

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

IN THE MATTER OF APPLICATIONS )  
36761 THROUGH 36776, INCLUSIVE, )  
FILED TO APPROPRIATE THE PUBLIC )  
WATERS FROM AN UNDERGROUND )  
SOURCE WITHIN THE AMARGOSA )  
DESERT GROUNDWATER BASIN (230) )  
NYE COUNTY, NEVADA. )

RULING

# 4525

GENERAL

I.

~~Application 36761 was filed on February 12, 1979, by James Owen to appropriate 3.6 cubic feet per second (cfs) of the underground waters of the Amargosa Desert Groundwater Basin, Nye County, Nevada, for the irrigation of 160 acres within the SW $\frac{1}{4}$  of Section 23, T.16S., R.48E., M.D.B.&M.<sup>1</sup> The point of diversion is described as being located within the SE $\frac{1}{4}$  SW $\frac{1}{4}$  of said Section 23.~~

~~Application 36762 was filed on February 12, 1979, by James Owen to appropriate 3.6 cfs of the underground waters of the Amargosa Desert Groundwater Basin, Nye County, Nevada, for the irrigation of 160 acres within the NW $\frac{1}{4}$  of Section 23, T.16S., R.48E., M.D.B.&M.<sup>2</sup> The point of diversion is described as being located within the SW $\frac{1}{4}$  NW $\frac{1}{4}$  of said Section 23.~~

~~Application 36763 was filed on February 12, 1979, by James Owen to appropriate 3.6 cfs of the underground waters of the Amargosa Desert Groundwater Basin, Nye County, Nevada, for the irrigation of 160 acres within the SW $\frac{1}{4}$  of Section 23, T.16S., R.48E., M.D.B.&M.<sup>3</sup> The point of diversion is described as being located within the NW $\frac{1}{4}$  SW $\frac{1}{4}$  of said Section 23.~~

<sup>1</sup> File No. 36761, official records in the office of the State Engineer.

<sup>2</sup> File No. 36762, official records in the office of the State Engineer.

<sup>3</sup> File No. 36763, official records in the office of the State Engineer.

Application 36764 was filed on February 12, 1979, by James Owen to appropriate 3.6 cfs of the underground waters of the Amargosa Desert Groundwater Basin, Nye County, Nevada, for the irrigation of 160 acres within the NW $\frac{1}{4}$  of Section 25, T.16S., R.48E., M.D.B.&M.<sup>4</sup> The point of diversion is described as being located within the SE $\frac{1}{4}$  NW $\frac{1}{4}$  of said Section 25.

Application 36765 was filed on February 12, 1979, by James Owen to appropriate 3.6 cfs of the underground waters of the Amargosa Desert Groundwater Basin, Nye County, Nevada, for the irrigation of 160 acres within the SW $\frac{1}{4}$  of Section 25, T.16S., R.48E., M.D.B.&M.<sup>5</sup> The point of diversion is described as being located within the NE $\frac{1}{4}$  SW $\frac{1}{4}$  of said Section 25.

Application 36766 was filed on February 12, 1979, by James Owen to appropriate 3.6 cfs of the underground waters of the Amargosa Desert Groundwater Basin, Nye County, Nevada, for the irrigation of 160 acres within the SE $\frac{1}{4}$  of Section 26, T.16S., R.48E., M.D.B.&M.<sup>6</sup> The point of diversion is described as being located within the NE $\frac{1}{4}$  SE $\frac{1}{4}$  of said Section 26.

Application 36767 was filed on February 12, 1979, by James Owen to appropriate 3.6 cfs of the underground waters of the Amargosa Desert Groundwater Basin, Nye County, Nevada, for the irrigation of 120 acres within the NE $\frac{1}{4}$  (excluding the NE $\frac{1}{4}$  NE $\frac{1}{4}$ ) of Section 36, T.16S., R.48E., M.D.B.&M.<sup>7</sup> The point of diversion is described as being located within the SW $\frac{1}{4}$  NE $\frac{1}{4}$  of said Section 36.

---

<sup>4</sup> File No. 36764, official records in the office of the State Engineer.

<sup>5</sup> File No. 36765, official records in the office of the State Engineer.

