

August 9, 2007

Laura Dobbins, Executive Editor, The Daily Independent
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Dear Laura:

Important water level and quality issues that affect water consumers near proposed District wells and across the valley have not been addressed or adequately covered in the **INDIAN WELLS VALLEY WATER DISTRICT INITIAL STUDY AND DRAFT MITIGATED NEGATIVE DECLARATION FOR THE 2007/2008 WATER SUPPLY IMPROVEMENT PROJECT, MAY 2007.**

My perspective as given below is based on expert advice about four topics: (1) affects of lowered groundwater locally and across the aquifer, (2) concentrating arsenic in groundwater, (3) total dissolved solids (TDS) and (4) subsidence. I have already sent letters to the IWV Water District on these subjects, posing questions and asking for response to me and others. Most of the information below is extracted from those letters.

Inadequate Hydrology Data. The only hydrology basis given in the DRAFT is 90-day drawdown simulation and an out-of-context misuse of selected information from the Bureau of Reclamation. The map of wells in FIGURE 2 of 2 and the Location table in the Hydrogeologic section both contain significant errors.

Expert Advice. Because of this limited and erroneous information, I sought expert advice and received it from three experts:

- A water-quality expert with over 30 years experience in aquatic toxicology, limnology, impact assessment and mitigation
- A geohydrologist
- A civil engineer with hydrology experience

Affects Of Lowered Groundwater Locally And Across The Aquifer

This issue at first sounds like it only applies to neighbors of the District's production wells, but that is just the beginning of an issue that spreads to all water consumers in our valley.

Proximity of Wells. All the experts resoundingly agreed that placement of proposed high-capacity wells 35 and 36, both within ½-mile of private wells and each other is reason for concern. Anywhere on that property is too close to neighboring wells (300 ft, 1/8 – 1/2 mile away). More District wells, to be refitted for high capacity, are similarly close to private wells and each other. The District's own consulting engineer, Mr. Charles Krieger, can inform you of reasons for concern (of course, he is being paid by the District).

Permitting of those larger production wells should include conditions to mitigate impacts to neighboring wells. That

might include piping undiminished-quality water supply to neighbors or drilling the neighboring residential wells to deepen them, at no increased cost to neighbors.

Barbara Houghton's Study. She is clear that drawdown tests she did for the District were meant to reproduce what was done in 1996 "with an additional time interval of 90 days to simulate longer term effects." 90 days is not sufficient to consider cumulative hydrogeologic effects. Still, she showed serious interference among the District's own wells. She states 6 disclaimers, acknowledging her study does not cover important hydrology issues.

Misleading Reference. In section VII. HYDROLOGY AND WATER QUALITY Issue b, out-of-context and partial information from Indian Wells Valley Groundwater Project (U.S. Bureau of Reclamation, 1993) is cited. This obscures the "Potentially Significant Impact" on our aquifer that is in critical overdraft. The DRAFT (p 38) claims "with appropriate management, the existing ground water resources will provide acceptable quality water for approximately 160 years without additional imported supplies." That statement omits important information on the same page of the Bureau's report that makes the quote invalid. The *appropriate management* required by the Bureau of Rec. includes both water conservation throughout the valley and mixing of poor-with good-quality water (starting in 1993). The report's conservative estimate is only 35 years if aquifer management remained basically unchanged, which better represents what has happened.

Unfounded Conclusions. It is illogical to claim "No Impact" on the many private-well owners near your proposed high-capacity wells. Local and broader effects on the aquifer are so potentially serious they also must be investigated, and described with mitigations or the plan revised, BEFORE final conclusions can be approved.

Concentrating Arsenic In Groundwater

Lack of Arsenic Information. Simply mentioning "and/or treatment facilities (including arsenic treatment)" is inadequate treatment of this potentially serious subject in the DRAFT. It is not just a matter of treating any arsenic that may already exist in the water. There is potential for *creating* an arsenic concentration problem beyond what exists naturally.

How Arsenic May Be Concentrated. Anoxic conditions tend to immobilize the arsenic (when water blocks contact with oxygen) in moist soil. Once water has been drawn away from the soil by the massive drawdowns associated with high-capacity wells, air can enter the interstitial spaces. Oxygen from the air combines with the arsenic thus changing its chemical form (valence). In its new form, it can more easily dissolve in water. This form of arsenic can later migrate through the soil and re-enter the water supply, causing greater concentrations than originally existed. This process is facilitated when pumps

are turned off to “rest” then restarted causing another drawdown.

