

MEMO

FROM: Jim Stanton

DATE: 11-14-2008

TO: Dave Tuthill

SUBJECT: History Of Groundwater Levels In The Cottonwood Critical Groundwater Area

This area, hereinafter referred to as Golden Valley, consists of 9 irrigation wells located above the foothill road northwest of Oakley, Idaho. Golden Valley runs southeast to northwest. There are currently 3 irrigators using the 9 wells. Joe Tugaw, the senior right holder here, owns the wells at Power Poles #205, 207 and 208 in the north end of the area. The junior appropriators own Wells #348, 216 and 386 (John Beukers), and #339, 214 and 215 (Triple Ace Inc/Russell Patterson) in the middle and south portions of the area. Russell Patterson operates both his wells and the Beukers wells. IDWR has provided watermaster services to Golden Valley since the 1970's, as this area is also designated as Water District 45-O.

In order to monitor groundwater levels in Golden Valley, a recording meter has been in place in Well 209 since 1977. This site is located on the east side of the Buckhorn Road uphill from the Tugaw 208 well. Water levels in the 209 well are directly impacted by the operation of the 208 well, dropping when the 208 well is turned on, and rising when the 208 well is turned off. The recorder operates from mid-March through early November, but cannot be operated during the winter months due to moisture rising out the well and ruining the chart paper. Water levels in this well peak between mid-April and mid-June, depending on when the 208 well starts pumping. Levels are lowest in early September, rising rapidly once the 208 well is turned off for the season.

The 217 well is located close to the south end of the aquifer. There has been a recording meter on this well from 1977 through early 1989, but it was removed when the well was put back into production. This well provided irrigation water for several years, but the pump was eventually removed. IDWR decided not to re-establish the recording station at this site, but I began monitoring the site monthly beginning in 2004.

When it became apparent that the junior appropriators would be curtailed, it seemed important that we obtain groundwater data from their end of the aquifer also. To this end, I also started monitoring Well 417, which was monitored with a recorder operated by the USGS. I do have the USGS data from this recorder, but have been checking water levels here monthly since March of 2005. This well is located about 3/8 mile NW of the 216 well, and at a slightly higher elevation. The old recorder and cable have been removed to make it easier to use an electronic probe at this site.

With 3 monitoring sites in place, we should be able to get an accurate picture of what is happening to groundwater levels in Golden Valley. In the past, I have tried to compare water levels in the 209 and 217 wells in order to find repeatable patterns. If levels in both wells change by the same amount, it would appear that reducing pumping by the junior users would directly benefit the senior user. If this does not occur, then perhaps Mr. Tugaw is simply pumping too much water from his end of the aquifer. Water in the two ends of the aquifer has moved somewhat independently, however; I could never find enough consistency in the data to make any definitive statements about the possible effects of curtailment of the junior users. I still hope that adding the 2 additional sites will yield worthwhile results.

As far as water levels are concerned, the 3 periods of interest are the spring peak, the summer bottom, and the end-of-season recovery. The recovery level may be the most important, as this reflects the cumulative effects of both seasonal weather patterns and actual irrigation pumping. There is always data available for the recovery levels, while summer bottoms sometimes cannot be determined due to problems with measuring/recording equipment. Spring rains help maintain groundwater levels by delaying pumping, but hot & dry weather after that can increase pumping. The reduction of pumping by junior appropriators does not occur until August or September, so is not directly reflected in the summer bottoms. It has been my observation that the effects of a good winter snowpack do not show up the deep aquifer until the following year; the wet winter of 2007/08 should positively impact the Golden Valley aquifer during the 2009 irrigation season.

In 1977, the aquifer level in the 209 well peaked at 325 feet in early April. It peaked at 319 feet in the 217 well that same year. The summer bottom was at 405 feet in the 209 well that year, but there was no data for the 217 well. The recovery level for the 209 wells was 366 feet on November 10, and 343 feet for the 217 well. The seasonal drop in the 209 well (spring peak to recovery) was 41 feet, while it was 24 feet in the 217 well.

In 1984, Well 209 peaked at 351 feet in mid-June, bottomed at 400 feet, and recovered to 370 feet (a seasonal drop of 19 feet). The 217 well peaked at 344 feet in May, bottom at 362 feet, and recovered to 355 feet (a seasonal drop of 11 feet).

The 3 Tugaw wells are limited to an annual pumpage of 1663 acre feet. Through 1984, the 6 wells of the junior appropriators were limited to a total pumpage of 3837 acre feet. From 1977 through 1984, recovery levels in the 209 well dropped 4 feet; the drop was 12 feet.

