IN THE OFFICE OF THE STATE ENGINEER
OF THE STATE OF NEVADA

IN THE MATTER OF APPLICATION)
54073 FILED TO APPROPRIATE THE)
UNDERGROUND WATER FROM THE GARNET)
VALLEY HYDROGRAPHIC AREA (216))
AND APPLICATION 54074 FILED TO)
APPROPRIATE THE UNDERGROUND WATER)
FROM THE HIDDEN VALLEY HYDROGRAPHIC)
AREA (217), CLARK COUNTY, NEVADA)

RULING

#5008

GENERAL

I.

Application 54073 was filed on October 17, 1989, by the Las Vegas Valley Water District to appropriate 10 cubic feet per second (cfs) of the water from the "underground rock aquifer" within the Garnet Valley Hydrographic Area for municipal and domestic purposes within Clark, Lincoln, Nye and White Pine Counties as more specifically described and defined within NRS § 243.210-243.225 (Lincoln), 243.275-243.315 (Nye), 243.365-243.385 (White Pine), and 243.035-243.040 (Clark). The proposed point of diversion is described as being located within Lot 1 (SW¼ SW¼) of Section 32, T.17S., R.63E., M.D.B.& M.[1] In Item 12, the remarks section of the application, it indicates that the water sought under the application shall be placed to beneficial use within the Las Vegas Valley Water District service area as set forth in Chapter 752, Statutes of Nevada 1989, or as may be amended. Further, that the water may also be served and beneficially used by lawful users within Lincoln, Nye and White Pine Counties, and that water would be commingled with other water rights owned or served by the applicant or its designee. By letter dated March 22, 1990, the applicant further indicated, in reference to Item 12, that the approximate number of persons to be served is 800,000 in addition to the current service of approximately 618,000 persons, that the applications seek all the unappropriated water within the

[1] File No. 54073, official records in the office of the State Engineer.

particular groundwater basins in the which water rights are sought and that the projected population of the Clark County service area at the time of the 1990 letter was estimated to be 1,400,000 persons by the year 2020.

II.

Application 54074 was filed on October 17, 1989, by the Las Vegas Valley Water District to appropriate 10 cfs of the water from the "underground rock aquifer" within the Hidden Valley Hydrographic Area for municipal and domestic purposes within the Clark, Lincoln, Nye and White Pine Counties. The proposed point of diversion is described as being located within the SW¼ SW¼ of Section 25, T.16S., R.62E., M.D.B.& M.[2] The Item 12 remarks are the same as those found under Application 54073.

III.

By letter dated March 5, 2001, the Las Vegas Valley Water District requested the State Engineer to reduce the quantity requested under Applications 54073 and 54074 to a total combined duty of 2,200 acre-feet annually with a diversion rate of 5.0 cfs under each application, and further requested the State Engineer act expeditiously on the applications in light of the western power shortage discussed below.[3]

IV.

Application 54073 was protested by the Unincorporated Town of Pahrump, the United States Department of Interior, National Park Service, the United States Fish and Wildlife Service, the United States Department of Interior, Bureau of Land Management, the County of Nye, the County of White Pine and the City of Ely, the Moapa Band of Paiute Indians, Charlotte C. Madison, the Ely

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[2] File No. 54074, official records in the office of the State Engineer.

[3] Letter from David Donnelly, Deputy General Manager, Las Vegas Valley Water District to Hugh Ricci, State Engineer, dated March 5, 2001. File Nos. 54073 and 53074, official records in the office of the State Engineer.

Shoshone Tribe, the City of Caliente, and the Lincoln County Board of Commissioners.

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The applications were protested on many grounds, including:

1. The applications were some of the 146 applications to appropriate water filed by the Las Vegas Valley Water District (LVVWD), which combined seek 864,195 acre-feet annually of underground and surface water, and diversion of such a quantity of water would deprive the area of origin of water needed to protect and enhance its environment and economic well being, and would unnecessarily destroy environmental, ecological, scenic and recreational values the State holds in trust for its citizens.

2. The applications should not be granted in the absence of comprehensive planning.

3. Approval of the applications would sanction and encourage the willful waste and inefficient use of water in the Las Vegas Valley.

4. The LVVWD has not obtained rights-of-way from the United States Department of Interior, Bureau of Land Management.

5. The LVVWD lacks the financial capability for developing the project.

6. The applications fail to include statutorily required information, specifically, a description of the place of use, the proposed works, the estimated cost of such works and the estimated time required to go to beneficial use.

7. The applications fail to contain sufficient information for the State Engineer to safeguard the public interest and that a publicly reviewable assessment must be done of the cumulative impacts of the proposed extraction, mitigation measures needed and alternatives to the proposed extraction.

8. The population projection numbers are unrealistic.

9. The applications would allow the LVVWD to "lock up" vital water resources for possible use in the distant future beyond current planning horizons.

10. The applications substantially overstate future water demand needs.

11. Further study is needed because the potential effects are impossible to anticipate.

12. The granting of the applications would destroy the economic and growth potential of the hydrographic basin.

13. The public interest will not be served if the water and water-related resources in the Death Valley National Monument and the Lake Mead National Recreational Area are diminished or impaired as a result of the appropriations.

14. The applications will eventually reduce or eliminate the flows from springs which are discharge areas for a regional groundwater flow system upon which the National Park Service claims senior appropriative and implied Federal reserved water rights.

15. The proposed diversions are from the carbonate-rock province of Nevada that is typified by complex, interbasin, regional-flow systems that include both basin-fill and carbonate-rock aquifers along with interbasin flows that are poorly defined, and the diversions will reduce the interbasin flows, and modify the direction of groundwater movement in adjoining and hydraulically connected basins thereby reducing spring and stream flows.

16. The available scientific literature is not adequate to reasonably assure that the proposed diversions will not impact senior rights and water resources.

17. As of December 1988 the committed diversions in Garnet Valley were 1,651 acre-feet annually (afa) with an estimated perennial yield of 400 afa and the sum of Application 54073 and the committed diversions will exceed the perennial yield of the groundwater basin; therefore, there is no water available for appropriation.

18. It is unclear whether the amount contemplated in the applications is necessary and reasonably required for the proposed purposes.

19. The granting of the applications will lower the water table, sanction water mining, degrade water quality, cause negative hydraulic gradient influences, threaten springs and seeps and phreatophytes which provide water and habitat critical to the survival of wildlife including, endangered species and grazing livestock.

20. The applications would create air contamination and pollution in violation of State and Federal statutes.

21. The applications will cause water rates to go up thereby causing demand to go down thereby rendering the water unnecessary.

22. Previous applications from Garnet Valley Hydrographic Basin have been denied.

23. The applications will negatively impact Nevada's environment.

24. The LVVWD has not shown a need for the water or that the project is feasible.

25. Until the claims under the Treaty of Ruby Valley (1863) are adjudicated the applications are premature.

26. The applications will interfere with the United States Department of Interior, Bureau of Land Management's ability to manage its lands and the points of diversion are within proposed wilderness areas.

FINDINGS OF FACT

I.

Nevada Revised Statute § 533.365 provides that the State Engineer shall consider a protest timely filed, but that it is within his discretion whether or not to hold an administrative hearing as to any particular water right application. The State Engineer finds there is sufficient information available in the records of the Division of Water Resources and in reports prepared by the United States Geological Survey in conjunction with the State of Nevada, Las Vegas Valley Water District, City of North Las

Vegas, National Park Service, United States Fish and Wildlife Service, Bureau of Land Management, Desert Research Institute, Bureau of Reclamation, United States Air Force and Bureau of Indian Affairs to review these specific applications and that an administrative hearing in this instance is not necessary.

II.