<sup>6</sup> File No. 36766, official records in the office of the State Engineer.

<sup>7</sup> File No. 36767, official records in the office of the State Engineer.

Application 36768 was filed on February 12, 1979, by James Owen to appropriate 3.6 cfs of the underground waters of the Amargosa Desert Groundwater Basin, Nye County, Nevada, for the irrigation of 160 acres within the SE $\frac{1}{4}$  of Section 36, T.16S., R.48E., M.D.B.&M.<sup>8</sup> The point of diversion is described as being located within the SW $\frac{1}{4}$  SE $\frac{1}{4}$  of said Section 36.

Application 36769 was filed on February 12, 1979, by James Owen to appropriate 3.6 cfs of the underground waters of the Amargosa Desert Groundwater Basin, Nye County, Nevada, for the irrigation of 160 acres within the SW $\frac{1}{4}$  of Section 36, T.16 S., R.48 E., M.D.B.& M..<sup>9</sup> The point of diversion is described as being located within the SE $\frac{1}{4}$  SW $\frac{1}{4}$  of said Section 36.

Application 36770 was filed on February 12, 1979, by James Owen to appropriate 3.6 cfs of the underground waters of the Amargosa Desert Groundwater Basin, Nye County, Nevada, for the irrigation of 160 acres within the NW $\frac{1}{4}$  of Section 36, T.16 S., R.48 E., M.D.B.& M..<sup>10</sup> The point of diversion is described as being located within the NE $\frac{1}{4}$  NW $\frac{1}{4}$  of said Section 36.

Application 36771 was filed on February 12, 1979, by James Owen to appropriate 3.6 cfs of the underground waters of the Amargosa Desert Groundwater Basin, Nye County, Nevada, for the irrigation of 160 acres within the SE $\frac{1}{4}$  of Section 30, T.16 S., R.49 E., M.D.B.& M..<sup>11</sup> The point of diversion is described as being located within the NW $\frac{1}{4}$  SE $\frac{1}{4}$  of said Section 30.

---

<sup>8</sup> File No. 36768, official records in the office of the State Engineer.

<sup>9</sup> File No. 36769, official records in the Office of the State Engineer.

<sup>10</sup> File No. 36770, official records in the Office of the State Engineer.

<sup>11</sup> File No. 36771, official records in the Office of the State Engineer.

Application 36772 was filed on February 12, 1979, by James Owen to appropriate 3.6 cfs of the underground waters of the Amargosa Desert Groundwater Basin, Nye County, Nevada, for irrigation purposes within the SW $\frac{1}{4}$  of Section 30, T.16 S., R.49 E., M.D.B. & M..<sup>12</sup> The point of diversion is described as being located within the NW $\frac{1}{4}$  SW $\frac{1}{4}$  of said Section 30.

Application 36773 was filed on February 12, 1979, by James Owen to appropriate 3.6 cfs of the underground waters of the Amargosa Desert Groundwater Basin, Nye County, Nevada, for irrigation purposes within the NE $\frac{1}{4}$  of Section 31, T.16 S., R.49 E., M.D.B. & M..<sup>13</sup> The point of diversion is described as being located within the SW $\frac{1}{4}$  NE $\frac{1}{4}$  of said Section 31.

Application 36774 was filed on February 12, 1979, by James Owen to appropriate 3.6 cfs of the underground waters of the Amargosa Desert Groundwater Basin, Nye County, Nevada, for irrigation purposes within the SE $\frac{1}{4}$  of Section 31, T.16 S., R.49 E., M.D.B. & M..<sup>14</sup> The point of diversion is described as being located within the NW $\frac{1}{4}$  SE $\frac{1}{4}$  of said Section 31.

Application 36775 was filed on February 12, 1979, by James Owen to appropriate 3.6 cfs of the underground waters of the Amargosa Desert Groundwater Basin, Nye County, Nevada, for irrigation purposes within the SW $\frac{1}{4}$  of Section 31, T.16 S., R.49 E., M.D.B. & M..<sup>15</sup> The point of diversion is described as being located within the NW $\frac{1}{4}$  SW $\frac{1}{4}$  of said Section 31.

