

The Basis for the Moapa Band of Paiutes Protests of Las Vegas Valley Water District Applications 53987, 53988 (Cave Valley, a total of 11,584 acre-feet annually) 53989, 53990 (Dry Lake Valley, a total of 11, 584 acre-feet annually) and 53991, 53992 (Delmar Valley, a total of 11,584 acre-feet annually).

The protest grounds to be offered by the Moapa Band of Paiutes (Tribe) relate to those listed in State Engineer's Intermediate Order No. 1 and Hearing Notice under FINDINGS OF FACT II, nos. 3, 4, 6, and 9, but with some qualifications or refinements with respect to the summarized statements.

In no. 3, "... as far away as 200 miles may experience drawdown thereby experiencing negative impacts" should be deleted and replaced with "... downgradient regional springs, associated local alluvial aquifers and streams flows may experience negative impacts because of reduced flows". Early analyses of the White River flow system (Eakin, 1966) proposed regional water balances of basin budgets beginning in Long Valley and Jakes Valley, and balancing roughly 200 miles to the south in Muddy River Springs area. However, other lines of evidence (stable isotopic data) indicate that northern-most derived waters likely discharge well to the north of the southern basins, and the early conceptual model of the configuration of interbasin flows is in question.

The Tribe's protest agrees with the general intent of no. 4, that the magnitude of the applications in the three basins greatly exceeds the amount of recharge available for development. The conceptual goal of Nevada Water law is to develop the water resources to the sustainable level based on the estimated perennial yield of a basin. However, for a region of interbasin flow that incorporates more than one hydrographic basin, there is no more sustainable water use than the estimated total recharge within the extent of

the integrated hydrologic system which may be constituted by several hydrographic basins. The amount of groundwater that may be developed without impacting existing senior water rights established for downgradient spring discharge is not the estimated recharge (perennial yield) of each involved hydrographic basin; rather it depends largely on how much total combined “perennial yield” is discharged at spring areas with existing senior water rights. The sum total of evidence indicates the estimated recharge of Cave, Dry Lake, and Delmar Valleys, minus minor local discharge that may or may not be related to the bulk of recharge in the mountainous areas, discharges largely by spring flow in downgradient basins. These spring flows have senior water rights, and therefore developing the “perennial yield” in each of these three hydrographic basins will not likely result in sustainable development of the water-resource base, but rather result in impairment of existing water rights, with time. The proposed development must eventually reduce the interbasin rate of outflow. Because the timing of impacts in down-gradient basins depends on detailed flow paths, aquifer properties, and hydraulic gradients between the area of proposed groundwater development and the regional springs, the Tribe believes there is insufficient data to determine the timing and magnitude of impacts that would develop from the proposed development of the applications on downgradient “regional” spring flows. However, the principles of conservation of mass, flows-system theory, the spring geochemistry (including isotopic signatures) temperatures of the regional springs, apparent regional hydraulic gradients, and water balance analyses combine to assure the impacts on the downgradient discharge areas.

Based on uncertainties in defining both the magnitude and timing of impacts on senior water rights established for the regional springs and

associated stream flows, the Tribe believes one appropriate test in considering the applications is from the public interest perspective. Is it in the public interest to allocate groundwater resources from these basins for municipal water supplies in a distant basin when it is highly likely that impacts on senior water rights will eventually occur? The high cost of the necessary infrastructure to develop and transport the waters derived from these basins indicates that prolonged periods of use would be required to amortize the capital expenditures and retire the necessary bonds or other financing costs through water sales. Further, these applications seek to establish an alternative supply to replace Colorado River diversions that may no longer be possible due to warming trends and drought flows. Is it in the public interest to make major development investments to three remote basins to capture groundwater that, based on the applicant's analyses, largely flows into White River Valley (from Cave Valley) or flows via Coyote Spring Valley to the Muddy River Springs discharge area (Dry Lake and Delmar Valleys) ? Most would assume prolonged delays before impacts would occur in distant downgradient areas, such as the Muddy River Springs area, but some of the southern White River Valley springs are within several tens of miles and display isotopically identical waters to Cave Valley water samples.

The Tribe's protest agrees with no. 9, but would add that the available scientific literature reasonably assures impacts on senior rights and water resources must occur, as a large component of the recharge that occurs in these basins eventually discharges via spring flow in other basins, and these springs and associated stream flows have established senior water rights.

