

ABSTRACT

PARAMETERIZATION OF A FRACTURED HARDROCK AQUIFER IN WESTERN FOOTHILLS OF THE SIERRA NEVADA, CALIFORNIA

Analytical studies of three aquifer-testing methods (step-drawdown, constant-discharge, and constant-drawdown) along with regional fractures and lineament analyses were conducted to characterize the fractured granite aquifers in the foothill areas of western Sierra Nevada, Madera County of California. The hydraulic properties (Transmissivity and Storativity) of the aquifers were obtained through in-situ pumping tests for up to 34 days, involving two test wells and 17 observation wells at a 540-acre study area. Two hypotheses (radial or linear flow patterns) were assumed and tested using the field experimental data.

Variations in the results suggested that both the flow patterns and the model parameters were scale-dependent, and the "scale effect" is related to heterogeneity within the aquifer, not to the testing methods. The long term pumping tests revealed that the influence radius of the pumping wells can reach up to 4,000 ft, which is mainly controlled by linear fractures that intersect the pumping wells.

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August 2007