CITY OF PRESCOTT
ARIZONA
Everybody's Hometown

Jack D. Wilson, Mayor

201 S. Cortez Street
Prescott AZ 86303
928-777-1270

June 8, 2009

John Zambrano
Vice-President, Citizens Water Advocacy Group (CWAG)
2910 W. Crestview Dr.
Prescott, AZ 86305

February 1994 Bureau of Reclamation
Big Chino Groundwater Study Technical Report

John:

I wanted to follow-up on our discussion at the Saturday, April 18 Earth Day celebration at Granite Creek Park. You referenced the 1994 U. S. Bureau of Reclamation (BOR) report. What I heard you say was the 1994 BOR report was definitive proof that pumping by the City of Prescott would cause harm to the Verde River. When I tried to offer my viewpoint on that report, I felt that you were summarily dismissing my comments as someone not qualified to discuss the report.

I do not feel that I need to be a hydrologist or geologist to comment on the 1994 BOR report. The most important trait I developed during my education was the ability to think for myself.

As I mentioned at Earth Day and at my CWAG March 14 presentation, at one point in my career with the Information Technology Shared Services department of Amoco Corporation (now BP) in Chicago, I was in charge of the mathematical modeling group. That group developed and maintained all the mathematical models for Amoco Corporation worldwide. Many of those models *were significantly larger and more complex* than the 1994 BOR groundwater model (53 rows, 87 columns, 7 layers and cell interval ½ mile). My experience with model development, from initial conceptualization through development and calibration runs into actual use provides me with a background that is fairly unique for a municipal official.

I have attached my analysis of the 1994 BOR. The city worked with the BOR in its preparation and provided previous studies the city had done as input to their study. Hopefully, we can start to agree on what is "Known" and what is "Unknown" about water in the Upper Verde Basin.

Sincerely yours,

Jack D. Wilson

cc: William Meyer, 13709 Forked Trail, Prescott, AZ 86305
Elected Officials
James Holt

I have read the report and also discussed it with professionals that were around when it was being prepared. In my mind, the circumstances surrounding its development and hasty completion are at least as important as the report itself. Rather than accepting second-hand information, I would encourage anyone interested in water issues in the Big Chino to read the actual report itself. I know that my understanding of the report and what it concluded and did not conclude was enhanced by my reading of the entire report.

I have excerpted portions of the 1994 BOR report to support my views on that report. Since both William Meyer and you have consistently claimed that this report, especially the supporting groundwater model, is proof positive that City of Prescott's proposed pumping from the Big Chino Water Ranch will harm the Verde River, let me start there.

The groundwater model is described in Appendix C Groundwater Model Development December 1993. On page 23, "IX Simulation Model Calibration/Verification" it is noted:

> "The model was run and calibrated to steady state conditions. Transient conditions were not run because the amount of data required to stress the system (either recharge events or pumping records) was insufficient, both spatially and temporally, for input and calibration purposes."

And:

> "The results of the calibration of the steady state conditions provided overall water budget data only."

On page 27 the following qualification precedes the two conclusions (highlighting added by me). These disclaimers would cause most reasonable people to raise serious concerns about the results of this groundwater model – they had that effect on me when I read them.

"The modeling efforts presented in this report are limited to steady state conditions. Transient conditions were not attempted for the following reasons: 1) the lack of detailed well data, 2) the generalized nature of the stratigraphic data, 3) the rather generalized nature of the estimates for the values of the hydrological parameters, and 4) the lack of specific pumping records and water levels during the period of agricultural development."

In my layman's reading of these qualifications I believe they state:

1. No simulation of groundwater pumping was attempted.
2. Simulations could not be run given lack of specific data needed to do a simulation and the rather generalized nature of existing information.

Given the lack of data and the rather generalized nature of the existing data used, any conclusion related to the impact or effects from ground water pumping would be conjecture at best.

Additionally, I have heard Bill Meyer discuss two (2) groundwater models in this report. If you read pages 23 and 24 in Appendix C, you find there is only one model. It was first calibrated using all seven layers, and then recalibrated using just its top three layers.

On page 27 and 28 of that appendix, two conclusions are listed:

"Two basic conclusions are drawn from the results of the steady state modeling efforts. The first conclusion is that the upper and lower parts of Big Chino Valley are not hydrologically isolated, but rather are in direct hydrologic connection. The zone of low conductivity in the central part of the valley, the so-called 'clay plug', is the result of deposition in a playa environment when the Big

Chino Valley was a closed basin. The clay zone in Big Chino Valley is typical of closed basin playa deposits in that it has zones of highly transmissive materials (sands and gravels) beneath it and adjacent to the mountain front. This is typical of alluvial fan deposition during the development of a playa system. In addition, the clay zone does not extend completely across the valley and there is no evidence that it extends up into, or closes off, Williamson Valley.