When the State Engineer analyzes whether water is available for appropriation from the underground sources of water in Nevada the first analysis addresses the perennial yield of the particular groundwater basin. The perennial yield of a hydrologic basin may be defined as the maximum amount of ground water that can be salvaged over the long term without depleting the groundwater reservoir. Perennial yield is ultimately limited to the maximum amount of natural recharge that can be salvaged for beneficial use. If the perennial yield is continually exceeded groundwater levels will decline.[4] Withdrawals of ground water in excess of the perennial yield contribute to adverse conditions such as water quality degradation, storage depletion, diminishing yield of wells, increased economic pumping lifts, land subsidence and possible reversal of groundwater gradients which could result in significant changes in the recharge-discharge relationship.

Presently, scientists can estimate the perennial yield of a groundwater basin by two distinct methods, recharge to the groundwater basin from precipitation, and discharge from the groundwater basin by spring/surface discharge, interbasin flow, consumption by plants tapping the ground water and consumption by man.

[4] State Engineer's Office, Water for Nevada, State of Nevada Water Planning Report No. 3, at 13, Oct. 1971.

In 1968, the United States Geological Survey issued Reconnaissance Report 50, which studied this area and indicated the following.[5]

> All the areas included in this report[6] apparently drain in the subsurface to either the Muddy River or directly to Lake Mead... Hidden Valley probably drains to Garnet Valley, which in turn probably drains eastward toward California Wash...Subsurface drainage may be both northeastward from California Wash Area toward the Muddy River and southeastward toward Lake Mead... Ground water may enter the report area at several places: (1) along Meadow Valley Wash, flowing through alluvium, (2) along the Muddy River, flowing through alluvium, and (3) from Las Vegas Valley, near Lake Mead Base..., flowing through carbonate rocks, and (4) from Las Vegas Valley along Las Vegas Wash flowing through alluvium. All these flow quantities are probably small.[7]

Reconnaissance Report 50 estimates that Hidden Valley has an annual recharge of 400 acre-feet from precipitation and that no water comes into the valley-fill reservoir from subsurface inflow. As to Garnet Valley, Report 50 estimates an annual recharge of 400 acre-feet from precipitation, plus 400 acre-feet subsurface inflow for a total recharge of 800 acre-feet.[8] The report further assumes that all recharge is discharged as subsurface outflow; therefore, Garnet Valley contributes an assumed 800 acre-feet annually to

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[5] F.E. Rush, Water Resources-Reconnaissance Series Report 50, Water-Resources Appraisal of the Lower Moapa-Lake Mead Area, Clark County, Nevada, United States Geological Survey (1968).

[6] The Reconnaissance Series Report 50 covered the Lower Moapa-Lake Mead Area of Clark County, Nevada, including Hidden, Garnet, Lower Moapa Valley, Black Mountains and Gold Butte Areas, California Wash and Greasewood Basin. F.E. Rush, Water Resources-Reconnaissance Series Report 50, Water-Resources Appraisal of the Lower Moapa-Lake Mead Area, Clark County, Nevada, United States Geological Survey, at 1 (1968).

[7] Id. at 13.

[8] Id. at 42.

California Wash and Hidden Valley contributes an assumed 400 acre-feet annually to Garnet Valley through the carbonate rock or alluvium provinces.[9]

However, the "possibility of salvaging all or part of the outflow by pumping is dependent upon the nature and extent of the transmitting lithology, which is generally unknown. For the purpose of this reconnaissance it is assumed that the subsurface geohydrologic controls might permit salvage of half of the outflow by pumping."[10] In 1968 the United States Geological Survey estimated the perennial yield of the Garnet Valley groundwater basin to be approximately 400 acre-feet and the Hidden Valley groundwater basin to be approximately 200 acre-feet.[11]

The committed groundwater resource in the form of permits and certificates issued by the State Engineer to appropriate underground water from the Garnet Valley groundwater basin currently exceeds 1,105 acre feet annually,[12] and no water rights have been granted for appropriation from the Hidden Valley groundwater basin.[13]

Another method for estimating the total quantity of water available for appropriation uses interbasin flow and discharge flow as a method to approximate the annual safe yield. Ground water is discharged by the natural processes of transpiration of vegetation, evaporation from the soil and free-water surfaces, and possible underflow from one groundwater basin to another.

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[9] Id. at 26.

[10] Id. at 49-51.

[11] Id. at 2, 50.

[12] Hydrographic Basin Abstract, Basin 216, official records in the office of the State Engineer, March 2, 2001.

[13] Hydrographic Basin Abstract, Basin 217, official records in the office of the State Engineer, March 2, 2001.

The State Engineer finds, in a straight perennial yield analysis, that existing groundwater rights in the Garnet Valley groundwater basin exceed the perennial yield of the groundwater basin. However, the State Engineer further finds that 32 years after Reconnaissance Report 50 more drilling has taken place and new estimates of the system yield need to be established. The State Engineer finds that even with this perceived "over-appropriation" there must be some contribution to the alluvial aquifer from the carbonate-rock aquifer because declining groundwater levels have not been seen with the appropriations now permitted. The State Engineer finds that due to the complexities of the system and potential interaction between the carbonate-rock aquifer, described below, and the alluvial aquifer, further analysis is required in order to understand what potential if any exists for the appropriation of more water from the Garnet Valley groundwater basin.

III.

The applications indicate the water proposed for appropriation under these applications is from a source known as a carbonate-rock aquifer, which is a source that was not generally considered in the analysis of water available for appropriation in these particular groundwater basins. In 1984, the Water Resources Division of the United States Department of Interior, Geological Survey proposed a 10-year investigation of the entire Carbonate Terrane.[14] It was understood at that time, that the water resources of the Carbonate Terrane were not well defined, that data was sparse and that the hydrology and geology are complex. It was known that it would take substantial amounts of money and a long time to arrive at some reasonable understanding of the system, and that without some understanding, development of carbonate water was risky and the

[14] Memorandum dated August 3, 1984, from Terry Katzer, Nevada Office Chief, Water Resources Division, United States Department of Interior Geologial Survey, Carson City, Nevada, to Members of the Carbonate Terrane Society.

resultant effects could be disastrous for the developers and current users.

It was believed that developing a better scientific understanding would identify possible additional water resources that could be developed, would further the attempts to define the perennial yield of this water source, would protect current users, would allow the State to better understand the system, which would allow management for the benefit of all the people, and would further the knowledge needed by the Federal agencies for protection of its water rights and water-resource related interests.

It was noted in the proposal referenced above, that this was not the first time a comprehensive investigation of the hydrology of the Carbonate Terrane in Nevada was considered, and that area-wide studies had been conducted by four different organizations to date. Those organizations were identified as:

(1) the Desert Research Institute (Mifflin 1968, Hess and Mifflin 1978);

(2) the United States Air Force (M-X Multiple Protective Shelter Water Resources Program 1983);

(3) the United States Geological Survey (Great Basin Regional Aquifer System Analysis, Harrill and others 1982), and;

(4) the United States Bureau of Reclamation (Southern Nevada Deep Carbonate Aquifer Study 1984).

These studies were based on many smaller scale studies, including:

(1) the early studies of the White River flow system by Maxey and Eakin 1949, and Eakin 1966);

(2) the numerous studies in the area between, and including, the Nevada Test Site and Death Valley by Hunt and Robinson 1960, Eakin and other 1963, Winograd and Thordarson 1975, Classen 1983, and;

(3) the investigations of the geohydrology of Central Nevada associated with the Atomic Energy Commission's Central Nevada Test Area, Fiero and Illian 1968 and 1969.