---

<sup>12</sup> File No. 36772, official records in the Office of the State Engineer.

<sup>13</sup> File No. 36773, official records in the Office of the State Engineer.

<sup>14</sup> File No. 36774, official records in the Office of the State Engineer.

<sup>15</sup> File No. 36775, official records in the Office of the State Engineer.

Application 36776 was filed on February 12, 1979, by James Owen to appropriate 3.6 cfs of the underground waters of the Amargosa Desert Groundwater Basin, Nye County, Nevada, for irrigation purposes within the NW $\frac{1}{4}$  of Section 31, T.16 S., R.49 E., M.D.B. & M..<sup>16</sup> The point of diversion is described as being located within the SW $\frac{1}{4}$  NW $\frac{1}{4}$  of said Section 31.

II.

The applications were protested<sup>17</sup> by Industrial Mineral Ventures on the following basis:

Protestant, Industrial Mineral Ventures, Inc., is mining and milling mineral products in and about the point of diversion of this application. Protestant has expended considerable sums of money in furtherance of its mining and milling operation and presently employs approximately 90 people in Invite, Nevada, located 15 miles south of Lathrop Wells, Nevada. Its milling and mining operation is entirely dependent upon its present water supply.

Protestant is the owner of record of Permits 27812, 27813, 26632, 14059, 29451 and 29452, all of which have their points of diversion near or in close proximity to the proposed point of diversion requested this application. All of protestant's permits are developing ground water from the same ground water basin as is requested by this application.

On May 14, 1979, the State Engineer entered an Order, pursuant to Chapter 534 of Nevada Revised Statutes, declaring and designating the Amargosa Desert Groundwater Basin. Clearly, this Order was entered because the annual development of water, exceeds the annual recharge.

---

<sup>16</sup> File No. 36776, official records in the Office of the State Engineer.

<sup>17</sup> ROR 10; Exhibit No. 8. ROR refers to Record on Review filed with the District Court in August 1990. Exhibit No. 8, public administrative hearing before the State Engineer, January 18, 1989, and August 3, 1989 (hereinafter "Exhibit No. 8").

NRS 533.370(4) reads as follows:

"Where there is no unappropriated water in the proposed source of supply, or where its proposed use or change conflicts with existing rights, or threatens to prove detrimental to the public interest, the State Engineer shall reject the application and refuse to issue the permit asked for."

The above quoted statute clearly sets forth three methods or areas wherein the State Engineer is required to reject an application:

1. Unequivocally, there is no unappropriated in the proposed source of supply, as the Amargosa Desert Ground Water Basin is already overappropriated.

2. The granting of this application would conflict with the prior rights of Protestant, as it would cause an unreasonable lowering of the ground water level.

3. The granting of this application would prove detrimental to the public interest, as the prior rights of Protestant would be adversely effected. Consequently, its mining and milling operation would suffer, all to the detriment of Protestant, Nye County and the State of Nevada.

Inasmuch as all three of the above referenced ~~criteria have been met, and only one is required,~~ the State Engineer is mandated to deny the application.

### III.

Pursuant to State Engineer's Ruling No. 2793,<sup>18</sup> Applications 36761 through 36776, inclusive, were denied on the basis that the appropriation of underground water for irrigation purposes, at the location applied for, would conflict with and tend to impair the value of existing rights and be detrimental to the public interest and welfare.

### IV.

An appeal of the denial of the applications followed resulting in an Order Granting Partial Summary Judgment signed May 10, 1983,

---

<sup>18</sup> ROR 4; Exhibit No. 2, State Engineer's Ruling No. 2793, dated December 15, 1982, official records in the Office of the State Engineer.

pursuant to which the matter was remanded to the State Engineer for an administrative hearing to supplement the record.<sup>19</sup> The matter was set for hearing on January 18, 1989,<sup>20</sup> but was continued and held on August 3, 1989.<sup>21</sup>

v.

On May 30, 1990, the State Engineer issued his Ruling on Remand<sup>22</sup> and denied Applications 36761 through 36776, inclusive, on the basis that the appropriation of underground water for irrigation purposes would conflict with and tend to impair the value of existing rights and be detrimental to the public interest and welfare. In Ruling 3714, the State Engineer made findings that the protestant had offered evidence and testimony on the theoretical performance of the aquifer if the pumpage were to occur under the proposed applications, and that the aquifer parameters had been adequately defined.