Also see combined effects with calcium carbonate in my section about total dissolved solids (TDS).

More Study Needed. At the July meeting of the Cooperative Groundwater Management Group, a good presentation about drawdown was given (and a correction to previous data). But this did not resolve worrisome questions about cumulative effects of repeated drawdowns. It also became apparent that concentrating arsenic by the way deep-wells are pumped was an issue not yet considered, thus it had not been investigated during the INITIAL STUDY and for the DRAFT.

The following document provides some basic guidance that is transferable to our environment, “Arsenic in Ground Water: A Review of Current Knowledge and Relation to the CALFED Solution Area with Recommendations for Needed Research,” Welch, Alan H., Ronald S. Oremland, James A. Davis, Sharon A. Watkins. 2006. San Francisco Estuary and Watershed Science. Vol. 4, Issue 2 [September 2006]. Article 4. <http://repositories.cdlib.org/jmie/sfews/vol4/iss2/art2>

Unfounded Conclusions. It is illogical to claim “No Impact” on humans near the planned wells and across the valley (p56 b and c), when causing arsenic concentration has not yet been mentioned nor mitigations offered in the DRAFT. It is incorrect to claim “Less Than Significant Impact” on HYDROLOGY AND WATER QUALITY (p38 b), when this issue has not yet been mentioned nor mitigations offered. With this new consideration, it is inappropriate (p 40) to claim “No Impact” because the Project supposedly has no “features that would have the potential to substantially degrade water quality.”

Increasing Total Dissolved Solids (TDS)

Lack of Information. A search of the initial DRAFT document finds no mention of total dissolved solids (TDS) or calcium carbonate (CaCO₃).

Increased TDS Problem. Increasing TDS, especially due to calcium carbonate, are known issues for District wells. Increasing concentrations are measurable and are observed by many Water District customers also.

The gigantic-plunger effect from turning on and off high-capacity wells (such as proposed by the District) can aggravate the problem. Two things happen here, one physical and one chemical. The physical could include the dislodging of particles as the water reenters voids left when previous water was pumped out. Also, with water that has not moved for longer periods, micro dissolution gradients form between minerals and the water, with the greatest concentration nearest the CaCO₃. Increasing the exchange rate (amounts of water intermittently pumped)

will increase the amount of CaCO₃ that could dissolve in the extracted water.

Also, carbonate (CO₃⁻²) can really increase the solubility of arsenic. There are documents to support this.

These effects transmit to non-District wells also.

Subsidence

Lack of Information. A search of the initial DRAFT document finds that the possibility of subsidence is swept away within a single casual remark based on expressed belief that is not then substantiated.

Possible Future Subsidence. Regarding possible subsidence, it is inadequate to simply mention (p 31 issue c) that existing and proposed well sites and pipeline alignments *are not believed to be* in areas affected by collapse. Future effects must also be addressed. *Belief* needs to be supported by references and their summaries, when describing an aquifer this is and has been in critical overdraft.

Over time without adequate recharge (our aquifer), the overall water level will drop, which will first affect shallower then deeper residential and irrigation wells. Eventually, with even more pumping and lowering of the groundwater, the air spaces that remain begin to collapse, with surface subsidence potentially occurring.

This is a particular concern in areas that have depended primarily on high-rate groundwater pumping to supply their needs. The Albuquerque area is an example, where surface settling is already apparent in a few locations.

One mitigation is to get water elsewhere, another is to pump pristine water back into the aquifer. Realistic justifications and/or solutions must be offered in the DRAFT, with supporting references and summaries.

More Study Needed. This additional information indicates that more literature study and investigation of effects measured elsewhere must be done, to cover what was missing in the INITIAL STUDY. The DRAFT needs to be augmented and realistic mitigations provided, and/or the plan needs revision.

Unfounded Conclusions. This additional information also clarifies that the following answers in the draft are not adequately founded: • “No Impact” on humans near the planned wells and across the valley (p56 b and c) is incorrect. • “Less Than Significant Impact” on HYDROLOGY AND WATER QUALITY (p38 b) is not justified. • “No Impact” because the Project has no “features that would have the potential to substantially degrade water quality” (p 40) is not founded.

Thank you for your consideration.

Sincerely,
Annette DeMay
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