Numerous other studies of individual or small groups of basins have also been conducted by private and public organizations, and information has been gathered from drilling for oil and mineral exploration. The 1984 United States Geological Survey memo indicates that given the "myriad possible avenues of hydrologic connection between the various aquifers and flow systems and the uncertainties of recharge and discharge mechanisms and processes, an investigation of the hydrology of the carbonate-rock aquifers in Nevada is undoubtedly a difficult undertaking."[15] Additional complicating factors included were that:

- basic hydrologic data (groundwater levels in both the basin-fill and carbonate-rock aquifers, flow measurements for important springs, and flow measurements for major streams) are scarce or infrequently obtained in much of the area;
- secondary hydrologic and other data, such as hydraulic parameters, geophysical and geochemical data, are lacking in many areas;
- only a small number of wells and drill holes tap the deep carbonate rocks;
- the geology of the Great Basin in general, and the Carbonate Terrane in particular, is complicated;
- uncertainties and inaccuracies exist in current methods of estimating groundwater inflow and recharge;
- uncertainties and inaccuracies exist in current methods of estimating groundwater outflow and evaporative discharge;
- the geometry, properties, and boundaries of the carbonate-rock and basin-fill reservoirs are generally unknown, and definition of these properties can be expensive and difficult;
- climatic conditions today are inadequately defined (particularly at higher altitudes) and conditions during the development of the flow paths within the deep-rock aquifers and flow paths are even more uncertain;

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[15] Id. Attachment at 7.

- limited stresses on the water resources of the area under current development conditions, allow hydrologists information only on the narrow band of system responses to natural conditions;
- the relationship between geothermal systems and the deep carbonate-rock aquifers and groundwater flow systems is not well understood; and
- the area underlain by significant carbonate-rock sequences in Nevada is over 40,000 square miles of sparsely populated land, and includes 106 hydrographic areas and basins.

> Because of the large number of hydrologic problems that exist and the scope, remoteness, and complexity of the ~~Carbonate Terrane, it is unlikely that a single, large-~~ scale comprehensive study of the Carbonate Terrane as a ~~whole could be pursued or even funded at appropriate~~ levels by any one of the interested agencies and organizations. It is unlikely that all of the interested ~~agencies taken together could pursue an adequate plan of~~ study unless the issues and investigations are pursued on ~~a more local level.~~[16]

The State Engineer finds that as of 1984 the carbonate-rock aquifers were known to exist, not much specific data existed on the carbonate-rock aquifers or their relationship to the basin-fill/alluvial aquifers and it was well known that further study was needed to understand the water systems. The State Engineer finds, given the complexities of the carbonate-rock aquifer system, ~~further site specific information (one valley at a time) is needed~~ and will provide information not presently available due to the ~~limited development of the resource~~.

IV.

In 1985, the Nevada Legislature authorized a program for the study and testing of the carbonate-rock aquifers of eastern and southern Nevada. The program was a cooperative effort between the State of Nevada and the Federal Government. The overall plan for the program was to study the carbonate-rock aquifers of southern, ~~east-central, and northeastern Nevada as separate phases of work,~~

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[16] Id. Attachment at 9.

with a summary of findings to be prepared at the end of each phase. A report, Distribution of Carbonate-Rock Aquifers in Southern Nevada and the Potential for their Development, Summary of Findings, 1985-1988,[17] summarized the findings of the first phase of the study, which assessed the resources of the carbonate-rock aquifers of southern Nevada. The summary brought together results from more than 20 technical reports produced during the study.

> The rocks that compose the carbonate-rock aquifers are layers of limestone and dolomite that were deposited hundreds of millions of years ago in much of the eastern Great Basin. Subsequently, the carbonate rocks were much deformed; as a result, they no longer exist as continuous layers beneath the region. Instead, they have been pulled apart to form a few large areas of thick and relatively continuous carbonate rocks. Separating these areas are noncarbonate rocks, within which are isolated mountain-sized blocks of carbonate rock.
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> Beneath southern Nevada, the thick carbonate-rock layers are continuous enough to transmit ground water at regional scales only beneath a north-south "corridor" 60-90 miles wide that extends southward from east-central Nevada to and beyond the Spring Mountains area west of Las Vegas. Within this corridor are the two major regional flow systems of southern Nevada: the Ash Meadows-Death Valley system and the White River-Muddy River Springs system. These flow systems link the ground water beneath dozens of valleys and over distances exceeding 200 miles. Flow in these systems probably is concentrated along highly transmissive zones associated with (1) recently active faults and (2) confluences of flow near major warm-water springs. Outside of the corridor, the carbonate rocks are present primarily as isolated blocks that form aquifers of limited extent, recharged mostly by local precipitation.

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[17] Michael D. Dettinger, Distribution of Carbonate-Rock Aquifers in Southern Nevada and the Potential for their Development, Summary of Findings, 1985-1988, Summary Report No. 1, United States Geological Survey, Department of Interior and Desert Research Institute, University of Nevada System, Forward, 1989.

The sources of ground-water flow in the aquifers of southern Nevada are (1) recharge from precipitation in the mountains and (2) regional inflow from carbonate-rock aquifers farther north. The total contribution from these sources to all the aquifers of southern Nevada--both carbonate and noncarbonate--is about 160,000 acre-feet per year. About 80 percent (130,000 acre-feet per year) passes beneath the central corridor; this includes nearly all flow in the major regional systems. At present, the fraction of the recharge that enters the carbonate-rock aquifers cannot be estimated because the controlling processes are poorly understood and because the available data are insufficient to describe these processes.

Some of the total flow beneath the area discharges through the basin-fill sedimentary aquifers that partly fill valleys, some flows from carbonate-rock aquifers at warm-water springs, and the rest flows out of Nevada into adjacent states (mostly to California) through the carbonate-rock aquifers. Discharge from the springs plus the outflow from Nevada through the carbonate rocks total about 77,000 acre-feet per year. The total rate of flow through the regional carbonate-rock aquifers of southern Nevada is equal to this 77,000 acre-feet per year plus some unknown quantity of ground water that leaks up into the basin-fill aquifers.

A much larger quantity of water--on the order of 800 million acre-feet--is stored in the carbonate-rock aquifers. This is because the aquifers underlie about 10,000 square miles and probably, are on the average, about 12,000 feet thick in the central corridor. On the order of 6 million acre-feet of water, the quantity stored in the upper 100 feet of the aquifers, might be economically accessible. However, this volume is equivalent to decades or centuries of recharge; if depleted, it would be replenished very slowly or not at all.

Large-scale development (sustained withdrawals) of water from the carbonate-rock aquifers would result in water-level declines and cause the depletion of large quantities of stored water. Ultimately, these declines would cause reductions in the flow of warm-water springs that discharge from the regional aquifers. Storage in other nearby aquifers also might be depleted, and water levels in those other aquifers could decline. In contrast, isolated smaller ground-water developments, or developments that withdraw ground water for only a short

> time, may result in water-level declines and springflow reductions of manageable or acceptable magnitude.
>
> Confidence in predictions of the effects of development, however, is low; and it will remain low until observations of the initial hydrologic results of development are analyzed. A strategy of staging developments gradually and adequately monitoring the resulting hydrologic conditions would provide information that eventually could be used to improve confidence in the predictions.[18]

At the time of Summary Report No. 1 - 1989 - the total rate of flow through the carbonate-rock aquifers could not be estimated directly, but rather must be bracketed by other rates that can be estimated.[19] The total flow was assumed to equal the recharge to the carbonate-rock aquifers alone, which is less than the total rate of recharge to all the aquifers of southern Nevada, both carbonate and non-carbonate. Because the fraction recharging the carbonate-rock aquifers alone could not be estimated, the total recharge was estimated to provide an upper limit on estimates of total flow.[20]

> The total rate of flow through the carbonate-rock aquifers is greater than the rate of land-surface discharge directly from the carbonate-rock aquifers, because some discharge from the carbonate-rock aquifers is by unseen subsurface leakage of water into adjacent basin-fill aquifers. The rate of land-surface discharge from the carbonate-rock aquifers therefore provides a lower limit on estimates of total flow. Thus, the total flow rate is bracketed between a regional total-recharge rate and a land-surface discharge rate.[21]

In Summary Report No. 1, it was estimated that for practical purposes, the perennial yield of the carbonate-rock aquifers of southern Nevada is no more than the combined rates of discharge at

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[18] Id. at 1-2.

