Preliminary studies have shown that significant No. 2 Seam resources were present underneath the No. 4 Seam. Preliminary quality polygons revealed that the qualities for the No. 4 Seam fell well within the contractual requirement set by Eskom, whereas the qualities of the No. 2 Seam, revealed shortcomings over the entire pit. Using more accurate modelling software, initial results were stated, which resulted in the use of an alternative solution. With no current market for low quality No. 2 Seam Highveld Coalfield coal, the decision was made to investigate the possibility of blending the coal. Because the mine has decided to use a double bench mining method, the No. 4 and No. 2 seams would be blended to a 1:1.22 ratio, in order to get the combined qualities within specification, without stockpiling the coal separately. If the No. 2 Seam is mined simultaneously with the No. 4 Seam, the annual Run of Mine for opencast operation's, rises from 2.4 to over 3.0 million tonnes per annum. The only question was if the quality parameters still fell within the contractual requirements set by Eskom.

The project also consisted of a section dedicated to risk assessment and mine rehabilitation, using locally sourced fly ash, to counter the effects of Acid Mine Drainage (AMD) on the environment. Various analyses indicated that the Pit 6 Extension had a low AMD potential, and that the locally sourced fly ash could be used as a possible lime supplement. Studies conducted by Potgieter-Vermaak *et al.* [1] on the use of Fly ash as a possible supplement for lime during mine rehabilitation, in conjunction with the results obtained, revealed the potential of this discarded by-product during co-disposal procedures. The Fly ash proved to be a viable supplement, neutralising the available acidity, and removing residual contaminants through precipitation. Although greater quantities of Fly ash is needed compared to agricultural lime, Fly ash contains more nutrients and has a larger surface area, making it ideal for rehabilitation purposes.

References:

[1] Potgieter-Vermaak, S.S., *et al.* (2006), *Minerals Engineering* 19 (2006): 454–462.

