

## **ABSTRACT**

The Number 5 Seam of the Witbank coal fields is the upper most coal seam of the sequence hosting different qualities of coal at different locations. With the seam being the upper most, it has areas where it is affected by erosion and other areas where the limit of weathering extends into the coal seam; this needs to be taken into consideration when modelling this seam.

The Minex software is widely used for the modelling and estimation of coal resources in the coal mining industry. The Software uses General purpose (Growth Algorithm), Ordinary Kriging and the Inverse distance as geospatial estimation methods. These methods produce geostatistical estimates of unknown values at unsampled locations within the study area using the laboratory data and geological information received from borehole logs; this is achieved through the process of gridding using the modelers estimation method of choice.

An in-depth understanding of what each method entails is imperative for the user to produce representative estimations in locations where data does not exist. The knowledge of the geological factors affecting a coal seam plays a major role in selecting the optimal method to be used for the estimation.

This research project explores the different estimation methods in Minex through gridding the Number 5 Seam at Klipspruit South. Each method then used to do point estimations in locations where values are known for the

comparison as to which estimation method yields results closest to the known values. Based on the data used and the analysis of the results on the different estimation methodologies, the inverse distance weighting method produces estimates closest to the known values.

Using the estimates derived from the inverse distance weighting method, two mining extraction methods (composite and selective mining) of the coal seam are assessed. Concluding that mining of the coal seam as composite yields best financial results with the current configuration of the Phola coal handling and processing plant.