[19] Id. at 17.

[20] Ibid.

[21] Id. at 17-18.

regional springs in southern Nevada and at discharge areas in the Death Valley region, totalling about 77,000 acre-feet per year.[22] Report No. 1 also indicated that the experiences with aquifer development at the Ash Meadows and Muddy River Springs areas indicates that the potential for adverse effects on both basin-fill and carbonate-rock aquifers can only be assessed on a site-by-site basis since different hydrologic settings in southern Nevada can be expected to respond differently to aquifer development.[23]

"Confidence in the prediction of effects that might result from development of the carbonate-rock aquifers will remain limited until observations are available that document changes as the aquifers respond locally to long-term pumping stresses."[24]

> Initially, assurances that the adverse effects of development will not overshadow benefits cannot be made with a high degree of confidence. However, if staged development were undertaken together with adequate monitoring, effects of continued or increased development could be estimated with progressively higher degrees of confidence. Staging means not developing the resources in one large step but rather starting with small projects that are augmented gradually as conditions and confidence warrant. This approach allows the effects of development to be observed and analyzed continually, so that the benefits and adverse effects of development can be judged and the effects reversed or mitigated if they prove to be too costly (in economic and environmental terms).[25]

The State Engineer finds the studies did not provide any precise numbers as to the quantity of unappropriated water available from the carbonate-rock aquifer as a whole nor any predictive numbers of the unappropriated water available from the carbonate-rock aquifer in any particular groundwater basin. The State Engineer finds that Summary Report No. 1 concludes that

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[22] Id. at 20.

[23] Id. at 25.

[24] Id. at 27.

[25] Id. at 27.

confidence in predicting the effects of specific plans for developing the carbonate-rock aquifers is likely to be increased only through a gradual, staged approach to aquifer development, together with adequate monitoring and interpretation of short-term and long-term effects. The State Engineer finds that gradual, small, staged development along with significant monitoring is a way in which additional science can be gathered to understand the system, and without allowing this development it appears the cost of exploring the system may prohibit the development of a full understanding.

V.

A central question in reference to appropriations from the carbonate-rock aquifers is how much water can potentially be withdrawn? "The water resource of the carbonate-rock aquifers is the sum of the sustained yield of the aquifers and a one-time reserve of water stored in the thick rocks."[26]

> How much total recharge and runoff is generated by precipitation on the mountains is uncertain; how much of the recharge enters the carbonate-rock aquifers as opposed to the basin-fill aquifers is even less certain.
>
> The quantity of water recharging the carbonate rocks is uncertain because once water enters the rocks it can follow one of several flow paths, and at each point will follow the one defined by least resistance. Flow paths may involve lateral movement through the carbonate-rock aquifers into adjacent basin-fill aquifers. The water that follows these paths leaves the carbonate-rock aquifers and becomes part of the resource of the basin-fill aquifers where it may be extracted as pumpage, discharged by evapotranspiration in areas of shallow ground water, or returned to an adjacent carbonate-rock aquifer. Some basin-fill aquifers receive recharge from adjacent carbonate-rock aquifers, some basin-fill aquifers provide recharge to adjacent carbonate-rock aquifers, and others both receive and provide recharge.

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[26] Michael Dettinger, James Harrill, and Dwight Schmidt, Distribution of Carbonate-Rock Aquifers and the Potential for Their Development, Southern Nevada and Adjacent Parts of California, Arizona and Utah, United States Geological Survey, Water-Resources Investigations Report 91-4146, at 47, 1995.

> Because these interactions are deep within the subsurface, they are difficult to identify and quantify. Consequently, it also is difficult to estimate the quantity of water recharging carbonate-rock aquifers. At present (1989), attempts at quantification are only adequate (1) to derive an estimate of the upper [sic] to the estimated recharge to all aquifers in the area, and (2) to estimate a lower limit based on discharge from the carbonate-rock aquifers at regional springs and by flow from the State through the carbonate-rock aquifers.[27]

The 1995 Water-Resources Investigations Report 91-4146[28] estimates the total water budget of all southern Nevada aquifers from the natural recharge to the mountains and subsurface inflow to the study area is estimated to be about 160,000 acre-feet annually, and discharges from major discharge areas to be about 77,000 acre-feet annually. The discharge rate includes about 21,000 acre-feet annually that enters the area from recharge sources in the high mountains of east-central Nevada along the northern part of the White River flow system.[29]

Several wells have already been developed in the carbonate-rock province. For example, the MX well CE-DT-4 penetrates the carbonate rocks beneath Coyote Springs Valley about 10 miles from the Muddy River springs.[30] The water levels in this well fluctuate about 0.2 feet seasonally with no apparent long-term trend of change. As of 1988, no water had been pumped from the carbonate-rock or basin-fill aquifers in the immediate vicinity of MX well CE-DT-4, but nearby industrial pumping was planned for the near future. The nearest pumping was from another well drilled into the

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[27] Id. at 49-50.

[28] Michael Dettinger, James Harrill, and Dwight Schmidt, Distribution of Carbonate-Rock Aquifers and the Potential for Their Development, Southern Nevada and Adjacent Parts of California, Arizona and Utah, United States Geological Survey, Water-Resources Investigations Report 91-4146, 1995.

[29] Id. at 50.

[30] Id. at 21.

carbonate rock about 6 miles away (MX well CE-DT-6) which the Moapa Valley Water Company had pumped during summers since 1986.[31] "More observations are needed to determine if the seasonal fluctuations measured in MX well CE-DT-4 are effects of this nearby pumping."[32]

A aquifer test of wells in the carbonate-rock was conducted from December 1993 to April 1994 under Applications 55450 and 58269, whereby 1,500 acre-feet of water at a diversion rate of 2,900 gallons per minute (6.46 cubic-feet per second) was pumped for 121 days.[33] This is equivalent to an average annual pumping rate of 2.14 cubic feet per second. Water levels in several carbonate and alluvial wells were monitored throughout the test and selected data are shown in Table A.

Table A. Maximum Drawdown in Several Wells

Well Name	Aquifer	Distance from Arrow Canyon Well, ft.	Maximum Drawdown, ft.
EH-4	Carbonate	14,000	0.50
EH-5B	Carbonate	1,800	0.50
MX-6	Carbonate	16,000	0.30
Dahlberg East	Alluvial	200	0
Lewis North	Alluvial	1,800	0
Lewis Farm	Alluvial	2,700	0

Discharge rates from certain springs within the Muddy River Springs Area groundwater basin were also measured during the test. Based on these facts, the State Engineer found that the discharge

[31] Ibid.

[32] Id at 21.

[33] State Engineer's Ruling No. 4542, dated June 19, 1997, official records in the office of the State Engineer.

rates for the springs were unchanged,[34] and further found that the data based on the observations from the monitoring wells from the 121-day pump test showed little or no impact to either the alluvial or carbonate aquifers.

