

ABSTRACT

The exploratory mining and drilling data of Khetri Copper Deposit has been subjected vigorously, for the first time, to various statistical, geostatistical and mathematical morphologic techniques of data analyses. The sample data is collected mainly from the definition drill holes and rarely from underground x-cuts exposing the full width of the ore body.

In the first chapter, a general introduction of the deposit detailing the actual sample data considered lenswise is given in the form of figures. Altogether 12 ore lenses are considered for the investigation representing all the three sections viz: north, centre and south. However, majority of the data is taken from 8 ore lenses of centre section which extends over a strike length of 1 km.

In the second chapter, the regional geology, local geology, structures including joints pattern, folds and faults are described in a lucid manner. Exploratory methods and mining methods being followed, formulation of assay zones are also described. The chapter also includes the views expressed by many geologists on the origin of copper mineralisation, as well as the author's observations and the conclusions based on them.

Chapter 3 to chapter 5 are devoted exclusively to explain the methodologies in vogue for estimation of ore grade and ore width and ore geometry. These methodologies are reviewed critically and the advantages of one method over the other in the context of necessities of mining industry is briefed. The available methods for the estimation of grade and width are comprehensively reviewed. An element of ambiguity is inherent in the understanding of the very process of mineralisation and hence any or all these methods can not accurately predict grade and width, since abnormality in geologic events is rather a rule than exception.

The methods now employed on the data of Khetri Copper Deposit can give guide lines for exploration and exploitation. However, the quality of ROM can not be predicted precisely irrespective of the usage of these methods and hence some inbuilt tolerances are a compulsive necessity at the ore processing stage.

Together with this study, attempts have been made to unravel the patterns of mineralisation. Some of the parameters related to sufficiency of exploration and definition of ore bodies is also studied. The ever increasing role of computers in the mining industry is thus detailed.

While the local geology and structures have been described and the ore assemblages have been detailed, no attempt has been made to study the genetic history of copper mineralisation of the deposit. The present study is restricted to a few number of ore lenses occurring in one part of the Khetri Copper Belt and it is prudent to suggest any genetic model on the basis of a non regional study. The patterns of mineralisation and their relation to the structural and geologic environment of the deposit is attempted.