EXPERT REPORT OF DR. LEE WILSON

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RECOMMENDATIONS FOR ADMINISTRATION OF THE JORNADA BASIN

LOWER RIO GRANDE UNDERGROUND WATER BASIN

Submitted in support of Supplemental Well Applications

LRG-430-S-29 and LRG-430-S-30

Revised

16 September 1996

EXECUTIVE SUMMARY

This report presents my opinions regarding facts and principles relevant to water-rights administration in the Jornada del Muerto Basin of New Mexico.

Factual basis of administration

Water-rights administration in the Jornada del Muerto Basin should consider the following facts.

- The Jornada del Muerto is a geologically isolated part of the Lower Rio Grande Basin which has a limited stream connection to the Rio Grande.
- The quantity of fresh water stored in the Jornada is on the order of 12 million acre-feet, most of which is concentrated in a deep trough which contains an aquifer having a relatively high transmissivity and specific yield.
- The southern part of the Jornada receives roughly 5,000 AFY of recharge.
- In the southern Jornada existing water rights are already diverting water at or near the rate of recharge.
- Declared water rights in the Jornada exceed 22,000 AFY. Exercise of these rights is projected to require 5,500-9,000 AFY within 40 years.
- Applications are pending which could appropriate in excess of 186,000 AFY. However, it does not appear practical that this amount of water could be put to beneficial use within a reasonably foreseeable time period.
- The State Engineer has previously made findings relevant to supplemental wells drilled by the City of Las Cruces in the Jornada basin (see Findings and Order, LRG-370-S-26).

- Existing and future development of ground water in the Jornada del Muerto Basin will result in long-term depletion, or "mining", of the local aquifer.

- The State Engineer has developed numerous precedents for management of mined basins.

- The longest economic lifetime so far recognized in a mined basin is 40 years.

- State Engineer analyses which assess impacts over a period longer than 40 years appear to be undertaken when water rights are to be protected in perpetuity, a situation which is impossible in a mined basin.

- Future uses of the Jornada Basin will be almost entirely for municipal purposes.

- New Mexico law entitles municipalities to secure a water supply to meet reasonably foreseeable demands through a 40-year period, but bars them from reserving water for uses beyond those which can be projected to occur within 40 years.

- Wastewater is an important part of the water budget of the Rio Grande Basin and at this time it should not be used for recharge of the Jornada Basin.

- Las Cruces does not now have access to the alternative of surface water supplies.

Principles of administration

Water-rights administration in the Jornada del Muerto Basin should consider the following principles and policies.

- Adoption of administrative criteria for the Jornada Basin will: establish policies for basin management which are protective of existing uses and supportive of economic activity; and provide for efficient, equitable processing of pending applications.

- The basin should be administered as a mined basin. Over time, the supply of water available to prior appropriators will be diminished, with consequent declines of the water table, higher pumping costs and (for wells which are not deepened) lower yields.

- Pumping in the Jornada Basin will have a small impact on streamflows of the Rio Grande. Depletion effects associated with inchoate rights should not require offset. Depletion effects associated with new appropriations will, in general, be more than offset by discharge of return flows.

- 40 years is an appropriate economic lifetime for management of mined water rights in the Jornada del Muerto.

- Within the main trough area, one-third of the saturated thickness in the fresh water aquifer may be reserved from appropriation. The remaining water should be considered recoverable and, if not already appropriated, should be made available to new wells. Recharge, local return flows, and minor amounts of water on fringe areas need not be considered part of the inventory of unappropriated water, though of course these resources will be appropriated by new wells.

- The evaluation of already appropriated water should be based on a projection of pumping for beneficial use, rather than on facial statements of inchoate water rights.

- New, large-capacity wells should be required to be one-half mile from one another and one-quarter mile from small-capacity wells. Well construction may be specified to avoid problems of saline intrusion.

- If impairment would otherwise occur, e.g. by exhaustion of unappropriated water in less than 40 years, a plan of replacement may be required.

- Based upon current conditions of public welfare and conservation, the export of water from the basin may be limited to 5,000 AFY, which in turn would limit the City of Las Cruces to export of 4,000 AFY from its pending applications for new appropriations of ground water.

alternative can be initiated only if and when the Elephant Butte Irrigation District develops a specific proposal to provide Las Cruces with surface water, and that proposal is acceptable. Although EBID has prepared several reports related to the alternative, no specific proposals have ever been made.

Thus it is not now possible to know if the alternative is practicable but it is certain that it could not provide water to Las Cruces for many years, if not decades. Note that even with development of surface water the City would require wells to divert ground water to meet demands during peak periods and during droughts; no surface water alternative has ever been proposed for southern New Mexico which could reliably meet all municipal water needs.