As a result of a search for a testing ground for the MX missile, the United States Air Force, Ballistic Missile Office contracted with the Earth Technology Corporation, ERTEC, to investigate potential sites for water resources.[35] As a result of this search, aquifer tests were conducted on a well (CE-DT-5) completed in the carbonate-rock aquifer located in the SE¼ SE¼ of Section 23, T.13S., R.63E., M.D.B.&M. The well was pumped at a constant discharge rate of 3,400 gallons per minute (7.58 cubic feet per second) for 30 days. The maximum well yield is not known because the yields obtained were at the limit of the pump capability used for the test, not the yield of the carbonate-rock aquifer. The aquifer test yielded drawdowns in the test well itself of 11 to 12 feet. The only other well seeing any response due to the test was a monitor well, CE-DT-4, drilled 330 feet away and in the same formation as CE-DT-5. CE-DT-4 showed no response during the first 500 minutes (8.3 hours) of the aquifer test and yielded a maximum drawdown of 0.38 feet after 12,000 minutes (8.3 days). During maintenance shutdowns or pump failures, the water levels in CE-DT-4 recovered fully to pre-pumping levels within three minutes. At the end of the thirty day test, the drawdown measured in CE-DT-4 was measured at 0.22 feet. Monitoring of springs in the Muddy River Springs hydrographic basin found no change in discharge rates.[36]

It was concluded from the aquifer test of the CE-DT-5 well that the carbonate-rock aquifer is capable of a long-term,

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[34] Ibid.

[35] State Engineer's Ruling No. 4542, dated June 19, 1997, official records in the office of the State Engineer.

[36] Ibid.

sustained yield in excess of 3,400 gallons per minute and that the long-term, constant discharge testing of the well resulted in no detectable impacts upon either the discharge rate or water quality of the regional springs in the Muddy River Springs area.[37] Clearly there is high transmissivity and storativity associated with this aquifer.

The State Engineer finds that little is known as to what yield exists from the carbonate-rock aquifer and its impact on the alluvial aquifers of the Garnet and Hidden Valley groundwater basins. However, based on the scientific studies to date, the experts believe there is some water that can be developed from the system, but only through slow, staged development of small amounts accompanied by significant monitoring, studying and reporting with plans for mitigation if impacts to existing water rights are shown. The State Engineer finds lack of knowledge should not stop the development of the carbonate-rock aquifers in light of its potential as a significant resource in one of the driest places in the nation, but that development should proceed in Garnet and Hidden Valley in relatively small quantities and cautiously.

VI.

By letter dated March 5, 2001, the Las Vegas Valley Water District requested that the State Engineer immediately proceed with action on Applications 54073 and 54074.[38] The LVVWD further indicated that the October 1999 Southern Nevada Resource Plan (which outlines plans for water resources for all purveyors in the Las Vegas Valley through 2050) identifies the Cooperative Water Project as a potential future option; however, there are no current plans to move forward with the importation of ground water from the rural counties since other options such as the Arizona Groundwater

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[37] Ibid.

[38] Letter from David Donnelly, Deputy General Manager, Las Vegas Valley Water District to Hugh Ricci, State Engineer, dated March 5, 2001. File Nos. 54073 and 54074, official records in the office of the State Engineer.

Bank and Colorado River water provided by recently approved Interim Surplus guidelines are more probable and cost effective. However, there has been tremendous growth and plans for future development outside the Las Vegas Valley along the I-15 corridor between Primm and Mesquite and these plans include the construction of a number of power plants along the Kern River natural gas pipeline.[39]

The national news of late is filled with stories as to the lack of sufficient power generating resources in the western United States. That news informs us that with much of the western United States is currently experiencing shortages of electrical power, and the ability of Nevada to maintain a reliable long-term power supply at a reasonable cost has been jeopardized. Specifically, the deregulation of the power industry in California has resulted in both escalating prices and widespread shortages. Nevada is now seeing the beginnings of similar cost increase and supply shortages. "[E]ven a substantial increase in conservation and renewable energy cannot meet the needs of Southern Nevada in upcoming years."[40]

> Presently, Nevada Power Company has generation capacity or permanent contracts for only about 50% of Southern Nevada's peak summer demands, with the remaining 50% provided by short-term contracts. The current critical power situation in California, which is impacting other states in the west, has resulted in Governor Guinn announcing on February 22, 2001, an energy plan for Nevada. This plans includes expediting the construction of some of these proposed power plants and negotiating for some of the energy to remain in Nevada. Action on Application Nos. 54073 and 54074 to appropriate water in Garnet and Hidden Valleys would allow the District to provide water resources for the construction of these

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[39] Letter from David Donnelly, Deputy General Manager, Las Vegas Valley Water District to Hugh Ricci, State Engineer, dated March 5, 2001. File Nos. 54073 and 54074, official records of the office of the State Engineer.

[40] Memorandum from Neill T. Dimmick, Director of Regulatory Operations, Public Utilities Commission of Nevada, to R. Michael Turnipseed, Director, Nevada Department of Conservation and Natural Resources, dated March 9, 2001.

power generation facilities in exchange for a portion of the energy remaining in Nevada.[41]

New generation is necessary in Southern Nevada by the summer of 2003 to ensure that Southern Nevadans get reliable service at a reasonable price. Nevada Power will have sufficient resources to meet the load through the summer of 2003, but the ability to meet the load depends upon there being sufficient regional reserves and recent events indicate that relying upon regional reserves is risky.[42] Nevada Power has become increasingly dependent upon imported energy in recent years.[43]

As shown in the Loads and Resources Table from Nevada Power's 2000 Resource Plan filing, Nevada Power Company's generation in its control area provided 1,708 MW of summer generation. In addition, NPC has access to 305 MW of generation from the Qualifying Facilities, 451 MW from the Mohave and Navajo plants, and 235 MW of Federal Power from the Hoover Dam. The total of this generation is 2,699 MW.[44]

Nevada Power Company's Peak Load for the summer of 2003 is forecasted to be 5,281 MW (including a 12% planning reserve margin).[45] Therefore, in round numbers, if Nevada Power were to supply all the power needs of Southern Nevada it would need about

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[41] Letter from David Donnelly, Deputy General Manager, Las Vegas Valley Water District to Hugh Ricci, State Engineer, dated March 5, 2001. File Nos. 54073 and 53074, official records in the office of the State Engineer.

[42] Memorandum from Neill T. Dimmick, Director of Regulatory Operations, Public Utilities Commission of Nevada, to R. Michael Turnipseed, Director, Nevada Department of Conservation and Natural Resources, dated March 9, 2001.

[43] Ibid.

[44] Figure 1, Memorandum from Neill T. Dimmick, Director of Regulatory Operations, Public Utilities Commission of Nevada, to R. Michael Turnipseed, Director, Nevada Department of Conservation and Natural Resources, dated March 9, 2001.

[45] Ibid.

2,582 MW of purchased power to meet its peak load for the summer of 2003.

Nevada Power has about 3,300 MW of firm transmission import capability but the existence of import capability does not equate in the current market environment with the ability to meet the load.[46] While Nevada Power Company's transmission system is predicted to be able to provide 3,625 MW of imported power in 2003, and the entire purchased power requirement could be met by imported power - if there are sufficient energy reserves in the Southwestern Region - given present conditions in California, the California Department of Water Resources's attempts to tie up regional reserves in long-term contracts, and the difficulty of siting new plants in California, this is a very big if. Alternatively, if approximately 3,000 MW of new generation is sited and energized in Southern Nevada by 2003 then there will be additional opportunities for the utility and other Southern Nevada consumers to arrange for supplies to meet their loads.

The March 5, 2001, letter from the Las Vegas Valley Water District indicated that the current critical power situation in California, which is impacting other states in the West, has resulted in Governor Guinn announcing on February 22, 2001, an energy plan for Nevada, which includes expediting the construction of some of the proposed power plants and negotiating for some of that power to remain in Nevada.[47] The District indicates that action on Applications 54073 and 54074 would allow the District to provide water resources for the construction of realistic power generation projects, which will use water efficient, air-cooled

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[46] Memorandum from Neill T. Dimmick, Director of Regulatory Operations, Public Utilities Commission of Nevada, to R. Michael Turnipseed, Director, Nevada Department of Conservation and Natural Resources, dated March 9, 2001.

