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

IN THE MATTER OF APPLICATIONS)
60985 THROUGH 60992 FILED TO)
APPROPRIATE THE PUBLIC WATERS)
FROM AN UNDERGROUND SOURCE WITHIN)
CRATER FLAT GROUNDWATER BASIN)
(229), NYE COUNTY, NEVADA)

RULING

#4327

GENERAL

I.

Application 60985 was filed on March 3, 1995, by Rayrock Mines, Inc. to appropriate 0.5 cubic feet per second (cfs) of water from the underground waters of the Crater Flat Groundwater Basin, Nye County, Nevada, for mining, milling and domestic purposes for use within the SW¼ and SE¼ of Section 12; Section 13; the NE¼ and SE¼ of Section 14, all within T.12S., R.47E. M.D.B.&M.; and the SW¼ and SE¼ of Section 7, and the SW¼ of Section 8, both within T.12S., R.48E. M.D.B.&M.[1] The point of diversion is described as being located within the NW¼SE¼ Section 4, T.12S., R.48.E, M.D.B.&M.

II.

Application 60986 was filed on March 3, 1995, by Rayrock Mines, Inc. to appropriate 0.5 cfs of water from the underground waters of the Crater Flat Groundwater Basin, Nye County, Nevada, for mining, milling and domestic purposes for use within the SW¼ and SE¼ of Section 12; Section 13; the NE¼ and SE¼ of Section 14, all within T.12S., R.47E. M.D.B.&M.; and the SW¼ and SE¼ of Section 7, and the SW¼ of Section 8, both within T.12S., R.48E. M.D.B.&M.[2] The point of diversion is described as being located within the NW¼SE¼ Section 9, T.12S., R.48.E, M.D.B.&M.

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[1]File No. 60985, official records of the Office of the State Engineer.

[2]File No. 60986, official records of the Office of the State Engineer.

III.

Application 60987 was filed on March 3, 1995, by Rayrock Mines, Inc. to appropriate 0.5 cfs of water from the underground waters of the Crater Flat Groundwater Basin, Nye County, Nevada, for mining, milling and domestic purposes for use within the SW¼ and SE¼ of Section 12; Section 13; the NE¼ and SE¼ of Section 14, all within T.12S., R.47E. M.D.B.&M.; and the SW¼ and SE¼ of Section 7, and the SW¼ of Section 8, both within T.12S., R.48E. M.D.B.&M.[3] The point of diversion is described as being located within the NW¼SE¼ Section 16, T.12S., R.48.E, M.D.B.&M.

IV.

Application 60988 was filed on March 3, 1995, by Rayrock Mines, Inc. to appropriate 0.5 cfs of water from the underground waters of the Crater Flat Groundwater Basin, Nye County, Nevada, for mining, milling and domestic purposes for use within the SW¼ and SE¼ of Section 12; Section 13; the NE¼ and SE¼ of Section 14, all within T.12S., R.47E. M.D.B.&M.; and the SW¼ and SE¼ of Section 7, and the SW¼ of Section 8, both within T.12S., R.48E. M.D.B.&M.[4] The point of diversion is described as being located within the SE¼NE¼ Section 20, T.12S., R.48.E, M.D.B.&M.

V.

Application 60989 was filed on March 3, 1995, by Rayrock Mines, Inc. to appropriate 0.5 cfs of water from the underground waters of the Crater Flat Groundwater Basin, Nye County, Nevada, for mining, milling and domestic purposes for use within the SW¼ and SE¼ of Section 12; Section 13; the NE¼ and SE¼ of Section 14, all within T.12S., R.47E. M.D.B.&M.; and the SW¼ and SE¼ of Section

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[3]File No. 60987, official records of the Office of the State Engineer.

[4]File No. 60988, official records of the Office of the State Engineer.

7, and the SW¼ of Section 8, both within T.12S., R.48E. M.D.B.&M.[5] The point of diversion is described as being located within the NE¼NE¼ Section 3, T.12S., R.48.E, M.D.B.&M.

VI.

