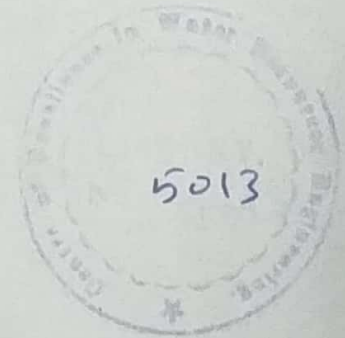


**APPLICATION OF GLOVER-DUMM EQUATION
FOR A DOUBLE LAYER AQUIFER**



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**FOR THE DEGREE OF
MASTER OF PHILOSOPHY**

in

WATER RESOURCES MANAGEMENT

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LAHORE, 54890 PAKISTAN**

MAY, 1994

ABSTRACT

The present research deals with application of Glover-Dumm transient drain spacing equation to an aquifer having shallow depth and to an aquifer having two distinct soil layers having different hydraulic conductivities, with their interface at or some distance below the drainage base. Existing Glover-Dumm equation predicts transient water table drawdown for a uniform aquifer. In the Glover-Dumm equation water table fall is governed by an exponential function, neglecting the second and higher order terms of the exponential function. In the present study the two more terms of the exponential function have been added. The involvement of more than one term in the exponential function made it difficult to solve the equation with a simple calculator but it permitted a very good improvement in the Glover-Dumm formula for its application to a shallow aquifer.

To apply Glover-Dumm equation to a double layer aquifer, the Houghoudt's technique of using a smaller depth i.e. the equivalent depth, instead of actual depth, was applied to both the layers separately. In this manner an equivalent transmissivity of the double layer aquifer was determined which also takes into account the effect of transient water table boundary. The transmissivity of the uniform aquifer was then replaced by the equivalent transmissivity of a double layer aquifer and the equation was derived on the same lines but including the second and third order terms of the exponential function.

The results for a shallow aquifer were verified against field data of an experimental field (Singh et al 1992). The comparison of results show a significant improvement in the prediction of water table drop of a shallow aquifer. The results for double layer aquifer were compared with the field data of Fourth Drainage Project Faisalabad. The comparison showed that presently proposed approach is more appropriate to simplify such a complex transient groundwater flow problem consisting of a double layer soil system.