Davey testifies about declining aquifer

BY RUTH HEIDE

ALAMOSA — From swimming in hot springs during his youth to seeing them dry up in recent years, the third expert witness in an ongoing water trial in Alamosa on Thursday offered personal as well as professional observations of the San Luis Valley's declining water resources.

Registered Professional Engineer Allen Davey is still on the witness stand this morning as the trial concludes its first of what may be six weeks.

District Judge O. John Kuenhold is presiding over the trial, which argues the merits of proposed state water rules governing new withdrawals in the confined aquifer of the San Luis Valley.

Davey described his youth growing up on a 5,000-acre cattle ranch south of Saguache where numerous warm-water wells naturally and abundantly flowed for livestock and crop irrigation.

"When I was young that artesian flow was quite extensive," Davey said. "There was sufficient water to do a good job of irrigating our hay crop." Now, he said, nearly all the artesian flow during the irrigation season has ceased to flow.

In his professional career as a long-time civil engineer with Davis Engineering and consulting engineer with the Rio Grande Water Conservation District, Davey has studied every manner of water resource in the Valley from the confined aquifer to flowing springs.

Davey testified from his research and review of data the Valley's water resources have experienced an overall and long-term decline indicating a point of over-appropriation and non-sustainability.

Aquifer not keeping up
with Mother Nature

Davey said although the exact number is unknown, approximately 7,000-8,000 wells exist in the confined aquifer of the San Luis Valley.

The Rio Grande Water Conservation District has 39 monitoring wells in the confined aquifer, and the U.S. Geological Survey (USGS) has 100-200 or more monitoring wells in the confined aquifer throughout the San Luis Valley. Well data is available from 1970 to the present although for some of the wells no information is available between 1970 and the early 1980's.

The water district and USGS have cooperated on mass well measurement to study the confined aquifer which is important to water users so they can understand if they have an adequate water supply, Davey said.

Davey has been involved in confined aquifer research since the mid-1970's.

He has studied the data collected from the water district's monitoring wells in addition to data collected by USGS.

Davey referred to a sampling of those confined aquifer wells which he said were representative of all the wells and illustrated the trends and conditions of the aquifer. The sampling included wells of anywhere from 118 feet to 801 feet in depth scattered from Mosca to Monte Vista and Center to La Jara.

One example was a 135-foot-deep well a few miles north of Mosca where the water was about 4 feet below the surface when the well was first measured in 1970 and now is 15 feet below the surface. Another Mosca-area well, 118 feet deep, has shown a 3.5-foot decline during the 10 years it has been measured.

"The trend in the pressure head in the confined aquifer has clearly declined for many many years in the San Luis Valley," Davey concluded. He said although certain areas of the Valley seem to be more stable than others, "overall there's been a long-term decline in the head of the confined aquifer."

He added "I believe more water is being withdrawn from the confined aquifer system than is being recharged." He said the confined aquifer is "clearly over-appropriated and over-used with withdrawals exceeding the supplies that Mother Nature provides." He said he did not believe the confined aquifer system was sustainable now, and "if we continue we will upset our entire system because this is the foundation."

To have a sustainable aquifer system, Davey said pressure heads in the confined aquifer have to be stable in the long term in spite of climatic fluctuations.
Davey said he only knew of one well in the confined aquifer which reflected an improvement in water level or pressure head. It was a 205-foot-deep well in the southwest corner of the Baca now part of the Great Sand Dunes. Davey attributed its improved measurements to reduced pumping in the confined aquifer near that well and the intermixing of aquifers caused by poorly constructed stock wells.

One million down and counting

Davey has also been involved in an ongoing unconfined aquifer storage study involving about 27 wells in an intensely irrigated area in the west central part of the Valley. The study dates to 1976, and Davey has been involved since the 1980's.
The unconfined aquifer in that region acts as an underground reservoir, the largest reservoir in the Rio Grande Basin, Davey explained.
The wells are measured monthly, and the pattern which emerged from this area provided a good estimate of the changes in storage in that aquifer system, Davey said. The pattern reflected both pumping and recharge to the unconfined aquifer storage area, he explained.
Davey described increases in the storage area during wetter years such as the mid-late-1980's when precipitation was above average and run off from the mountains was good, and decreases in dryer years.
However, in the mid-late-1990's Davey began observing a decline even in years with nearly average moisture. After reviewing information, "I began spreading the opinion that we were pumping more water than was coming into the aquifer even in average years." He said he and many water users became concerned "that they were essentially de-watering this reservoir to very alarming levels."
Davey said the unconfined aquifer storage area has experienced more than one million acre feet declines in storage since the beginning of the study period three decades ago.
Davey concluded the unconfined aquifer is clearly over-appropriated with more water withdrawn from the aquifer than is being recharged.
Davey said the aquifers can recover in two ways: 1) increased precipitation; or 2) decreased withdrawals from the aquifer.
"I don't think we can depend on significant increases in precipitation to solve our problem," he said. This year, for example, is so far rivaling the historic drought of 2002. Davey said even if the Valley returns to average conditions, water users would still have to reduce withdrawals because the long-term monitoring showed both aquifers as declining.

Falling springs

Davey also gave examples of decreased flows in springs in the Valley. He referred to McIntire Springs, southeast of Sanford near the Conejos River, which has experienced a decline in discharge over the long term. In 1936 the spring ran at 19 cubic feet per second (cfs.) Recent measurements in the last few years clocked the spring at 3 cfs. "I believe it is a significant declining trend," Davey said.
He also pointed to Russell Springs near his boyhood home south of Saguache. The springs used to run at 3-4 cfs and provide a good supply of water during irrigation season. Now the spring supplies stock wells in the winter and is dry during the summer irrigation season.
Spring Creek south of Monte Vista is another example. It had a substantial flow in the 1920's and 1930's but now has very little.
Davey said the trend with the springs is the same as with the aquifers, a decline.