The State Engineer found that the protestant's witness, in predicting the performance of the aquifer in response to the proposed pumping assumed an aquifer of an infinite aerial extent. This is a standard engineering assumption in doing any predictive analysis on aquifer response. The State Engineer found that the performance predictions utilized an accepted standard methodology involving aquifer parameters, flow rates, using the well locations as applied for, and that the results could be readily reproduced by other experts. The State Engineer also found that the interference effects (drawdown) indicated a water level drop of 48 to 61 feet in protestant's wells after twenty years of pumping under the subject

---

<sup>19</sup> ROR 8; Exhibit No. 6.

<sup>20</sup> ROR 3; Exhibit No. 1.

<sup>21</sup> ROR 19; Exhibit No. 17.

<sup>22</sup> ROR 1; State Engineer's Ruling on Remand No. 3714, dated May 30, 1990, official records in the office of the State Engineer.

applications and that perhaps the drawdown figures were conservative and could be greater.

The State Engineer, on the basis that the evidence of drawdown and interference effects was un rebutted, and on the basis that there would be a substantial effect on the protestant's wells, concluded that the water level drop would be unreasonable and would therefore conflict with the protestant's prior rights. The State Engineer further concluded that the granting of the subject applications would prove to be detrimental to the public interest.

VI.

A second appeal<sup>23</sup> was pursued from the State Engineer's denial of the applications which resulted in an Order of Remand to State Engineer filed by the District Court on March 12, 1991. The Court found that Dr. Sharp, expert witness for the protestant, in his analysis failed to consider the factor of recharge by the carbonate aquifer and the hydraulic gradient of this aquifer and what ameliorating effect it might have with regard to the drawdown in the protestant's wells. The Court held that, based on the failure of the expert witness to consider this parameter adequately, the State Engineer's ruling was not based on substantial evidence, and was therefore, arbitrary, although not capricious, but nonetheless one that requires further study and analysis prior to precluding the applicant from obtaining a water right.

Pursuant to its Order of Remand, an additional concern of the Court is the analysis that what goes in to the basin either comes out or is otherwise available for consumption. The Court found this type of analysis to be overly simplistic and failed to consider the factor of the underground moving body of water with its hydraulic gradient, but also the hydraulic barrier between the Amargosa River drainage proper and the impervious gravity fault that separates the Amargosa River aquifer from the springs in the

---

<sup>23</sup> Morris DeLee v. State Engineer, In the Fifth Judicial District Court, in and for the County of Nye, Case No. 11557.



Ash Meadows area. The Court remanded the applications to the State Engineer for further analysis consistent with its order and for an amendment to the ruling on remand dated May 30, 1990, that would be consistent with its order.

VII.

The State Engineer initially described and designated the Amargosa Desert Groundwater Basin on May 14, 1979, under the provisions of NRS 534.030, as a basin in need of additional administration.<sup>24</sup>

FINDINGS OF FACT

I.

The court did not order the State Engineer to reopen the evidentiary hearing, but rather ordered the matter remanded to the State Engineer for further analysis consistent with its order of remand, and for an amendment to the ruling on remand dated May 30, 1990.<sup>22</sup> The State Engineer finds that further analysis and refinement of its previous order can be had without reopening the evidentiary hearing.

II.

With all due respect to the District Court, and as further elaborated below, the State Engineer finds that the District Court did not fully understand the parameters considered in the Theis drawdown analysis, and further finds that the real crux of whether to grant or deny these applications is not whether water is available for appropriation in the Amargosa Desert Groundwater Basin, as discussed below there is no question that there is no water available for appropriation in that groundwater basin, but rather, the real issue, even if water were available, is whether the granting of the applications would interfere with existing rights or threaten to prove detrimental to the public interest.

---

<sup>24</sup> State Engineer's Order No. 724, dated May 14, 1979, official records in the office of the State Engineer.

III.

