NUMERICAL SIMULATION OF A PARTIALLY PENETRATING WELL IN CONFINED AQUIFER

THESIS BY

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ABSTRACT

The maximum advantage is gained from an in situ pumping test when geological knowledge of aquifer and analysis of aquifer test data complement each other. The available analytical techniques to study ground water behaviour do not account for various factors which have a combined effect on the capability of an aquifer to store and transmit water. Numerical methods are flexible enough to simulate as many conditions as may be required. There are many numerical models for pumping test analysis but they are based on the assumption that the well is fully penetrating. However, in practice some time wells are partially penetrating.

This study carried out aimed at to develop a numerical model for unsteady radial flow towards a partially penetrating well. The aquifer was assumed to be isotropic, homogenous and confined at the top and bottom. A two dimentional finite difference model was developed for this purpose. The alternating direction implicit technique (ADI) was used for the solution of unsteady radial flow equation.

The digital model has been verified by comparing it with Visocky (1970) analytical method of solution for partially penetrating well and Theis (1935) method of solution for fully penetrating well. The distance beyond which partial penetration of the well has no effect, has been investigated. Further procedure to estimate aquife parameters by use of numerical model was studied along with an example.