In 1985, IDWR issued an order reducing pumpage by the junior appropriators to 2337 af. This order was stayed a month later due to the promise of aquifer recharge by the junior users. Two recharge sites for Cottonwood Creek water were established, and were monitored by Bill Young of the USGS. There is no record of any recharge occurring since 1996, and the USGS no longer has any presence in Golden Valley. Water levels are taken monthly in their old recording site at the 417 well, and have been since 2005.

From 1985 through 1996, recovery levels in the 209 well dropped from 382 feet to 432 feet (estimated November 10 level). There is no data for the 217 well, as it was used for irrigation during this period. The drop in the 209 well shows that the recharge project was not effective in maintaining groundwater levels under the original pumping allocation of 5500 acre feet. Most of the 50-foot drop during this period occurred from 1986 through 1992, as recovery levels varied considerably from year to year during the 1990's.

From 1996 through 2004 (total pumping allocation still at 5500 af), recovery levels in the 209 well dropped from 432 feet to 475 feet. From 1984 through 2004, levels dropped 105 feet in the 209 well and 93 feet in the 217 well (to 448 feet).

In 2005, the junior users in Golden Valley were reduced to a pumping allotment of 2337 af. From then through 2007 (3 irrigation seasons), recovery levels in the 209 well have increased by 1 foot to 474 feet. The 217 well dropped 4 feet during this period after being up about 3 feet from 2004 levels. The 417 well dropped about 6 feet during this period. While the Tugaw end of the aquifer did stabilize, the small improvement could easily be due to changes in irrigation practices by the senior appropriator. Obviously the current pumpage reduction has not been enough to stabilize the rest of the aquifer, even with some recharge by the junior users.

Both ends of the aquifer took a big hit in 2008. There was no increase in spring water levels in 2007 from the initial March measurements until pumping started, and I believe that the lack of natural recharge last year (which was one of the driest on record) is the cause for this. The 209 well dropped 16 feet this year, while the south obs wells dropped 11 feet and 10 feet, respectively.

I expect to see a good increase in water levels next spring, but it remains to be seen whether that will be enough to make up for this year's decline. The 2 data sites on the south end of the aquifer have only been monitored in March and June since they were re-established as collection points, but I think this needs to change in order to get a better picture of what is happening there. I plan to monitor the sites every month from March through November, even though it will mean two extra field trips. I do not start reading the flow meters on the pumping wells until June, and we normally only charge the water users for field trips that involve this, so I do not propose to charge the users for the two extra water-level-monitoring trips.

The junior users have just agreed to a voluntary reduction of 500 acre feet in their pumping allotment for the 2009 season, but it might still be prudent to do another hydrologic study of Golden Valley to provide better data for future management decisions. Cindy Yenter is also in favor of this. Now that we are actively managing this aquifer instead of just recording data, what are we trying to accomplish? Do we want to maintain groundwater supplies at their current low level, or do we want to increase water levels in order to reduce pumping costs and therefore make these farms more economically viable (at least for the senior user)?

One item that needs to be considered relates to data collection in Golden Valley. There is one permanent recorder in Well 209, but it is an old Stevens paper-chart recorder that has been limping along for years. These units are no longer made, so I have had to salvage parts from other units that we have in storage to keep this one running. When it goes out for some reason, we have no data at all until it was fixed or unless water levels were above about 490 feet (the practical measuring level of a 500' steel tape). I now have a 600' electronic probe, but am very reluctant to use it in this well due to the possibility of getting it hung up on the recorder cable that is already in the well. A steel tape with pencil lead on the end can get hung up in these installations, and the probe is much larger than pencil lead. Eventually this recorder will just stop working altogether. I salvaged the recorder from the 417 well, but it did not work; maybe the parts will be of some value.

The two main alternatives to using the Stevens recorder is to do away with a recorder altogether in favor of just using the electronic probe. We would lose some springtime data, but more field trips could be made if needed. There could be some additional expense to IDWR, but this would still be a cheaper alternative to buying a permanent electronic recorder for the 209 site. And if we have a permanent recorder here, it would make sense to re-install a permanent recorder in the 217 well; the above-mentioned data clearly shows that a single observation point does not give a clear picture of what is happening in this aquifer. Cindy will price out these units, but estimates that they could cost up to \$1000 each due to the large amount of cable needed (up to 600 feet each to be sure that the probe is always under water). This expense could be cost-shared with the users if they agree. Having permanent recorders would provide off-season data that has not been historically available, but the data would probably not be downloaded until March, anyway, as the recorders may be snowed in until then. The current system catches the spring peak, at least in the 209 well, so I do not know how winter data would be used in future management decisions.

James E Stanton