The District Court indicated it had concerns with the analysis of "what goes in to the basin either comes out or is otherwise available for consumption." The Court found this type of analysis to be overly simplistic and failed to consider the factor of the underground moving body of water with its hydraulic gradient, but also the hydraulic barrier between the Amargosa River drainage proper and the impervious gravity fault that separates the Amargosa River aquifer from the springs in the Ash Meadows area. The State Engineer will consider each of the District Court's concerns below in the analysis as to water available for appropriation.

IV.

In general, when the State Engineer analyzes whether water is available for appropriation in a groundwater basin the first analysis addresses the perennial yield of the particular groundwater basin. The perennial yield of a hydrologic basin is the maximum amount of water of usable chemical quality that can be consumed economically each year for an indefinite period of time. Perennial yield cannot exceed the natural replenishment to an area indefinitely, and ultimately is 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 until the groundwater reservoir is depleted.<sup>25</sup> 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.

Various methodologies are available for estimating the annual recharge to a groundwater basin; however, while recharge estimates

---

<sup>25</sup> State Engineer's Office, WATER FOR NEVADA, STATE OF NEVADA WATER PLANNING REPORT NO. 3, p. 13, Oct. 1971.

are far from being an exact science, the methods used are the best science has to offer at the present time. 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 ground water basin by spring/surface discharge, interbasin flow, consumption by plants tapping the ground water and consumption by man.

In the Amargosa Desert Groundwater Basin it is believed that only a small percentage of localized precipitation recharges the groundwater reservoir.<sup>26</sup> The total average annual recharge from precipitation is estimated to be 1,500 acre-feet annually (afa), most of which is derived from precipitation in Oasis Valley and Fortymile Canyon, which are tributary to Amargosa Desert by interbasin flow.<sup>27</sup> It is estimated that 250 afa of that recharge is from precipitation in Oasis Valley; thus, the estimated average recharge to Amargosa Desert below Amargosa Narrows would be about 250 afa less than the 1,500 afa estimated for the total drainage area, or roughly 1,200 afa.<sup>28</sup> However, based on various assumptions, the total estimated recharge to Amargosa Desert from precipitation within the surficial drainage area, plus recharge to Paleozoic carbonate rocks from beyond the drainage area, would be roughly 20,000 acre-feet per year.<sup>29</sup>

---

<sup>26</sup> Walker, George E. and Eakin, Thomas E., Ground-Water Resources - Reconnaissance Series Report 14, Geology and Ground Water of Amargosa Desert, Nevada-California, p. 19, 1963.

<sup>27</sup> Walker, George E. and Eakin, Thomas E., Ground-Water Resources - Reconnaissance Series Report 14, Geology and Ground Water of Amargosa Desert, Nevada-California, p. 19, 1963.

<sup>28</sup> Walker, George E. and Eakin, Thomas E., Ground-Water Resources - Reconnaissance Series Report 14, Geology and Ground Water of Amargosa Desert, Nevada-California, p. 20, 1963.

<sup>29</sup> Walker, George E. and Eakin, Thomas E., Ground-Water Resources - Reconnaissance Series Report 14, Geology and Ground Water of Amargosa Desert, Nevada-California, p. 21, 1963.

The State Engineer finds, by using a recharge analysis which only considers the geographical area of the Amargosa Desert Groundwater Basin, the total quantity of water available for appropriation in the Amargosa Desert Groundwater Basin from precipitation and from additional inflow from the carbonate rocks is on the order of 20,000 afa.

v.

Another method for estimating the perennial yield or the total quantity of water available for appropriation uses discharge from the basin as the method by which to approximate the annual safe yield. "Ground water is discharged from Amargosa Desert by the natural processes of transpiration of vegetation, evaporation from the soil and free-water surfaces, and to a lesser extent by stream flow and underflow from the Alkali Flat southeast of Death Valley Junction."<sup>30</sup> In using a discharge analysis, any influence of the carbonate aquifer is taken into consideration because the analysis looks at the total quantity of water flowing through the system and not at precipitation.