Limitation on exports of water. The applications which are the subject of this report have been protested by Moongate Water Company. In settlement negotiations between Moongate and the City, the following concern has been discussed at length: a 40-year economic lifetime for the basin is appropriate for preventing impairment of existing water rights, but adoption of this criteria runs the risk that water users outside of the Jornada Basin (such as Las Cruces) may try to exploit the basin by rapidly mining out its unappropriated water.

Las Cruces has agreed with Moongate that, all else being equal, the principles of public welfare and conservation of water would be promoted if Jornada water is principally (but not exclusively) retained for use by those who live within the Jornada Basin. To effectuate this agreement, the parties believe that it would be appropriate for the State Engineer to adopt a public welfare/conservation criteria which would limit the quantity of water which can be exported from the Jornada Basin, thus conserving Jornada water for the public welfare benefit of the Jornada Basin.

The basis for the criteria is as follows.

- Quantity. Under pre-development conditions, the roughly 5,000 AFY of natural recharge to the Jornada Basin was eventually discharged to the Mesilla Valley and the Rio Grande. With development, this discharge will eventually be reduced to zero. Allowing export of up to 5,000 AFY of Jornada water is thus consistent with the natural hydrology of the basin.

The recommended criteria is to limit exports to 5,000 AFY. Note that coupled with the fact that in-basin demands are far less than the total applications shown in Table 2, this criteria effectively protects the basin against rapid development and is one reason why I do not believe a separate criteria to limit drawdowns is necessary.

- Location. For purposes of this criteria, it is necessary to define the boundary of the Jornada -- i.e. the area in which water uses will be considered "in-basin" and thus not subject to the export limit. Upon consideration, I believe it makes sense to set this boundary at the outer side of the geological structures which define the Jornada Basin, i.e. at the outside of the horsts which form the basin boundaries. This definition encompasses both the geological Jornada Basin (i.e., the area inside the structures) and the structures themselves. The latter are included because there is essentially no locally available water on the horsts: supplies to these areas must be imported from somewhere. Jornada water is a logical and normal source of supply for these areas, and use of Jornada supplies there should not be considered an export.

  The City of Las Cruces has a pressure-zone boundary which is located on the topographic contour line at 4,127 feet elevation. This contour line is very close to the boundary definition described above. A pressure zone boundary is appropriate for administering the export criteria because there is no way to segregate water to serve only part of a pressure zone. Therefore, my specific recommendation is to use the 4,127 foot contour line as the locational boundary on the west side of the basin, across which any movement of Jornada water represents an "export".

- Allocation. As indicated in Table 2, there are existing water rights and pending applications which collectively would appropriate large quantities of Jornada water. Both Moongate and Las Cruces envision some export of water under these rights and applications, and together these two uses could easily find beneficial uses in the Mesilla Valley which far exceed the recommended 5,000 AFY export limit. Moongate has agreed not to seek export of more than 1,000 AFY and Las Cruces has agreed not to seek export of more than 4,000 AFY. Assuming the State Engineer adopts the criteria and allocation, the seniority of these two parties will mean that no

export water remains for use by others. However, to my knowledge, none of the other applicants propose export, and thus there is no adverse effect of having the allocation used by the two existing applicants.

It should be noted that because the recommended export criteria is based on public welfare and conservation considerations, and not impairment, it is subject to review if and when public welfare/conservation perspectives change. In particular, Las Cruces has agreed to limit its exports from the basin to 4,000 AFY in expectation that it will obtain future water supplies from its pending, unprotested applications for wells on the West Mesa; and/or from surface water provided by EBID. Were these supplies not available to the City, and the City faced a water shortage, then public welfare considerations would require that the limit on Jornada exports be reconsidered.

APPLICATION OF CRITERIA TO PENDING APPLICATIONS

The principal criteria I have recommended are: to administer the Jornada as a mined basin with an economic lifetime of 40 years; to consider the bottom one-third of the aquifer as not available for appropriation; to require spacing of one-quarter mile for large municipal wells (one-half mile, if the adjoining well is also high capacity); and to limit export from the basin to 5,000 AFY, of which 4,000 AFY would be available to the City of Las Cruces.

I have recommended against a quantitative limit on annual drawdown. I have recommended that, if the State Engineer would otherwise find a problem of impairment, he solve that problem by requiring a plan of replacement.

To quantify unappropriated water, I have recommended using the Shomaker model which is presented in a separate expert report. At this time, the pumping estimates developed by John Shomaker (see separate report) are being used. These input data are subject to revision as the Engineer proceeds to take action on subsequent appropriations.

Figure 6 shows the amount of unappropriated water remaining after 40 years, if the City's two pending applications are approved, and if prior permits for LRG-430-S-26 and 28 are pumped at their expected schedule. The