[47] Letter from David Donnelly, Deputy General Manager, Las Vegas Valley Water District to Hugh Ricci, State Engineer, dated March 5, 2001. File Nos. 54073 and 54074, official records of the office of the State Engineer.

technology, in exchange for a portion of the energy remaining in Nevada. Providing water for these generating facilities would allow an opportunity to negotiate a fixed amount of power for Southern Nevada users through contracts.

The State Engineer finds the evidence indicates a power crisis is on the horizon for Southern Nevada.

VII.

Many of the protestants alleged that these applications were two of the 146 filed by the Las Vegas Valley Water District, which when combined, sought a quantity of water that would deprive the area of origin of water needed to protect and enhance its environment and economic well being, and that the diversion would unnecessarily destroy environmental, ecological, scenic and recreational values the State holds in trust for its citizens.

Application 54074 is subject to the provisions of NRS § 533.370(4) as to the importation of water, and the water being requested for appropriation from the Garnet Valley groundwater basin will be used in the basin the origin; therefore, this protest issue does not raise any issue to be decided by the State Engineer in Garnet Valley. The water being requested for appropriation from the Hidden Valley groundwater basin is planned for importation into Garnet Valley, and the State Engineer finds the applicant has justified the need to import water. The State Engineer finds the requirements of monitoring and mitigation being imposed will provide the needed information as to whether the importation is environmentally sound from a hydrologic standpoint. The State Engineer finds, since the LVVWD reduced the quantity requested for appropriation from its original 14,000 acre-feet annually to 2,200 acre-feet annually, he does not believe its use will unduly limit future growth and development in the Hidden Valley groundwater basin, but as previously discussed there are unknowns as to actual quantity of water which is available from the system.

VIII.

Some of the protestants alleged that the applications should not be granted in the absence of comprehensive planning. The State Engineer finds there is no provision in Nevada Water Law which requires comprehensive water resource development planning prior to the granting of a water right application, and further as discussed below, that the Las Vegas Valley Water District and the Southern Nevada Water Authority have engaged in long-range planning.

IX.

Some of the protestants alleged that the approval of the applications would sanction and encourage the willful waste and inefficient use of water in Las Vegas Valley.

> In Las Vegas, the role of conservation is critical to the region's water planning efforts. In 1990, the local water and wastewater agencies completed an extensive supply and demand projection process that resulted in public realization that the region would run out of water in fifteen years even with conservation. The need for conservation was quickly acknowledged by the public and widespread conservation efforts began in the summer of 1991. Creation of artificial lakes was banned, water waste ordinances were adopted, and lawn watering was restricted during the hotter time of the day.
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> * * *
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> To begin the shift to water-conserving rates, local water purveyors switched from flat rates to increasing block rates.
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> From 1991 through 1994, conservation education and water rates slowly increased. During the IRP [Integrated Resource Plan] process in 1994 and 1995, it became obvious that conservation could extend the time frames when additional resources and facilities are needed. As a result, the Board adopted recommendations on conservation, including one that required a 10 to 15 percent reduction in maximum day water usage by summer 2000.[48]

Further activity towards conservation in the Las Vegas Valley has encompassed public education to reduce peak summer usage,

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[48] Southern Nevada Water Authority 1999 Water Resource Plan, at 7-10, October 1999.

agreeing to follow the Bureau of Reclamation's conservation measures called "Best Management Practices", waste water reuse and a xeriscape study. "A recent survey by the City of Austin, Texas of water purveyors around the nation shows the Authority's overall program is among the most comprehensive in the country."[49]

The State Engineer finds the Southern Nevada Water Authority is taking conservation seriously as part of its overall water management plan.

X.

Some of the protestants alleged that the LVVWD has not obtained rights-of-way from the BLM. The State Engineer finds every water right permit is conditioned on the applicant obtaining the necessary right-of-way, if needed, and these applicants will not be treated any differently. Such a requirement to obtain any necessary right-of way will be part of a permit term.

XI.

Some of the protestants alleged that the LVVWD lacks the financial capability for developing the project. This protest allegation is more relevant if the State Engineer were considering the applications as a whole. Since these applications are not being considered as a group, but rather individually and basin by basin, and since there is evidence that the project of water and power development will be done jointly with private industry,[50] the State Engineer finds the issue of financial ability to develop the massive project of all the Las Vegas Valley Water District filings concurrently is not relevant.

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[49] Id. at 8.

[50] Letter from David Donnelly, Deputy General Manager, Las Vegas Valley Water District to Hugh Ricci, State Engineer, dated March 5, 2001. File Nos. 54073 and 53074, official records in the office of the State Engineer.

XII.

Some of the protestants alleged that the applications failed to include statutorily required information specifically a description of the place of use, the proposed works, the estimated cost of such works and the estimated time required to go to beneficial use. The State Engineer finds he has sufficient information to address the applications.

XIII.

Some of the protestants alleged that the applications failed to contain sufficient information for the State Engineer to safeguard the public interest and that a publicly reviewable assessment must be done of the cumulative impacts of the proposed extraction, mitigation measures needed and alternatives to the proposed extraction. The State Engineer finds that the process envisioned by allowing relatively small amounts of water to be appropriated along with staged development and significant monitoring addresses this protest concern; however, there is nothing in the water law which requires a public review assessment process. The records of the State Engineer are always available for public review.

XIV.

Some of the protestants alleged that the population projection numbers are unrealistic. The applicant projected a population of 1,400,000 people by the year 2020. The present population of Clark County is approximately 1,400,000 people; therefore, the State Engineer finds the population projections were not unrealistic.

XV.

Some protestants alleged that these applications, among the others, would allow the Las Vegas Valley Water District to "lock up" vital water resources for possible use in the distant future beyond current planning horizons, and further alleged that the applications substantially overstate future water demand needs. These applications were filed in 1989. In 1989, the Las Vegas Valley Water District believed it was running out of additional

water resources in the very near future.

In 1987, the Nevada Legislature enacted the first water laws providing for projects which recharge, store and recover water.[51] Recharge of excess Colorado River water by the Las Vegas Valley Water District began around 1989. In 1991, the Las Vegas Valley Water District issued a moratorium which prohibited any new hookups to the water system. Thus, the future water demands were not beyond current planning horizons.

Since the filing of the applications, the Las Vegas Valley Water District, along with and as a member of the Southern Nevada Water Authority, has been involved in many varied programs to plan for the future resources of the Las Vegas Valley. In 1991, the Southern Nevada Water Authority (SNWA) was formed, and the SNWA purveyors agreed that any new contract with the Secretary of the Interior for remaining unallocated water from the Colorado River would be with the SNWA and would deliver water to purveyor members and they agreed on the method of allocating any water received.[52] The remaining Colorado River water was contracted for in 1992.

In 1993 and 1994, the SNWA obtained additional Colorado River water through agreements with Southern California Edison and Basic Management, Inc., and agreements have been reached regarding reclaimed water.[53] Beginning with 1996, the Secretary of Interior has declared a surplus condition on the Colorado River every year (up to the date of the October 1999 Water Resource Plan), and under the excess surplus criteria this had provided additional water for Southern Nevada.[54] Since then, the Department of Interior has issued a record of decision making the Interim Surplus Guidelines

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[51] Nevada Revised Statutes § 534.250 - 534.340.

[52] Id. at 14.

[53] Southern Nevada Water Authority 1999 Water Resource Plan, at 14-15, October 1999.

