

ABSTRACT

Coal supplies over 90% of South Africa's electrical energy power requirements. The coal mainly comes from the Witbank and Highveld coalfields, which together account for about 75% of South Africa's production. However, the Witbank and Highveld coalfields will be depleted in the next 15 to 25 years. This poses an energy risk for the country unless replacements coalfields are fully developed in time. Of the country's total of 19 known coalfields, the Waterberg coalfield despite its small geographical footprint is a suitable replacement for the Witbank and Highveld coalfields because it contains the largest known coal reserves.

However, exploitation of the Waterberg coalfield faces challenges of mining deep-seated multiple coal seams that are intercalated with mudstone and shale in the top 50-60 m and occurring over a coal thickness in excess of 110m. For example, east of the Daarby fault, coal seams are at a depth in excess of 250m. This challenge is further amplified by the fact that South Africa currently does not have experience in mining deep, multi-seam coal formations.

While the shallow reserves in the western portion of the Waterberg are currently mined by an open-pit, the deep eastern part will need to be exploited by multi-seam underground mining on a scale never before attempted in South Africa. This dissertation has reviewed international practice and concludes that United States experience is the most applicable to the underground mining of the Waterberg reserves. It is probable that total extraction using longwall will be the correct choice of mining method.

Finally, this dissertation has illustrated the essential need for fundamental research if the industry is to successfully transition to the Waterberg. While a horizon of 20-25 years appears far-off to those concerned with day to day production issues, the mining, infrastructure, environmental and social issues are of such magnitude that co-ordinated research will need to be initiated well ahead of mining activities and preferably in the next few years.