Description of aquifer test for town of Minden # 7 well.

A single-well step-drawdown was conducted by Sargent Irrigation Company of Reno, Nevada. The well is located at 38º 57' 48.7"N, 119º 43' 26.8"W, and is completed in the basin-fill aquifer of Carson Valley, Nevada. Copies of time-drawdown and pump data were obtained from files of Resource Concepts, Inc.(RCI), the engineering firm in charge of the water-supply system for the town of Minden (Bruce Scott, RCI, written commun. 2005). Results of the aquifer test will be used in the development of a numerical ground-water flow model in Carson Valley, project # 9705-BPS01. Specifically, the estimated transmissivity will be used to develop a relation between transmissivity and specific yield. The relation will then be used with data from driller's logs to develop a preliminary distribution of transmissivity for the valley.

The pump rate was varied from 518, 668, 823, 948, 1059, and 1,149 GPM for about 1-hour periods during the step-drawndown test on 6/11/85. After 5 PM, rates were decreased by various steps through 10:45 AM on 6/13/95. These data were not used for analysis. The methods of water-level and flow-rate measurements, location of discharge of pumped water, and pre-test water-level trends are not known. The well was reported completed on 6/13/97, and development of the well likely took place a relatively short time prior to the test periods.

Time-drawdown data were analyzed using an Excel spreadsheet program (Halford and Kuniansky, 2002). The step-drawdown data were analyzed by plotting the drawdown (s) divided by the discharge at each step (Q_{NSTEP}):

s/Q_{NSTEP} , against the summation of the log of elapsed time (t_i) since the beginning of each step multiplied by the change in discharge at the beginning of the step (Q_i), divided by the discharge of that step (Q_{NSTEP}):

$^{NSTEP}\Sigma_{i=1} (Log(\Delta t_i)\Delta Q_i)/Q_{NSTEP}$, from Lee (1982).

Transmissivity (T) is estimated with a straight line fitted to the plots for each step and calculated by the equation:

$T = (2.3/4\pi)$ (1/m'), where m' is the slope of the fitted line (Halford and Kuniansky, 2002, p. 24).
Results of the analysis provide estimates of the hydraulic conductivity of the annular space between the well casing and face of the well bore ($K_{annular}$), and Skin, a term that combines the effects differences in hydraulic conductivity between the formation and the annulus, and the effective diameter of well bore damage (Halford and Kuniansky, 2002, p. 24).

Results indicate a hydraulic conductivity and transmissivity of 5 ft/day and 2,000 ft^2/day, respectively.

References Cited

Halford K.J., and Kuniansky, E.L. 2002, Documentation of spreadsheets for the analysis of aquifer pumping and slug test data: U.S. Geological Survey Open-File Report 02-197, 54 p.

Lee, John, 1982, Well testing: Society of Petroleum Engineers of AIME: New York, 159 p.