



State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WATER RIGHTS

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MEMORANDUM

TO: Dan Blake
FROM: Jerry Olds *JO*
SUBJECT: South Salt Lake City: Vitro Well
DATE: June 4, 1993

Enclosed, for your review, is a draft of a letter to South Salt Lake City, giving authorization to divert water from their well located at the old Vitro site.

I would appreciate your comments/suggestions to me by the week of June 14. If you have any questions, please feel free to call, (538-7390).

PRELIMINARY
SUBJECT TO REVISION

June , 1993

Mr. Mike Mehraben
City of South Salt Lake
220 East Morris Avenue
South Salt Lake City, Utah 84115

Dear Mr. Mehraben:

Recently, you requested to begin diversions from South Salt Lake's well located at the former Vitro site. As you are aware, according to the Salt Lake Valley Interim Ground-Water Management plan, this well is located in a ground-water management area that has restrictions on withdrawals. The restrictions are intended to protect the water quality in the principal aquifer. Before authorization to divert water from the principal aquifer at this site can be granted, some determinations on the allowable drawdown of the potentiometric surface are necessary, in order to prevent a reversal in the upward gradient. In reviewing this matter, we have examined the situation and made some calculations to determine both a pumping rate and a maximum drawdown that we believe will maintain the upward gradient.

The approved water rights in the Vitro well allows a maximum diversion rate of 2.61 cfs. The drawdown that would result from pumping at this flow rate was calculated utilizing several sets of available aquifer parameters (1987 USGS Ground-Water flow model input data; Hely and others, 1971; 1983 aquifer test as described in Waddell and others, 1987 and 1989; and preliminary, unpublished data from the revised USGS Ground-Water flow model still under development). The 1983 aquifer test parameters are believed to be the most accurate. The Hantush Modified Method (1960) for leaky confined aquifers was used to calculate the drawdown. The resulting drawdown at the vitro well, after 6 months of pumping at 2.61 cfs, ranges from 27 to 104 feet. The highest calculated drawdown was based on 1983 aquifer test parameters. This time period reflects the potential maximum utilization of the well.

There are several other active public supply wells in the area which could contribute to the overall drawdown of the potentiometric surface at the Vitro well. Most of the wells do not pump continually at the maximum diversion rate they are allowed by their water rights. However, if these wells withdraw maximum allowable quantity diversion rate, calculations show the drawdown at the vitro well could be as high as 180 feet. Once again, the highest calculated drawdown is obtained using the 1983 aquifer test parameters. Before a drawdown of 180 feet would be reached, however, interference limitations defined in the Interim Ground-water management plan would come into effect, limiting withdrawals according to priority.

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It is difficult to specify a particular drawdown where the gradient would begin to reverse. Both drill logs and input to the ground-water flow model show the shallow water table aquifer to have water levels ranging from 5 to 20 feet below land surface. The potentiometric surface of the principal aquifer in the area is typically above the land surface. Drill logs show wells to be completed at all intervals, and an increase in artesian conditions with depth. Certainly if the potentiometric surface drops below the base of the confining layer(s), the gradient would reverse. However, the extent and location of the confining interval is uncertain. Available data indicates the bottom of the shallow aquifer could be anywhere from 40 to 100 feet below land surface. Therefore, we recommend that the maximum drawdown at the Vitro well site be limited to the base of the shallow aquifer, which can be conservatively approximated at 60 feet below land surface.

Calculations show that 60 feet of drawdown below land surface will be exceeded if the well is pumped at the maximum diversion rate allowed under the existing water rights. In order to keep the drawdown from exceeding 60 feet, the Vitro well should not be pumped in excess of 1.50 cfs. However, it appears that other nearby wells could also contribute to the total drawdown. Therefore, we believe that the diversion rate from the Vitro well should not exceed 1.0 cfs.

In addition, the following monitoring program should be in place before operation of the Vitro well occurs:

- 1) South Salt Lake should identify, if possible, several nearby monitoring wells completed in the principal aquifer in the area to monitor water level declines.
- 2) As provided for under the Salt Lake Valley Interim Ground-Water Management Plan, a meter should be installed, on the Vitro well, that is capable of measuring both the instantaneous flow rate and total withdrawals.
- 3) When the well is in operation, the following data should be collected and submitted to the Division of Water Rights on a monthly basis:
 - a) Water level in Vitro site pumping well.
 - b) Water levels in observation wells.
 - c) Instantaneous flow rates of vitro pumping well at time of water level measurements.
 - d) Total withdrawals from Vitro well for that month.

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4) Quarterly monitoring of the water quality in the Vitro pumping well should be done under the supervision of the Division of Drinking Water.

5) South Salt Lake should analyze the integrity of the Vitro well's annular seal through the confining layers and report the results to both the Division of Drinking Water and the Division of Water Rights, prior to diverting water from the Vitro well.

You can consider this letter my approval for you to begin diversions from the Vitro well; subject to both the restrictions stated in this letter and in the Interim Ground-Water Management Plan. If and when you receive approval to use this well from the Division of Drinking Water, I would like to establish a contact person from my staff to coordinate the monitoring, data collection and data submittal with you or someone from your staff. Please contact Jim Riley, the Utah Lake/Jordan River Regional Engineer (538-7421) to make arrangements.

I realize these conditions may be somewhat restrictive, however, until site-specific data is available, we should take a cautious approach to ground-water withdrawal from the principal aquifer in the Vitro area. As additional data is collected and analyzed, we can reevaluate both the diversion rate and drawdown limitations and adjust them, if warranted by the data.

Sincerely,

Robert L. Morgan, P. E.
State Engineer

RLM:ml