Application 60990 was filed on March 3, 1995, by Rayrock Mines, Inc. to appropriate 0.5 cfs of water from the underground waters of the Crater Flat Groundwater Basin, Nye County, Nevada, for mining, milling and domestic purposes for use within the SW¼ and SE¼ of Section 12; Section 13; the NE¼ and SE¼ of Section 14, all within T.12S., R.47E. M.D.B.&M.; and the SW¼ and SE¼ of Section 7, and the SW¼ of Section 8, both within T.12S., R.48E. M.D.B.&M.[6] The point of diversion is described as being located within the NE¼NE¼ Section 10, T.12S., R.48.E, M.D.B.&M.

VII.

Application 60991 was filed on March 3, 1995, by Rayrock Mines, Inc. to appropriate 0.5 cfs of water from the underground waters of the Crater Flat Groundwater Basin, Nye County, Nevada, for mining, milling and domestic purposes for use within the SW¼ and SE¼ of Section 12; Section 13; the NE¼ and SE¼ of Section 14, all within T.12S., R.47E. M.D.B.&M.; and the SW¼ and SE¼ of Section 7, and the SW¼ of Section 8, both within T.12S., R.48E. M.D.B.&M.[7] The point of diversion is described as being located within the SW¼NE¼ Section 22, T.12S., R.48.E, M.D.B.&M.

VIII.

Application 60992 was filed on March 3, 1995, by Rayrock Mines, Inc. to appropriate 0.5 cfs of water from the underground waters of the Crater Flat Groundwater Basin, Nye County, Nevada,

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[5]File No. 60989, official records of the Office of the State Engineer.

[6]File No. 60990, official records of the Office of the State Engineer.

[7]File No. 60991, official records of the Office of the State Engineer.

for mining, milling and domestic purposes for use within the SW¼ and SE¼ of Section 12; Section 13; the NE¼ and SE¼ of Section 14, all within T.12S., R.47E. M.D.B.&M.; and the SW¼ and SE¼ of Section 7, and the SW¼ of Section 8, both within T.12S., R.48E. M.D.B.&M.[8] The point of diversion is described as being located within the NW¼NW¼ Section 14, T.12S., R.48.E, M.D.B.&M.

IX.

Item #12 of Applications 60985 through 60992, inclusive, indicates that if permits are granted on the applications, the waters would be commingled under Applications 60985 through 60992, inclusive, and Certificates 13786 and 13788 for a total consumptive use not to exceed 210.4 millon gallons annually (645.7 acre-feet annually).

X.

Applications 60985 through 60992, inclusive, were timely protested by the United States Department of Interior, National Park Service ("NPS") on the grounds that: the granting of Applications 60985 through 60992 might cause injury to water rights belonging to the U.S. National Park Service at the Death Valley National Monument (hereinafter "DVNM"), no water remains available for appropriation, and granting of the applications would be detrimental to the public interest.

XI.

Applications 60985 through 60992 were also protested by the U.S. Department of Energy on the grounds that: the granting of the applications might cause injury to water rights belonging to the U.S.D.O.E. and might cause injury to Ash Meadows and other environmentally sensitive areas, no water remains available for appropriation, and granting of the applications would be detrimental to the public interest. The U.S.D.O.E. withdrew its protest on January 29, 1996, on the basis that the applicant had

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[8]File No. 60992, official records of the Office of the State Engineer.

agreed to develop a monitoring plan and implement an early warning system; thus, this ruling does not address the U.S.D.O.E. protest.

XII.

After all parties of interest were duly noticed by certified mail, an administrative hearing was held on March 19 & 20, 1996, at Carson City, Nevada, before representatives of the Office of the State Engineer with regard to the NPS's protests to the applications.[9]

FINDINGS OF FACT

I.

Crater Flat Groundwater Basin is within the Pahute Mesa Groundwater Subsystem which is within the Death Valley Basin hydrographic region. The State Engineer finds the points of diversions under Applications 60985 through 60922 are located within the Crater Flat Groundwater Basin and are approximately 40 miles from Devil's Hole and more than 40 miles from the discharging springs of concern in the DVNM.[10].

II.

The NPS identified water rights it owns for the DVNM issued pursuant to California law[11], and claims Federal reserved water rights for lands within the DVNM.[12] The NPS claims senior priority dated water rights in the eastern part of the DVNM on Grapevine, Keane Wonder, Nevares, Texas, Travertine and Saratoga Springs and also claims senior water rights for the approximately 350 other springs in the DVNM.[13]

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[9]Transcript, public administrative hearing before the State Engineer, March 19-20, 1996. (Hereinafter "Transcript".)