Water-level data used in preparation of the water-level contour map further suggest that ground water from the Paleozoic carbonate rocks in part leaks upward into the ground-water reservoir in the valley fill...the amount of this upward leakage cannot be directly estimated, but may be several thousand acre-feet a year. Collectively, ground-water discharge from the carbonate rocks is more than 17,000 acre-feet and may exceed 20,000 acre-feet, if upward leakage in the ground-water reservoir is included. This discharge accounts for most of the 24,000 acre-feet estimated as ground-water discharge by natural processes.<sup>31</sup>

---

<sup>30</sup> Walker, George E. and Eakin, Thomas E., Ground-Water Resources - Reconnaissance Series Report 14, Geology and Ground Water of Amargosa Desert, Nevada-California, p. 21, 1963.

<sup>31</sup> Walker, George E. and Eakin, Thomas E., Ground-Water Resources - Reconnaissance Series Report 14, Geology and Ground Water of Amargosa Desert, Nevada-California, p. 27, 1963.

The physical conditions in Amargosa Desert suggest that the estimate of discharge is the better basis on which to estimate perennial yield in the light of present information. Thus, the tentative perennial yield may be about 24,000 acre-feet a year.<sup>32</sup> Of this, about 17,000 acre-feet discharge at Ash Meadows and is used to satisfy the certificated water rights of the United States Fish and Wildlife Service for wildlife purposes. The remaining amount [7,000 afa] would be available for development by wells largely in the area northwest and northeast of the springs."<sup>33</sup>

The State Engineer finds that by using the discharge analysis, the perennial yield of the Amargosa Desert Groundwater Basin is estimated to be 24,000 afa. The State Engineer further finds that both the recharge and discharge estimations for the quantity of water available for appropriation in the Amargosa Desert Groundwater Basin both factor in contribution of water from the carbonate aquifer.

#### VI.

A fault runs through the Amargosa Desert west of Devil's Hole in the Death Valley National Monument and east/southeast of the applications at issue here.<sup>34</sup> It is believed that fault creates a barrier between the Ash Meadows Subsystem in the eastern portion of the Death Valley Groundwater Flow System, and the Pahute Mesa Subsystem in the central portion of the region. The State Engineer

---

<sup>32</sup> Walker, George E. and Eakin, Thomas E., Ground-Water Resources - Reconnaissance Series Report 14, Geology and Ground Water of Amargosa Desert, Nevada-California, p. 22, 1963.

<sup>33</sup> Walker, George E. and Eakin, Thomas E., Ground-Water Resources - Reconnaissance Series Report 14, Geology and Ground Water of Amargosa Desert, Nevada-California, pp. 22, 29, 1963.

<sup>34</sup> Plate 1 - Generalized Hydrogeology of the Nevada Test Site Area, Rush, F. Eugene, Water Resources - Reconnaissance Series Report 54, Regional Ground-Water Systems in the Nevada Test Site Area, Nye, Lincoln, and Clark Counties, Nevada, 1970.

finds the applications at issue here are within the Pahute Mesa Subsystem in the central portion of the region.

The State Engineer further finds that if the fault is considered, as ordered by the District Court, the 17,000 afa discharged by the springs at Ash Meadows are excluded from the water available for appropriation in the Pahute Mesa Subsystem, thus, leaving only the 7,000 afa available for appropriation in the western 2/3rd of the Amargosa Desert.

#### VII.

Three types of groundwater reservoirs are identified within the regional groundwater subsystems: valley-fill (alluvium), volcanic-rock and carbonate-rock aquifers.<sup>35</sup> Alluvium underlies the valley floors and is commonly saturated only at great depth. Some water in the valley-fill leaks downward to the underlying volcanic or carbonate rock.<sup>36</sup> In the topographically closed hydrographic areas ground water flows through the valley fill and moves laterally or vertically downward to the volcanic-rock or carbonate-rock aquifers.<sup>37</sup> While there may be some leakage between the deep carbonate aquifer and the shallow alluvial aquifer in the Amargosa Desert, there is presently a lack of science to indicate the magnitude of mixing or leakage, if any, between the Amargosa Desert Groundwater Basin and the regional carbonate aquifer.

---

<sup>35</sup> Rush, F. Eugene, Water Resources - Reconnaissance Series Report 54, Regional Ground-Water Systems in the Nevada Test Site Area, Nye, Lincoln, and Clark Counties, Nevada, p. 1, 1970.