[54] Southern Nevada Water Authority 1999 Water Resource Plan, pp. 20-21, 31-36, October 1999.

effective beginning in 2002, which will provide Colorado River water for the Southern Nevada Water Authority purveyors through 2016.[55] Planning for the reuse of reclaimed water has taken place over the last decade and thousands of acre-feet of water are now used in power plants and on golf courses.[56] Furthermore, there now exists the possibility of using the Arizona Water Banking program, an option which did not exist at the time of the filing of the applications.[57]

The LVVWD indicated that the October 1999 Southern Nevada Resource Plan (which outlines plans for water resources for all purveyors in the Las Vegas Valley through 2050) identifies the Cooperative Water Project as a potential future option; however, there are no current plans to move forward with the importation of ground water from the rural counties since other options such as the Arizona Groundwater Bank and Colorado River water provided by recently approved Interim Surplus guidelines are more probable and cost effective.[58]

The State Engineer finds as to these applications, the applicant has reduced the amount of water requested downward from its original applications and the amount is not substantially overstated. The State Engineer finds that Nevada is a prior appropriation state, that is, first in time, first in right, and the applicant is moving forward with a use for the water requested

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[55] Letter from David Donnelly, Deputy General Manager, Las Vegas Valley Water District to Hugh Ricci, State Engineer, dated March 5, 2001. File Nos. 54073 and 54074, official records of the office of the State Engineer.

[56] Southern Nevada Water Authority 1999 Water Resource Plan, pp. 16-17, October 1999.

[57] Southern Nevada Water Authority 1999 Water Resource Plan, pp. 36-38, October 1999.

[58] Letter from David Donnelly, Deputy General Manager, Las Vegas Valley Water District to Hugh Ricci, State Engineer, dated March 5, 2001. File Nos. 54073 and 53074, official records in the office of the State Engineer.

for appropriation under these applications; therefore, there is a reasonable expectation to go to beneficial use within a reasonable amount of time.

XVI.

Some of the protestants alleged that the granting of the applications would destroy the economic and growth potential of the hydrographic basin. The State Engineer finds Nevada is a prior appropriation state, that is first in time is first in right, the quantity requested has been adjusted significantly downward, and NRS § 533.370(4) provides for a method by which the State Engineer can address this issue.

XVII.

Some of the protestants alleged that further study is needed because the potential effects are impossible to anticipate, that the public interest will not be served if the water and water-related resources in the Death Valley National Monument and the Lake Mead National Recreational Area are diminished or impaired as a result of the appropriations, and that the applications will eventually reduce or eliminate the flows from springs which are discharge areas for a regional groundwater flow system upon which the National Park Service claims senior appropriative and implied Federal reserved water rights. The State Engineer finds that gradual, staged appropriations of smaller quantities of water with sufficient monitoring and mitigation will deal with these protest issues, and there are too many unknowns to be able to address this issue without developing additional science.

XVIII.

Some of the protestants alleged that the proposed diversions are from the carbonate-rock province of Nevada that is typified by complex, interbasin, regional-flow systems that includes both basin-fill and carbonate-rock aquifers along with interbasin flows that are poorly defined, and the diversions will reduce the interbasin flows, modify the direction of groundwater movement in adjoining and hydraulically connected basins thereby reducing

spring and stream flows. The State Engineer finds this is the reasoning behind gradual, staged development, which is to develop further knowledge that it lacking at this time as to how the complex carbonate-rock aquifer system works. The State Engineer finds it is not known whether the diversions will reduce the interbasin flows, modify the direction of groundwater movement in adjoining and hydraulically connected basins reducing spring and stream flows; thus, the reasoning behind gradual development, monitoring, and mitigation, if necessary.

XIX.

Some of the protestants alleged that the available scientific literature is not adequate to reasonably assure that the proposed diversions will not impact senior rights and water resources. The State Engineer finds this statement to be true, and again; thus, the reasoning behind gradual development, monitoring and mitigation, if necessary. The State Engineer finds without development of the resource the knowledge will not be obtained to even explore whether development of the resource is feasible or not.

XX.

Some of the protestants alleged that as of December 1988 the committed diversions in Garnet Valley were 1,651 acre-feet annually (afa) with an estimated perennial yield of 400 afa and that the sum of Application 54073 and the committed diversions will exceed the perennial yield of the groundwater basin; therefore, there is no water available for appropriation. The State Engineer finds the water requested for appropriation under these applications is from the carbonate-rock aquifer and at this time it is unknown what contribution if any the carbonate-rock aquifer has to the estimated perennial yield of either the Garnet Valley or Hidden Valley groundwater basins.

XXI.

Some of the protestants alleged that it is unclear whether the amount contemplated in the applications is necessary and reasonably required for the proposed purposes. The State Engineer finds since he is taking these applications basin by basin, the amount requested under these applications has been reduced, and the amount is for the development of perhaps several air-cooled power plants, it is a reasonable amount for the power plants envisioned.

XXII.

Some of the protestants alleged that the granting of the applications will lower the water table, sanction water mining, degrade the water quality, cause negative hydraulic gradient influences, threaten springs and seeps and phreatophytes which provide water and habitat critical to the survival of wildlife, including endangered species and grazing livestock. They further alleged that the applications would create air contamination and pollution in violation of State and Federal statutes.

By letter dated March 5, 2001, the Las Vegas Valley Water District requested that the State Engineer immediately proceed with action on Applications 54073 and 54074.[59] The LVVWD further discussed hydrologic conditions in Garnet and Hidden Valleys, but centered its discussion on the amount of water in storage in each valley.

> Based on the number of power plants considered realistic for the Apex area and their planned water efficient, air-cooled technology, it is estimated that a total duty of about 2,200 acre-feet per year is needed. The estimated potential impact to the aquifer, assuming a maximum of 2,200 acre-feet per year of total withdrawals (totally from one basin or partially from each basin) for 25 years, and assuming no natural recharge or no contribution from the underlying carbonate aquifer, would be about 8 percent (55,000 acre-feet of the combined 650,000 acre-feet) of the amount of water in storage in the upper 100 feet of saturated sediment, or if assumed

[59] File Nos. 54073 and 54074, official records in the office of the State Engineer.

> to be distributed uniformly throughout the aquifer a total water level decline of about 8 feet over the 25-year period. While this is a simplistic calculation and the actual water level decline would be greater considering local conditions, this gives an overall general conservative comparison of the withdrawal volume compared to the resource available. Since there are no phreatophytes or spring complexes within these valleys, pumping of 2,200 acre-feet annually over the life of these plants would not have significant impacts. However, pumping from both the Garnet and Hidden Valley aquifers would be closely monitored as an expanded part of the current monitoring program now ongoing in this general area.[60]

The State Engineer finds these protest claims directly relate to the discussion above as to gradual, staged development with sufficient monitoring to explore the capacity of the system, and air quality issues are addressed by the Clark County Health Department. Furthermore, the State Engineer finds that as the municipality with access to resources such as the Colorado River, the Las Vegas Valley Water District has sufficient resources to plan for any necessary mitigation, including bringing in Colorado River water, if necessary.

XXIII.

Some protestants alleged that the applications will cause water rates to go up thereby causing demand to go down thereby rendering the water unnecessary. The State Engineer finds this protest claim to be completely hypothetical and not within the purvey of his review.

XXIV.

Some protestants alleged that previous applications from Garnet Valley Hydrographic Basin have been denied. State

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[60] Letter from David Donnelly, Deputy General Manager, Las Vegas Valley Water District to Hugh Ricci, State Engineer, dated March 5, 2001. File Nos. 54073 and 53074, official records in the office of the State Engineer.

Engineer's Ruling Nos. 2563[61] and 3585[62] were issued in June 1980 and February 1989, respectively, and denied a series of applications requesting appropriations from Hidden Valley for irrigation on the grounds that the perennial yield of the groundwater basin would be exceeded and since the depth to ground water exceeded 500 feet, the water was too deep to be economical to pump for the irrigation of crops. State Engineer's Ruling No. 2814[63] was issued in June 1983 and denied a series of applications requesting appropriations from Garnet Valley for irrigation purposes under either Carey Act or Desert Land entries. Many of the applications were filed on the same date and in total requested the appropriation of 34,400 acre-feet annually. These applications were also denied on the grounds that the perennial yield of the groundwater basin would be exceeded, but further, that if granted they would remove ground water from the groundwater reservoir which would not be replaced resulting in depletion of the groundwater reservoir.

