

Witness attacks state computer model

BY RUTH HEIDE

Water trial is into fifth week

ALAMOSA — The third witness called by protesters to proposed state water rules on Tuesday testified against one of the state's prime exhibits, a groundwater computer model.

The proposed state rules govern new withdrawals from the Valley's confined aquifer. Charles Norris was qualified as an expert in geology, hydrology, hydro-geology, geochemistry and groundwater modeling including the use of MODFLOW. He told District Judge O. John Kuenhold he did not believe the state's computer model Rio Grande Decision Support System was reliable, particularly for predictive purposes. Norris was on the stand all day Tuesday.

Judge Kuenhold also visited with attorneys from both sides about the status of the trial which is scheduled to go six weeks and is well into its fifth week. Since the closing arguments will not be made before the trial is scheduled to close, Kuenhold on Tuesday scheduled the closing arguments for Friday afternoon, March 24.

Glenn Porzak, one of the attorneys representing protesters to the state's rules, told Judge Kuenhold protesters should make it through all their witnesses this week except for Dr. Jeris Danielson, former Colorado Division of Water Resources state engineer. Porzak expected testimony from Danielson to run into Monday of next week.

Porzak said the protesters still have another witness besides Danielson, and that witness will probably take two full days.

Norris says state
model needs work

Norris testified he has built or developed "dozens upon dozens" of groundwater models. He said he familiarized himself with the groundwater model in this case and made his own model runs with it to analyze its performance.

Norris said the state's groundwater model does not converge (reach a solution), and a model that does not converge is unacceptable for predictive purposes. "That's what you look for first is a system that is converging on a solution," he said.

Norris shared with the judge examples of print outs from the computer model which contained the warning "failed to converge."

Norris said he took one of those model runs which failed to converge after 30 iterations or repetitions and ran it to 150 iterations, but it still failed to converge. He also relaxed the criterion for the convergence, and it still did not converge, he said. Norris also went through some of the "time steps" in a 100-year model run which included 4,800 total time steps. He said of the 4,800 time steps, 100 came up with the "failure to converge" warning. He pointed out specific time steps in the 50th year of the model run and showed where the time step did not reach convergence, or a solution, but the modeler continued, and the error became more magnified. "This model run should have been allowed to stop," Norris said.

He spoke against a unique feature of the Rio Grande Decision Support System called the "mass balance override" which he said the modelers used as a substitute for reaching convergence. He said the "mass balance override" was not even known, much less accepted, in the groundwater modeling community.

Norris compared this feature to a banker who decides he is not getting a good enough balance between individual accounts and instead of resolving the problem looks at the total amount of money coming into the bank that day and the total amount of money leaving the bank that day and is content the books have balanced and it did not make a difference that one customer's account was \$1,000 over or

another's was \$1,000 under.

Norris said the state's model was not stable or robust and could not be used to make predictions. He said the model as it is will produce implausible or impossible results in some cases because in tests he conducted on the model, that is what happened. He pointed to a hypothetical new withdrawal of 15 gallons per minute, for example, which when run through the model showed an impact 55 miles away which would be impossible.

He said the state built on a weak foundation by accepting the Rio Grande Decision Support System before all the kinks were worked out. "There are problems with this model that have to be addressed before you can continue," he said.