<sup>36</sup> Rush, F. Eugene, Water Resources - Reconnaissance Series Report 54, Regional Ground-Water Systems in the Nevada Test Site Area, Nye, Lincoln, and Clark Counties, Nevada, pp. 1, 8, 1970.

<sup>37</sup> Rush, F. Eugene, Water Resources - Reconnaissance Series Report 54, Regional Ground-Water Systems in the Nevada Test Site Area, Nye, Lincoln, and Clark Counties, Nevada, p. 8, 1970.

The consolidated rocks of the area are comprised of mostly volcanic rocks.<sup>38</sup> The volcanic-rock aquifers locally transmit water through fractures to the underlying carbonate-rock aquifers; however, where the carbonate rocks are absent, the fractured volcanic-rock aquifers transmit ground water beneath topographic divides.<sup>39</sup>

Several thousand feet of saturated carbonate-rock aquifers are believed to lie under some of the region, and carbonate-rock aquifers also may transmit a regional flow of water.<sup>40</sup> However, the Amargosa Desert itself is an alluvial filled area, and in the Central Amargosa Desert (the area under consideration regarding these applications) research has indicated that alluvial deposits are approximately 2,000 to 4,500 feet thick.<sup>41</sup> Irrigation wells do not go to 2,000 feet as the wells are too costly to either drill or pump.<sup>42</sup>

The State Engineer finds that most of the wells in the Amargosa Desert Groundwater Basin are not deep enough to capture water from any carbonate-rock aquifer that may underlie Amargosa Desert Groundwater Basin. The wells in the area tap the resources from the valley-fill aquifer, and other irrigation wells in the

---

<sup>38</sup> Rush, F. Eugene, Water Resources - Reconnaissance Series Report 54, Regional Ground-Water Systems in the Nevada Test Site Area, Nye, Lincoln, and Clark Counties, Nevada, p. 1, 1970.

<sup>39</sup> Rush, F. Eugene, Water Resources - Reconnaissance Series Report 54, Regional Ground-Water Systems in the Nevada Test Site Area, Nye, Lincoln, and Clark Counties, Nevada, p. 8, 1970.

<sup>40</sup> Rush, F. Eugene, Water Resources - Reconnaissance Series Report 54, Regional Ground-Water Systems in the Nevada Test Site Area, Nye, Lincoln, and Clark Counties, Nevada, pp. 1, 8, 1970.

<sup>41</sup> Transcript, pp. 37 - 39, public administrative hearing before the State Engineer, January 18, 1989, and August 3, 1989. (Hereinafter "Transcript").

<sup>42</sup> Transcript, pp. 39, 45.

vicinity of these applications have been drilled to 700 - 750 feet.<sup>43</sup>

VIII.

Applications 36761 through 36776, inclusive, each request an appropriation a 3.6 cfs of water to irrigate a total of 1,720 acres of land which represents a total request for a new appropriation of 8,600 acre-feet annually. As of February 27, 1997, existing certificated water rights in the Amargosa Desert Groundwater Basin exceed 24,305 afa, and existing permitted groundwater rights in the Amargosa Desert Groundwater Basin exceed 5,776 afa, for a total of 30,081 afa of rights appropriated in the Amargosa Desert Groundwater Basin.<sup>44</sup> The State Engineer finds that existing groundwater rights in the Amargosa Desert Groundwater Basin exceed the perennial yield of the basin whether the perennial yield is analyzed using a recharge or discharge.

IX.

In the Amargosa Desert, between 1964 and 1982, groundwater levels declined as much as 27 feet.<sup>45</sup> "The declines presumably are related to major ground-water development in the agricultural area about 10 miles southwest of Lathrop Wells" with net declines exceeding 10 feet in a combined area of at least 25 square miles.<sup>46</sup> Applications 36761 through 36776, inclusive, propose to divert an additional 8,600 afa from the already over-appropriated Amargosa Desert Groundwater Basin. The State Engineer finds that the

---

<sup>43</sup> Transcript, p. 46.

<sup>44</sup> Hydrographic Basin Summary, Basin 230, official records in the Office of the State Engineer, February 27, 1997.

