ABSTRACT

The first part of the present work embodies the results of vertical electrical sounding using Schlumberger configuration carried out around Jaldha-Digha coastal region of West Bengal, India. The field data have been interpreted by the semi-empirical graphical-analytic method and the lithological logs prepared. The interpretation of resistivity data has been facilitated by the lithological logs of bore holes drilled at selected points and the sounding data supplemented by bore hole data. The probable lateral and vertical extent of the aquifers have been delineated and a saline water bearing pocket of sand detected. It has been confirmed, however, that there is no saline water invasion, in general, in the Jaldha-Digha coast line.

In the second part of the thesis a convenient form of electromagnetic induction method of sounding, referred to as 'central frequency sounding' by the author, has been developed. After introducing the method and indicating the possible fields of application, an attempt has been made by the author to present a set of theoretical two-layer standard curves suitable

for interpretation of field data involving measurement of the vertical magnetic component of the field induced at the center of a loop, placed on a layered earth. The approximate but reasonably accurate solutions for a two-layer earth of any arbitrary resistivity contrast have been considered for the purpose and expressed in a form suitable for computation. The computed results have been plotted and presented in sets of curves useful for interpretation. Some experimental curves for large contrast have been obtained from model studies and utilized to indicate the possible technique of interpretation. The instrumentation and field procedure for conducting central frequency sounding have been suggested and the limits of applicability and usefulness of this new technique of exploration have been outlined.