[10]Transcript, pp. 128 - 129, 245; Exhibit No. S2 through S9, public administrative hearing before the State Engineer, March 19-20, 1996. (Hereinafter Exhibit No.".)

[11]Exhibit No. P9; Exhibit No. P10.

[12]Exhibit No. S10.

[13]Exhibit No. S10.

The DVNM in California was set aside in 1933 for the preservation of unusual features of scenic, scientific and educational interest contained within the area designated as the monument.[14] Additional lands were added to the DVNM in 1937[15], and in 1952 an area known as Devil's Hole, Nevada, located outside the boundaries of the DVNM, was also added as a detached unit to the DVNM.[16]

In 1976 the United States Supreme Court in the case of Cappaert v. U.S. recognized a federal reserved water right to a water level in the pool at Devil's Hole sufficient to maintain the level of the pool to preserve its scientific value.[17] No general adjudication of pre-statutory or federal reserved water rights under the provisions of NRS 533.090-533.320 has been concluded with regard to any federal reserved water rights that may exist in favor of the DVNM. The State Engineer finds that while the NPS appears to claim that all water within the boundaries of the DVNM are subject to a claim of federal reserved water rights, no decree has been entered in any court of law to date establishing a right to the extent claimed. The State Engineer further finds that nothing in this ruling shall be construed to be a determination of the limit and the extent of any reserved rights which may exist for the benefit of DVNM.

III.

Testimony and evidence indicates various regional groundwater flow systems contribute to the water level in the pool at Devil's Hole and to discharge at springs in the DVNM.[18] Records of the

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[14]Exhibit No. P3.

[15]Exhibit No. P5.

[16]Exhibit No. P4; Transcript, pp. 14-17.

[17]Cappaert v. U.S., 426 U.S. 128, 48 L.Ed.2d 523 (1976); Transcript, p. 17.

[18]Transcript, pp. 84-192; Exhibit No. P11, p. 2, 6.

Office of the State Engineer, testimony and evidence describe three regional interbasin groundwater flow subsystems which contribute to a larger regional flow system known as the Death Valley Groundwater Flow System covering approximately 15,800 square miles.[19] The three regional interbasin groundwater flow subsystems are known as the Ash Meadows Subsystem in the eastern portion, the Pahute Mesa Subsystem (aka the Alkali-Flat Furnace Creek Ranch Subsystem) in the central portion, and the Sarcobatus Flat Subsystem in the western portion of the region.[20]

The protestant identified another way of delineating boundaries of three larger subsystems which may contribute flow to the Death Valley region[21]; however, to date no one has been able to specifically define the boundaries of the overall area of the Death Valley Groundwater Flow System; thus, regional scale uncertainties exist as to the boundaries of the overall flow system.[22] Over 15 conceptual models have been created relating to the Death Valley Groundwater Flow System[23], and major uncertainties remain regarding the eastern and northern boundaries of the flow system.[24] After years of intensive study in parts of the system, the hydrology of the entire Death Valley Groundwater Flow System still is not completely understood.[25]

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[19]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), p. 1; Transcript, p. 88, 145; Exhibit No. P11, p.1.

[20]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), p. 1.

[21]Exhibit No. P13; Exhibit No. P11, p. 31.

[22]Transcript, pp. 87-92; Hearing Exhibit No. P11, pp. 1-12, 55.

[23]Exhibit No. P11, p. 8.

[24]Transcript, p. 89.

[25]Exhibit No. P11, p. 3.

The State Engineer finds that substantial uncertainties remain as to the specific boundaries of the regional groundwater flow system and subsystems which contribute to regional groundwater flow that may contribute to the discharge from the system at Devil's Hole or springs within the DVNM.

IV.

Three types of groundwater reservoirs are identified within the regional groundwater subsystems: valley-fill (alluvium), volcanic-rock and carbonate-rock aquifers.[26] 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.[27] 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.[28]

The consolidated rocks of the area are comprised of mostly volcanic rocks; however, some extensive areas of carbonate rocks are known to exist.[29] 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.[30]

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.[31] The

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[26]Rush, supra note 20, at 1.

