TECHNICAL MEMORANDUM

To File ENTRANOSA/OSE HEARING

January 20, 1999

From Dave M. Romero

Subject LONG-TERM YIELD ANALYSIS OF ESTANCIA BASIN

Long-term future withdrawal of groundwater from the Estancia Basin (Basin) was simulated to quantify the flow components contributing to Basin yield. The model simulated development in the Basin represents historical groundwater withdrawal from 1940 to 1996, one hundred years of projected use in which additional withdrawal grows in the first 40 years to a maximum of 51,400 acre feet per year (AFY), and an additional 1,000 years of pumping which maintains the water table at its projected elevation in year 2096 while withdrawal declines to a steady maintenance level. Figure 1 illustrates the pumping rate and contributing flow components through year 2340. By the end of the first 100 years of projection (year 2096), the pumping rate is 51,400 AFY. The 51,400 AFY rate is creating water-table drawdown. All active wells in 1996 are simulated in the future runs. A smaller pumping rate is necessary to maintain the water table at its 2096 elevation. Figure 1 shows the decay of the overall pumping rate for the next 500 years as it approaches 31,200 AFY. The flow components contributing to pumping at years 2096 and 3096 are shown in Table 1. In 1,000 years, by the end of year 3096, less than one percent of the flow comes from storage, hence, these values represent steady-state flow conditions. Figures 2 and 3 show the locations of wells and head distribution of the water table at year 2096 and at steady-state conditions, respectively. At steady-state conditions, Basin flow remains directed toward the lakebed. The drawdown from year 2096 to steady-state conditions is shown on Figure 4. There is less than ten feet of drawdown below the lakebed.



After year 2096, the model solves for the flow necessary to maintain the water table at its current elevation. By the time steady-state conditions are reached, only the lower elevation wells among those illustrated in Figures 2 and 3 continue to produce water while maintaining the water table at its 2096 elevation. Figure 5 illustrates the wells producing at steady state and highlights wells in the vicinity of E-6722 and E-6722-S, which produce 8,500 AFY combined.

Conclusions:

- 1. Long-term yield from the Estancia Basin is 31,200 AFY dependent primarily on capture of evaporation from the lake. The total volume from storage depleted from the Basin for the depicted scenario is 4.25 million acre feet (MAF) of the eight MAF in storage originally.
- 2. At steady-state conditions, 8,500 AFY can be produced in the vicinity of E-6722 and E-6722-S under the head condition simulated.

Attachments: 1 Table

5 Figures

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E-6722 AND E-6722-S

Year	Evapotranspiration Salvage (AFY)	River Leakage (AFY)	External Basin Flow (AFY)	Storage Depletion (AFY)	Pumping (AFY)	Percent of Pumping from Storage
1996	19700	200	2500	23900	46300	51.6%
2036	21900	200	4200	25100	51400	48.8%
2096	23600	200	6500	21100	51400	41.1%
3096	24000	200	6800	200	31200	0.6%

TABLE 1. PROJECTED FLOW COMPONENTS CONTRIBUTING TO PUMPING

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