

No. 105, ORIGINAL

In The
Supreme Court of the United States

STATE OF KANSAS,

Plaintiff,

v.

STATE OF COLORADO,

Defendant,

and

UNITED STATES OF AMERICA,

Defendant-Intervenor.

ARTHUR L. LITTLEWORTH, Special Master

FOURTH REPORT

October 2003

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A. Kansas' Prospective Compliance Model.

The Kansas prospective compliance analysis was based upon its revised H-I model used for the 1997-99 period, but with certain additional modifications. Kan. Exh. 1093 at 51. A repeat of the 1950-94 hydrology was retained, along with current institutional conditions (e.g., the 1980 Operating Plan, current levels of transmountain imports, operation of the Winter Water Storage Program). However, changes were made with respect to assumed levels of pumping; the distribution of pumping on the basis of "unmet demand"; the use of permitted and decreed groundwater acreage; and the use of the Penman-Monteith method to establish potential evapotranspiration in place of the Blaney-Criddle procedures.

1. Assumed Future Pumping.

Kansas assumed that future pumping would average 130,000 acre-feet per year over a repeat of 1950-94 hydrologic conditions. Kan. Exh. 1093 at 52, Table 15. The maximum level of pumping is 200,000 acre-feet, which is reached five times during the 1950-94 period. *Id.*, Table 15. Each of these five years was listed as "very dry." Colo. Exh. 1408, Table 11. However, recent dry year experience in 2002 would indicate that the amount of replacement water available would only permit pumping in the order of 100,000 acre-feet. RT Vol. 254 at 113-14. During Mr. Books' examination, I noted that high levels of pumping in the order of 200,000 acre-feet had not been seen for a long time, and looking to the future, "we're not likely to see that much again." RT Vol. 241 at 111. Mr. Book generally agreed. Apparently the higher estimates were made when Kansas thought that more replacement water would be available. *Id.* at 112-13. Nonetheless, Mr. Book still believed

that the 130,000 acre-foot average was realistic. *Id.* at 113. Historical pumping from 1970-94, after well development had stabilized, averaged about 170,000 per year, with a peak of about 287,000 acre-feet. *Id.* at 111-12; Kan. Exh. 1093 at 58. However, those numbers reflect pumping before replacement water was required. The Kansas estimates of pumping assume that sufficient amounts of replacement water will be available, and will not act additionally to constrain pumping. RT Vol. 237 at 71-72; RT Vol. 254 at 55-56. Because of this assumption, Kansas experts testified that their analysis was "somewhat insensitive" to the exact magnitude of pumping. RT Vol. 237 at 72, 80. But as a corollary, the availability of replacement water becomes a critical premise. Colorado's estimate of future pumping, as constrained by the availability of replacement supplies, averaged 111,047 acre-feet per year. Colo. Exh. 1408, Table 13.

2. Kansas' Redistribution of Pumping.

A more important part of Kansas' prospective compliance analysis lay not in the amount of assumed pumping, but rather in the way in which the model distributes pumped water. In all prior versions of the H-I model, the use of groundwater had been based on the general assumption that if a section of land contained a well, all of the acreage within that section was assumed to be irrigated with groundwater. RT Vol. 239 at 6, 11-12. This was reflected in the model as a percentage of the acreage in a ditch service area that was irrigated with groundwater. For example, with respect to the Bessemer Canal, the model assumed that 100% of the area was irrigated with wells, while for the Fort Lyon Canal the percentage was only 30%. Kan. Exh. 1093, Table 4; Colo. Exh. 1353, Table