[27]Rush, supra note 20, at 1, 8.

[28]Rush, supra note 20, at 8.

[29]Rush, supra note 20, at 1.

[30]Rush, supra note 20, at 8.

[31]Rush, supra note 20, at 1, 8.

regional distribution of carbonate rocks has hydrologic significance because they transmit a flow of ground water in regional groundwater systems beneath topographic divides.[32] There may be different flow directions between the shallow and deep aquifer systems[33], and it is recognized there may be more than one way that water gets into Death Valley.[34] While testimony was presented that there may be some leakage between the deep and shallow aquifers,[35] the State Engineer finds there is a lack of testimony and evidence on the magnitude of any mixing or leakage, if any, between the Crater Flat Groundwater Basin and the regional carbonate aquifer.

V.

The movement of ground water in the Death Valley Groundwater Flow System is complex. However, the evidence indicates the dominant flow direction is from the north, northeast and east to the south and southwest, but flows at local or intermediate points in the regional flow system may be strongly influenced by faults and fractures and may not always be in the general downgradient direction.[36] Ground water in the Ash Meadows Subsystem is believed to flow generally toward Ash Meadows to discharge at springs in the Ash Meadows area by evapotranspiration, and possibly by subsurface outflow across a fault to the south end of the Pahute Mesa Subsystem in the Amargosa Desert.[37]

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[32]Rush, supra note 20, at 7.

[33]Transcript, p. 114.

[34]Transcript, p. 117.

[35]Transcript, pp. 115-116.

[36]Exhibit No. P11, p.59.

[37]Rush, supra note 20, at 1-2.

The Pahute Mesa Subsystem is believed to flow generally southward to discharge largely by evapotranspiration in the Amargosa Desert.[38] The Ash Meadows and the Pahute Mesa Subsystems converge in the Amargosa Desert,[39] and some of the water in Ash Meadows and Pahute Mesa Subsystems may move southward as underflow to Death Valley through the carbonate rocks of the Funeral Range.[40] The evidence also indicates that the flow of ground water in the area of the proposed points of diversion is south to the Amargosa Valley,[41] and possibly southwest through the Furnace Mountains to Death Valley.

There is uncertainty as to the source of water for some of the small springs in Death Valley[42]. Protestant's evidence indicates that the discharge at Ash Meadows, including Devil's Hole in the southeastern Amargosa Desert, is supplied by the regional carbonate rock aquifer, but most of the water originates as recharge from the Spring Mountains to the southeast which are not in the Pahute Mesa Subsystem, but rather in the Ash Meadows Subsystem.[43] Applicant's expert witness testified that the ground water in Pahute Mesa Subsystem is not tributary to Devil's Hole.[44]

The State Engineer finds that while the pool elevation at Devil's Hole may serve as a water level indicator for the Ash Meadows Groundwater Flow Subsystem, it is not substantially effected, if at all, by the water of the Pahute Mesa Subsystem, the subsystem at issue with regard to Rayrock's Applications. The

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[38]Rush, supra note 20, at 1.

[39]Rush, supra note 20, at 10.

[40]Rush, supra note 20, at 1-2.

[41]Exhibit No. A5, Plate 1.

[42]Exhibit P11, p. 3.

[43]Exhibit P11, pp. 6, 37, 43; Transcript, pp. 107-108, 148-149.

[44]Transcript, p. 248.

State Engineer has many years of pumping records for the Amargosa Valley[45] and no correlation is seen between ground water pumping in the Pahute Mesa Subsystem and the water level in Devil's Hole.

VI.

The protestant's main points of contention are based on a regional groundwater flow analysis. The NPS argues, using that analysis, that there is no water available for appropriation and that the granting of these applications may cause injury to the NPS's water rights at DVNM.