The second conclusion is that the flows within the Verde River can be accounted for solely from the inflows into Big Chino Valley (Walnut and Partridge Creeks, and Williamson Valley Wash) and from area precipitation. No surface or subsurface boundary flows are required from Big Chino Wash at the northern end of the valley, nor are any subsurface boundary flows required from Little Chino Valley or Granite Creek."

These two conclusions, excerpted above, are the only conclusions from the groundwater model. From those conclusion I fail to see why William Meyer or you feel this model establishes any precedent whatsoever that the City of Prescott's proposed pumping from the Big Chino Water Ranch will cause harm to the Verde River. Since you claim this is your scientific proof, I have examined the stated proof and I have found it lacking.

From Section I Perspective of that report:

"1.1 Purpose and Goals

This report is the result of an investigation of the Big Chino Valley, Yavapai County, Arizona. The purpose of the investigation was to examine the relationship between the groundwater of the Big Chino Valley and the surface water of the Upper Verde River. The understanding of this relationship will provide the Secretary of Interior with information to support a decision as to the source of water for the Fort McDowell Indian Community Water Rights Settlement.

1.2 Authority
The Fort McDowell Indian Community Water Rights Settlement Act of 1990, (Title IV, Public Law 101-628, SEC. 406.), authorized the Secretary of Interior to acquire land and water rights and to construct diversion, collection, and conveyance facilities to deliver water from the Big Chino Valley to a point near Sullivan Lake in Yavapai County, Arizona. At least 7,000 acre-feet of water would be delivered annually by these facilities for use by the City of Prescott in exchange for 7,000 acre-feet of Prescott's Central Arizona Project water which would be made available to the Fort McDowell Community."

And:

"The objective in evaluating the effect of pumping large amounts of groundwater from the valley immediately adjacent to the Verde River is to insure protection of a threatened species of fish in the river."

During my presentation at the March 14 CWAG meeting, I discussed the property the City of Prescott owns in Paulden just west of US Highway 89. It is approximately 120 acres, including the Dugan well and was purchased by the City in 1998 for $345,000. Black & Veatch was commissioned to design and engineer a pipeline and pump station from the Dugan property to the Chino Valley Water Production facility at the end of 2001 for $540,000. That design and engineering work was completed in 2003. However, the City concluded in 2003 that this option was potentially problematic due to its proximity to the Upper Verde Springs soon after completion of the design work. The City of Prescott could have sold that property, but we choose not to thereby preventing someone else from pumping large quantities of water from the well.

Our groundwater flow model shows that projected pumping of 17,768 acre-feet/year (more than twice what ADWR currently says we are allowed, and more than three times more than our net pumping of 6,000 af/yr (after retiring the irrigation uses) at the BCWR shows that the water table will only lower by about 180 feet after 100 years at our production well. The decline is significantly less at the model boundary (about 10 feet).

Our groundwater flow model went through a rigorous review by the Arizona Department of Water Resources (ADWR) which is a matter of public record.

And:

"**1.3 Previous Investigations**
Several important investigations have been conducted earlier and these are noted in the section on References. Most important to this study is the work completed in 1990 by Water Resources Associates, Inc. (WRA). The City of Prescott had retained WRA as a consultant to examine the feasibility of developing a well field in Big Chino Valley. Therefore, much of the technical work completed by WRA was of value to Reclamation. Their report, "Hydrogeology Investigation, Big Chino Valley, Yavapai County, Arizona," provided background and data that considerably shortened the time and effort by Reclamation."

And:

"Boundaries for the groundwater modeling area are slightly different due to the limited availability of data for a model."

And:

"**3. FINDINGS AND CONCLUSIONS**

3.1 Findings
The results of this investigation suggest that groundwater pumping in the upper Big Chino Valley would have an adverse effect on the flow and perhaps the biota of the Verde River. However, the information gathered to date is incomplete as to what effect the diversion of those waters would have on the continued existence of the spikedace (Meda fulgida).

The geologic and geophysical studies by Reclamation confirmed the existence of a large zone of semi-impervious material (clay) in the central part of the valley. This zone of material (in conjunction with some evidence of nearby faulting) has the potential to isolate the upper Big Chino Valley groundwater from the groundwater springs which maintain the constant flow of water in the upper Verde River. However, to effectively isolate the groundwater in the upper valley, the zone would have to be complete and continuous across the central portion of the valley. The geologic and geophysical investigations have not confirmed the extent of this zone especially on the west side of the valley."

Please note that the first paragraph of the findings is not one of the two conclusions from the Groundwater Model.