The State Engineer finds that these applications were denied several years before and after the discussions began as to the carbonate-rock aquifer and its connection or disconnection to the alluvial aquifers, and whether there was additional water for appropriation from the carbonate-rock aquifer above and beyond that water considered for appropriation on a strict perennial yield analysis for each individual basin. The State Engineer finds if those denied applications were ready for action today they would be denied as they are not considered a preferred use of the ground

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[61] State Engineer's Ruling No. 2563, dated June 11, 1980, official records of the office of the State Engineer.

[62] State Engineer's Ruling No. 3585, dated February 14, 1989, official records of the office of the State Engineer.

[63] State Engineer's Ruling No. 2814, dated June 7 1983, official records of the office of the State Engineer.

water in these groundwater basins pursuant to the State Engineer's Orders designating these groundwater basin.[64]

XXV.

One protestant alleged that until the claims under the Treaty of Ruby Valley (1863) are adjudicated the applications are premature. The State Engineer finds issues as to the Treaty of Ruby Valley are not within his jurisdiction and all water right permits are issued subject to existing rights.

XXVI.

A protestant alleged that the applications will interfere with the Bureau of Land Management's ability to manage its lands and the points of diversion are within proposed wilderness areas. The State Engineer finds if these applications are within proposed wilderness areas that is an issue for the BLM to address.

XXVII.

The State Engineer finds that if any significant impacts to existing water rights are detected the Las Vegas Valley Water District will be required to mitigate those impacts.

CONCLUSIONS OF LAW

I.

The State Engineer has jurisdiction over the parties and the subject matter of this action and determination.[65]

II.

The State Engineer is prohibited by law from granting a permit under an application to appropriate the public waters where:[66]

A. There is no unappropriated water at the proposed source, or

B. The proposed use conflicts with existing rights, or

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[64] State Engineer' Order Nos. 1024 and 1035, dated April 24, 1990, official records in the office of the State Engineer.

[65] NRS chapters 533 and 534.

[66] NRS Chapter 533.370(3).

C. The proposed use threatens to prove detrimental to the public interest.

III.

The State Engineer concludes that the expert scientific evidence found in the reports prepared over the last decade leads him to believe there is unappropriated water in the carbonate-rock aquifer system, but that further knowledge is necessary before any amount can be quantified. The State Engineer concludes that only by gradual, staged development can the additional science be obtained which will allow a better understanding of the carbonate-rock aquifer(s).

IV.

The State Engineer concludes that little is known as to what yield exists from the carbonate-rock aquifer; therefore, it is impossible to say if there will be any impacts on the alluvial aquifers of the Garnet and Hidden Valley groundwater basins or existing water rights within those groundwater basins or in other areas; therefore, by providing safeguards, such as monitoring and mitigation, the State Engineer can be assured that any impacts can be quantified.

V.

The State Engineer concludes that Nevada Water Law does not require comprehensive planning before the granting of a water right application.

VI.

The State Engineer concludes the evidence does not indicate that appropriation of water from the carbonate-rock aquifers will automatically conflict with existing water rights. The complexity and unknowns of the system make such a determination extremely difficult. Only by allowing some development to proceed will the additional science be obtained to provide further knowledge as to how the carbonate-rock aquifer and alluvial aquifer systems are connected, if they are. The State Engineer concludes that the available scientific literature is not adequate to reasonably

assure that the proposed diversions will not impact senior rights and water resources; thus, the requirements of monitoring and mitigation, if necessary. The State Engineer concludes that the evidence to date indicates that generalizations cannot be made applicable to specific basins because they may not be applicable to any particular basin, since individual basins may react completely differently to the pumping of the carbonate-rock aquifer.

VI.

The State Engineer concludes that the protest issue that the applications would encourage willful waste and inefficient use of water in the Las Vegas Valley is not a protest issue warranting consideration.

VII.

The State Engineer concludes if the applicant needs to obtain the approval of the United States Department of Interior, Bureau of Land Management for any necessary rights-of-way that is any issue for the applicant to address with the Bureau of Land Management. The granting of a water right permit does not waive the requirements of other State or Federal laws.

VIII.

The State Engineer concludes the applications contain sufficient information for the State Engineer to safeguard the public interest. The State Engineer concludes that it does not threaten to prove detrimental to the public interest to allow smaller quantities of water to be developed from the carbonate-rock aquifer system, but the development must be staged and in conjunction with sufficient monitoring, and plans for mitigation of impacts, if necessary. The State Engineer concludes, in light of the looming energy crisis, that it does not threaten to prove detrimental to the public interest to allow some development of this resource to proceed for the beneficial use of power production since the capacity of the system can only be determined by further development. The State Engineer concludes that the Las Vegas Valley Water District has sufficient resources to plan for any

necessary mitigation, which could include bringing in the water line that supplies Colorado River water.

IX.

The State Engineer concludes that Nevada Water Law does not require a publicly-reviewable assessment of the cumulative impacts of the proposed appropriation.

X.

The State Engineer concludes he is only acting on Applications 54073 and 54074 under this ruling and since the applicant has proposed a plan for the beneficial use of the water in the near future, the issue of "locking-up" the resource beyond current planning horizons is moot.

XI.

The State Engineer concludes that granting of the applications will not destroy the economic and growth potential of the hydrographic basin since the project(s) envisioned are located within the Garnet Valley hydrographic basin and the quantity of water requested for appropriation has been significantly reduced.

XII.

The State Engineer concludes that the water-related interests of the Death Valley National Monument and the Lake Mead Recreational Area are protected by the required monitoring and mitigation, if necessary.

XIII.

The State Engineer concludes that it is unknown without further analysis if these appropriations will reduce interbasin flows or modify the direction of groundwater movement thereby reducing spring and stream flows; thus, the requirement of monitoring and mitigation, if necessary.

XIV.

The State Engineer concludes that while the existing rights in the Garnet Valley groundwater basin exceed the estimated perennial yield, that analysis did not contemplate the carbonate-rock aquifer resource as perhaps changing the analysis of the water available

for appropriation and only by stressing the system can such a determination be made.

XV.

The State Engineer concludes the amount requested for appropriation is necessary and reasonable for the several air-cooled power plants contemplated.

XVI.

The State Engineer concludes that by the granting of these water right applications he is not sanctioning water mining; and thus, the requirement for monitoring and mitigation.

XVII.

The State Engineer concludes that the issue of air contamination or pollution is within the authority of the Clark County Health Department.

XVIII.

The State Engineer concludes that the protest issue that the applications will cause water rates to go up causing demand to go down is without merit.

XIX.

The State Engineer concludes that any issues as to the Treaty of Ruby Valley are not within his jurisdiction and all water right permits are issued subject to existing rights.

XX.

The State Engineer concludes that if the proposed points of diversion are within proposed wilderness areas that is an issue the applicant will need to address with the Bureau of Land Management.

RULING

The protests to Applications 54073 and 54074 are hereby overruled. Applications 54073 and 54074 are hereby granted subject to:

1. Existing rights;
2. Payment of the statutory fees;

3. A monitoring program approved by the State Engineer prior to the diversion of any water permitted under these applications;

4. The total combined duty under Permits 54073 and 54074 shall be limited to 2,200 acre-feet annually and each permit ~~will have a diversion rate of 5.0 cfs~~;

5. If impacts to existing rights are demonstrated, the applicant will be required to mitigate the same to the satisfaction of the State Engineer.

Respectfully submitted,

HUGH RICCI, P.E.
State Engineer

HR/SJT

Dated this 20th day of March, 2001.