Various methodologies are available for estimating the annual recharge to a groundwater basin; however, testimony and evidence noted that while recharge estimates are far from being an exact science, the methods used are the best science has to offer at the present time.[46] Using the traditional Maxey-Eakin method, recharge was estimated at 12,000 acre-feet annually for the Pahute Mesa Subsystem.[47] Using a methodology developed in the State of Arizona, recharge was estimated to be 10,000 acre-feet annually,[48] while another methodology identified as the modified Maxey-Eakin method estimated recharge at 26,000 acre-feet annually. As indicated by a witness for the protestant, in the Pahute Mesa Groundwater Subsystem an accurate figure as to recharge is still a "moving target".[49]

Testimony was presented that in the Crater Flat Groundwater Basin the average annual recharge is estimated to be 220 acre-feet, with another approximately 1,500 acre-feet leaking as subsurface

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[45]Pumpage inventories, official records of the Office of the State Engineer. Transcript, p. 8, administrative notice taken of all records of the Office of the State Engineer.

[46]Exhibit P11, pp. 33-39.

[47]Exhibit No. P15.

[48]Exhibit No. P15.

[49]Transcript, pp. 99-103.

inflow into Crater Flat from Oasis Valley.[50] The State Engineer finds that a significant amount of discrepancy exists with regard to the quantity of recharge in the Pahute Mesa Groundwater Subsystem, and that substantial uncertainty exists as to the total recharge to the regional flow system with the figures varying by more than 100%.

VII.

The parties appear to agree there are two different main groundwater flow systems in the Pahute Mesa Subsystem, one being the lower carbonate aquifer and the other being the volcanic-rock aquifer; and that ground water may possibly leak either upward or downward between the different groundwater flow systems. The protestant's evidence indicates its belief that the carbonate-rock groundwater flow system is the source of water for the springs at DVNM.[51] The perennial yield figures which have been historically used to quantify the availability of ground water are based on a prediction of recharge to the groundwater basin from precipitation and do not take into account water coming into the groundwater basin from the deep lower carbonate aquifer.

Protestant's evidence shows the carbonate-rock province extends all the way across the eastern third of Nevada and includes the northwest portion of Utah.[52] The NPS alleges that the source of water in the springs at DVNM are the groundwater flows in the carbonate-rock province, that the water in the shallow aquifers supplies the deep carbonate-rock aquifer, and that pumping ground water in the shallow aquifers might affect the quantity of water available in the carbonate-rock aquifer, thereby interfering with the reserved rights claimed at DVNM. No evidence was presented as to the quantity of water from the Crater Flat Groundwater Basin

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[50]Exhibit No. P15; Transcript, p. 111.

[51]Exhibit No. P18; Exhibit No. P19; Supra note 20, at 1-8.

[52]Exhibit No. P11, p. 14.

that may contribute to the flow of water in the carbonate-rock aquifer.

The State Engineer finds that no evidence was provided which quantified any amount of water in the carbonate-rock aquifer which should be considered part of the perennial yield of the Pahute Mesa Subsystem.

VIII.

Natural discharge of ground water from the entire Death Valley Groundwater Flow System from regional subsurface outflow is believed to occur at Ash Meadows, Amargosa Desert, Sarcobatus Flat, Oasis Valley, and possibly Death Valley, at springs and as evapotranspiration in areas of shallow ground water.[53] Ground water is also discharged by the pumping from wells in the various groundwater basins. Springs in the Death Valley Groundwater Flow System range from small perched springs in the mountains to large regional springs in the terminal discharge areas of the regional groundwater flow systems.[54]

The protestant presented testimony and evidence that 17,000 acre-feet annually is discharged at Ash Meadows, and that from Ash Meadows there is more or less a continuous area of shallow ground water which discharges by evapotranspiration at Franklin Lake.[55] The State Engineer has already found that the springs at Ash Meadows are a discharge point of the Ash Meadows regional flow system and not substantially effected by the flow of water in the Pahute Mesa Subsystem, the subsystem at issue with regard to Rayrock's Applications. The State Engineer finds that the protestant did not provide evidence to quantify an amount of the

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[53]Rush, supra note 20, at 17; Exhibit P11, p. 40.

[54]Exhibit P11, p. 40.

[55]Exhibit No. P20; Transcript, pp. 112-114..

discharge at Ash Meadows or DVNM resulting from regional flows through the Pahute Mesa Subsystem, and further finds that Franklin Lake is not part of DVNM.

IX.