The primary expert witness for the Tribe will be the Tribe's hydrogeologist, Dr. M. D. Mifflin (Resume attached). The Tribe also lists

Dr. Cady Johnson (Resume attached) as a possible expert witness for testimony on groundwater modeling-derived evidence that the applicant may present. His testimony would be detailed in the second round of exchange and be based only on exhibits presented by the applicant related to modeling analyses, as yet unavailable to the Tribe. Dr. Mifflin's testimony will focus on databases and analyses of Exhibit 54 (Coyote Spring Valley hearing Exhibit 54) entitled Water Resources and Ground-Water Modeling in the White River and Meadow Valley Flow Systems, Clark, Lincoln, Nye, and White Pine Counties, Nevada, by Las Vegas Valley Water District, June 2001. Incorporated analyses are assumed to be the SNWA position on the regional hydrogeology and available resource base. The Tribe's perspective and testimony will be structured as a review of important aspects and assumptions, where there are alternative views or issues or alternative interpretations that warrant consideration from the perspective of the order of magnitude of the applications and postulated resource base, and where impacts are likely to occur from the development of the applications, or portions thereof.

Dr. Mifflin's opinions, supported by discussions based on the lists of exhibits, are summarized as follows:

- I. The postulated patterns of interbasin flows as delineated by many prior investigators are generally accepted but in many areas local details remain uncertain. Uncertainties relate to water budgets, configuration and directions of flow. Considerable uncertainty is associated with both northern and southern extents of the region called the White River Flow system. Exhibit 54 and Thomas, et al, 2001 are assumed to be essentially correct for that part of the

Carbonate Rock Province involving the three basins of applications. The southward flow in Dry Lake and Delmar basins is assumed to enter Coyote Spring Valley to become a part of the interbasin component of inflow recharging that basin. An important part of Cave Valley recharge may discharge to southern White River Valley.

- II. The evidence provided by water budgets, isotope hydrology, and characteristics of spring flow, temperatures and geochemistry, when combined with flow system theory and regional relationships of hydraulic gradients, support the conceptual model that many large springs of the region are discharge points for interbasin flows recognized by elevated water temperatures, characteristic geochemistries indicating long flow paths and sometimes trace elements that indicate probable source terrain, and isotopic signatures also related to source areas.
- III. Uncertainties continue with respect to basin water budgets based on estimates of recharge and discharge. SNWA has adopted the modified Maxey-Eakin method that, in the case of both Dry Lake and Delmar hydrographic basins, includes extensive areas of low altitude basin terrain as contributing recharge. The effect is to essentially double that which would have been estimated with the Maxey-Eakin method in these hydrographic basins. Discharge estimates are also significantly greater than prior estimates. There is no independent check for these estimates, and it is possible that recharge has been overestimated systematically by incorporating extensive areas of basin lowlands receiving some recharge.

- IV. The Muddy River flows have been significantly diminished by pumping of groundwater based on early certificated rights and newer permits in the local spring area as documented by pumpage balancing with decreases in historic flows. There are currently undeveloped permitted rights located in the spring area and in the upgradient Coyote Spring Valley where hydraulic gradients indicate continuity with the spring area in transmissive carbonate aquifers. These currently undeveloped permitted water rights combine to equal more than half of the remaining Muddy River flows and greatly concern the Tribe with rights to Muddy River flows.
- V. Double counting the water resource base when allocating groundwater rights in the Carbonate Rock Province may set the stage for major impacts on the “regional” spring flows. If the exploited aquifers are immediately upgradient and in close hydraulic continuity with regional spring areas, impacts on the regional discharge areas and senior water rights will develop at short time scales, counted in decades. However, if the exploited areas are in portions of the regional interbasin systems without close hydraulic continuity with regional discharge areas, impacts are likely to develop over prolonged time scales---perhaps centuries.
- VI. The available evidence indicates Cave Valley type recharge could be in close hydraulic continuity with and discharging at major springs in White River Valley. There is minimal data to determine the detailed characteristics of Dry Lake and Delmar Valley downgradient flow paths, but the regional fluid potential

relationships indicate there is not close hydraulic continuity with the postulated discharge area at the Muddy River Springs.