

## MEMORANDUM

TO: Steve Lester

FROM: Paul Castelin *PMC*

DATE: July 3, 1995

SUBJECT: Stewart Gulch Water District 63-S, Requested Boundary Change

---

I was present for the hearing at which Ed Squires presented the case for modifying the boundary, and have reviewed the material in the file, which included well test data, Stevens Type F recorder charts, and correspondence. I concur with the observations of both Ken Neely and Mark Slifka.

The bulk of the data presented by Ed Squires does seem to establish the existence of a barrier boundary in the vicinity of Shot Point 48 on the Chevron seismic line, but I am bothered by several things:

- 1) Faults are rarely 100% effective barriers, and can act either as barriers or conduits to the flow of water.
- 2) Faults acting as conduits for water movement can halt the expansion of a cone of depression through them, similar to the response seen in the hydrograph of the Windsock well as it is pumped in 1993 test.
- 3) The effects of pumpage through fault gouge (the disturbed material within a fault zone), which can be much less permeable than adjacent material, can greatly delay and attenuate, but not halt, the progression of a cone of depression.
- 4) Aquifer test data, presented in graphical form, tends to mask the subtle fluctuations (too large an interval on the y-axis of most plots), and on those plots with shorter interval log-log or semi-log plots, the plot could be interpreted as supportive of a non-barrier condition.
- 5) Establishing a boundary sub-parallel to known faults along the Boise Front is probably a good "first cut", but the strike (direction) of the fault line could be considerably different than that inferred by Ed Squires. This means probable constant readjustment of the boundary as new data becomes available.
- 6) The northwest/southeast orientation of the fault block compartments shown on Slides 7 and 19 implies that the northwest and southeast boundaries of the current district, based on topography more than subsurface geology, could be in error or open to considerable interpretation. The district may, in fact, extend a considerable distance northwesterly and south-easterly of the current boundaries. For instance, the Simplot and Boise Water Corporation wells in Section 27 could be impacting Terteling Windsock and District wells to the northwest even though they are not currently in the District boundaries. To a

MEMORANDUM

June 28, 1995

TO: Steve Lester, Paul Castelin  
FROM: Mark Slifka *MS*

*QMC*  
**Reference: Stewart Gulch Water District (63-8), Recommended boundary changes**

I have reviewed Ken Neely's overview of the data supplied by the Tertelings which they and their consultant Ed Squires contend justify a change in the Water District boundaries.

I attended the hearing at which this information was presented in summary form. After reviewing Ken Neely's overview of the data I concur with Ken that a hydrologic separation exists between the southern part of the water district and the northern portion where the Terteling wells are located.

The area is likely broken by several faults and highly fractured fault 'zones', some of which will be barriers to fluid movement while others will not. Therefore, the existence of a fault does not necessarily constitute a subsurface hydrologic barrier. Such barriers must be determined by well testing in combination with other geologic support.

The separation of the northern and southern portions of the district is likely due to the NW-SE trending faults known to exist along the Boise Front and which are evidenced by surface geologic mapping and subsurface correlation of lithology in well data and seismic geophysical sections. It is probable that the aquifers in the area are shaped like long polygons oriented parallel with the NW-SE trending faults. Technically the district boundaries would also have this orientation if we wished those districts to correlate to geologically defined aquifers and we had sufficient data to delineate hydrogeologic boundaries. We would not likely have sufficient data in most cases to accurately delineate such boundaries.

I disagree with the diagonal line proposed by Tertelings for a district boundary due to the difficulty of administration relative to both property owners and the well development community. The boundary should probably follow public land surveys. If a diagonal boundary is chosen, in that it more closely approximates the known faulting, surface landmark should be used to guide the location of that boundary if practical.

MEMORANDUM

June 27, 1995

To: Paul C. & Mark S. *GMC*  
From: Ken N. *6-28-95*  
Re: Stewart Gulch Proposed Boundary Change

Steve Lester asked if we would review the data submitted by the Tertelings related to their proposal to modify the boundary of the Stewart Gulch Water District (63-S). I have re-examined the data and have come to the following conclusions and recommendations:

Conclusions

1. The results of three aquifer tests indicate that there is a hydrologic boundary between the Motorcycle Club (and the Terteling Springs and Pool well) and the Windsock well.
2. The occurrence of the Terteling Springs, the disrupted sediments in the nearby road cuts, and the seismic data suggest that there is faulting in this area. The Chevron seismic line suggests that the faulting is normal and down to the southwest.
3. The well logs from the Motorcycle Club and Windsock wells can be correlated with some certainty. Two marker beds (the top of the lava and a red clay zone) occur in both wells. Based on these marker beds, the vertical offset between the two wells is about 200 feet (with the marker beds being lower in the Windsock well). The topographic offset is about 130-150 feet from the Motorcycle Club well to the Windsock well. The well log for the Pool well is not available at IDWR (I will request it from the USGS as the site schedule indicates that it is available).
4. The final aquifer test (when the Motorcycle Club well was the pumping well) indicated that there is a hydrologic boundary between Motorcycle Club well and the Windsock well (and the Terteling Springs and Pool well).
5. The Terteling Springs seem to be isolated hydrologically from both the Windsock and the Motorcycle Club wells.

6. The Motorcycle Club well may be affected by other production as indicated by declining water levels during the June-July, 1993 aquifer test. This decline does not appear to be related to the pumping of the Windsock well because it did not occur until the test was in the third day. Moreover, this data (from the Windsock well) was collected prior to the reconstruction of the well. The water level data that is available after reconstruction is for a time period of about 11 days before the Spring, 1994 test and for about 6 days after the test began. This data does not show a similar decline as was observed during the June-July, 1993 test.
7. Based on the seismic data and the aquifer tests results, the faulting between the Windsock and Motorcycle Club wells may be more complex than indicated by Ed Squires.
8. Hydrographs from all of the wells that are monitored in the Stewart Gulch Water District show a similar decline, indicating that regardless of faulting, the area is experiencing water level declines (see attached).

#### Recommendations

1. The boundary should be modified to reflect the results of the aquifer test data. The modified boundary should be at least as far to the north as the Terteling Springs.
2. The Decision should include two provisions:
  - i. Any new, non-domestic wells drilled north of the Windsock well should be tested hydrologically before production is permitted. If the new well is in hydrologic connection with the Windsock well, the new well must be included in the Water District.
  - ii. The boundary should be subject to future modifications based on data collected by the District members or the Department.