<sup>45</sup> Nichols, William D. and Akers, J.P., Water-Resources Investigations Report 85-4273, Water-level Declines in the Amargosa Valley Area, Nye County, Nevada, 1962-84, U.S.G.S., p. 4, 1985.

<sup>46</sup> Nichols, William D. and Akers, J.P., Water-Resources Investigations Report 85-4273, Water-level Declines in the Amargosa Valley Area, Nye County, Nevada, 1962-84, U.S.G.S., p. 4, 1985.



applications at issue here are right in the area where the net decline in groundwater levels has been seen. If these applications were granted it would allow further substantial appropriation in an over-appropriated groundwater basin which already has experienced groundwater level declines and would thereby interfere with existing water rights in the area, and threaten to prove detrimental to the public interest.

X.

The District Court in its Order of Remand indicated its belief that Dr. Sharp, expert witness for the protestant, failed to consider the factor of recharge by the carbonate aquifer and the hydraulic gradient of the carbonate aquifer and what ameliorating effect it might have with regard to the drawdown in Protestant's wells. The Court held that based on this failure the State Engineer's ruling was not based on substantial evidence.

Protestant's expert witness made the statement that water flowing through the system may have an ameliorating effect with regard to the amount of drawdown.<sup>47</sup> However, in the physical context of the aquifers at issue here, and with a review of the Theis drawdown analysis (which is the method used by scientists to estimate drawdown) the carbonate aquifer is not an issue.

The Theis drawdown analysis, as indicated in State Engineer's Ruling on Remand, utilizes a parameter which assumes an aquifer of an infinite aerial extent. This means that whether the water comes into the system from precipitation or inflow from the carbonate rock aquifer is not an issue. The analysis takes water from storage regardless of the flow of water into the system. The State Engineer finds that the drawdown analysis used by the Protestant's expert is what the science of today has to offer and the State Engineer cannot give the court another formula. The Theis formula requires the use of a transmissivity and storage coefficient.

---

<sup>47</sup> Transcript, p. 72.

These values are usually determined by a pump/recovery test and monitoring nearby monitor wells. These values are determined regardless of whether the water is coming from carbonate leakage, volcanics or alluvium. They are true values of aquifer characteristics and can be used to predict the cone of depression and the radial extent of drawdown over time. Furthermore, the evidence was unrefuted that there is very little hydrologic connection between the Northern Amargosa Desert and the major area of regional flow through the carbonate rock aquifer in the Southern Amargosa Desert.<sup>48</sup>

CONCLUSIONS OF LAW

I.

The State Engineer has jurisdiction over the parties and of the subject matter of this action and determination.<sup>49</sup>

II.

The State Engineer is prohibited by law from granting a permit under an application to appropriate the public waters where:<sup>50</sup>

- A. there is no unappropriated water at the proposed source, or
- B. the proposed use conflicts with existing rights, or
- C. the proposed use threatens to prove detrimental to the public interest.

III.

The State Engineer concludes there is no water available for appropriation in the Amargosa Desert Groundwater Basin on the magnitude of the amount requested under these applications; thus, the law mandates that the State Engineer deny the applications on that basis alone.

---

<sup>48</sup> Transcript, pp. 60 - 62.

<sup>49</sup> NRS Chapters 533 and 534.

<sup>50</sup> NRS Chapter 533.370(3).

IV.

The State Engineer concludes that to grant permits on the applications at issue here in over-appropriated groundwater basin would interfere with the existing water rights of others in the groundwater basin, particularly those of the protestant; thus, mandating under Nevada law that the State Engineer deny said applications.

V.

The State Engineer concludes that to grant permits on the applications at issue here would further exasperate the problem of declining groundwater levels in the groundwater basin threatening to prove detrimental to the public interest; thus, mandating under Nevada law that the State Engineer deny said applications.

RULING

Based on the above findings and conclusions, as directed by the Court's Order of Remand, the State Engineer affirms the prior ruling denying Applications 36761 through 36776, inclusive.

Respectfully submitted,

  
R. MICHAEL TURNIPSEED, P.E.  
State Engineer

RMT/SJT/ab

Dated this 9th day of  
May, 1997.