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Feasibility of thin seam coal mining at Dorstfontein Coal Mine

by

Petrus C. Meyer

June 2003

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treatise submitted in fulfillment of a part of the requirements for the

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ABSTRACT

Dorstfontein Coal Mine is situated in the northern limb of the Highveld Coalfield. The mine is currently owned by Total Coal South Africa Ltd (Pty). Mining to date has taken place where the seam heights are in the excess of 1.5 m with an average height of 1.9m. Some areas have been identified where the seam heights ranges between 1.2 and 1.4m with an average height of 1.32m. The in situ tonnage of the thin seam areas is 7.06mil. tons.

The thin seam coal quality is very good and product yield at an ash content of 13.5% is 95.7% and at a cut density of 1.6 the yield is 89.2% (Air dry basis).

The largest thin seam coal producer in the world is the U.S.A. followed by the former U.S.S.R. Other countries that produced coal from thin seams are mainly from Europe.

In the Republic of South Africa most of the thin seam coal mining was concentrated in the KwaZulu-Natal province. Most of the larger mines are now defunct but some small mines are still operating.

The risks involved in thin seam coal mining differ from that of thicker seam mining. There are occupational diseases associated specifically with thin seam coal mining. The most pronounced geological risks are changes in seam heights, changes in coal quality, in-seam partings and unpredicted dolerite intrusions.

At Dorstfontein Mine a newly developed German Wirth Paurat thin seam continuous miner is been tested. Some Stamler BH10 thin seam battery haulers were introduced to the section to haul the coal from the face to the tip.

There are some advantages in mining the thin seam coal. The increase in yields, savings in belt replacement, less handling of stone and the extension of the life of mine are some of the major benefits.

For the financial evaluation it was assumed that 30% of the run of mine tons will come from the thin seam resource. All Capex and Opex costs were allocated pro rata at a 30% basis. The production rate was based on current experience and the assumption that this section will reach its completion at the same time as the mine closes. The run of mine tons (R.O.M.) are 3.53mil. tons which is 50% (70% extraction, 10% mining loss, 10% geological loss) of the in situ resource of 7.06mil. tons. For 10 years at an average daily production of 1400 tons per day, a total R.O.M. of 3,514mil. tons could be achieved, which relates to 99.55% extraction of the in situ R.O.M. tons.

Capital expenditure is minimal and many sunk costs are excluded from the model. The main Capex item is the Wirth Paurat. The N.P.V. for the project is R 27,206 mil. at a discount rate of 15% and the corresponding I.R.R. is 305.2%. The distorted I.R.R. is related to the small but realistic capital input.

Sensitivity analyses were performed for Operating Costs, Selling Prices (Export and Domestic), Yield and Production. The project is the most sensitive for selling prices, and operating costs.

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