The perennial yield of a groundwater reservoir may be defined as the maximum amount of natural discharge that can be salvaged each year over the long term by pumping without bringing about some undesired result.[56] There is a great deal of discrepancy in the perennial yield figures for the regional groundwater flow systems because scientists can only estimate the limit and extent of the contribution from the regional carbonate aquifer. However, testimony and evidence indicates that 24,000 acre-feet annually is the most agreed upon figure for quantification of the perennial yield of the Pahute Mesa Subsystem.[57]

The State Engineer finds that the perennial yield for the Pahute Mesa Groundwater Subsystem is approximately 24,000 acre-feet annually, including a perennial yield for the Crater Flat Groundwater Basin of 900 acre-feet annually with subsurface inflow from Oasis Valley in an amount of approximately 1,500 acre-feet annually.[58]

X.

Testimony and evidence estimates the average annual natural discharge from the Pahute Mesa Subsystem to be 9,000 acre-feet, and of this amount 2,000 to 4,300 acre-feet is discharged in Oasis Valley, with the remaining 7,000 acre-feet being discharged west of the Ash Meadows fault.[59] However, the protestant also presented evidence that 24,000 to 43,000 acre-feet is discharged in the

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[56]Rush, supra note 20, at 20.

[57]Exhibit No. P15; Exhibit No. A1.

[58]Exhibit No. P15.

[59]Rush, supra note 20, at 17; Exhibit No. P15.

Amargosa Desert,[60] and that substantial uncertainty exists as to the discharge figures at the Saltpan in DVNM.[61] The State Engineer finds that Protestant's own evidence points to the substantial uncertainty regarding the recharge/discharge relationship in the Pahute Mesa Subsystem.

XI.

The protestant presented evidence in the form of a water budget that deducted the 17,000 acre-feet annually discharged at Ash Meadows from the 24,000 acre-feet perennial yield of the Pahute Mesa Subsystem for the purpose of stating that only 7,000 acre-feet annually is the actual perennial yield of the subsystem available for appropriation.[62] The State Engineer has already found that the 17,000 acre-feet discharge at Ash Meadows is a result of groundwater flows in the Ash Meadows Subsystem resulting from precipitation and recharge from the Spring Mountains. Based on that finding, the State Engineer finds that Protestant's water budget[63] does not reflect an accurate number for the water available for appropriation.

XII.

Protestant's evidence estimates that water rights totalling 43,923 acre-feet have been issued in the Pahute Mesa Subsystem and of that total 2,995 acre-feet have been issued in the Crater Flat Groundwater Basin.[64] Protestant's evidence also indicates that approximately 12,900 has been pumped in recent years in the Pahute Mesa Subsystem,[65] and existing water rights in Crater Flat Valley

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[60]Exhibit No. P15.

[61]Transcript, pp. 94-97.

[62]Exhibit No. P20.

[63]Exhibit No. P20.

[64]Exhibit No. P15.

[65]Exhibit No. P15.

are only used minimally. Of the 900 acre-feet perennial yield of the Crater Flat Groundwater Basin, only 29 acre-feet was recently pumped.[66]

To obtain a right to water in the State of Nevada a person first files an application to appropriate water.[67] If granted, the application is identified as a permit. A permittee is given a certain amount of time under the law to construct the diversion works and then place the water to beneficial use.[68] It is recognized that while on paper it appears that a certain quantity of water rights are appropriated, in fact, it may be that the actual quantity of water actually pumped from the basin can be significantly less. The Nevada Legislature has provided a means by which a water right may be obtained in ground water basins pumped to a degree less than the perennial yield.[69]

The State Engineer finds that the subject applications are requested for a beneficial use for a finite period of time and lie in a basin (or regional flow system) that is not over-pumped; and with the uncertainties demonstrated by the evidence as the amount of recharge to the subsystem, water is available for short-term appropriation as contemplated by these applications.[70]

XIII.

The NPS, in its protests, claims reserved rights on more than 350 other springs in the DVNM; however, no quantity of water was given to indicate the extent of the right claimed. Evidence was

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[66]Exhibit No. P15.

[67]NRS 533.325.

[68]NRS 533.380.

[69]Section 4, Chapter 469, Statutes of Nevada 1991; NRS 533.371.

[70]The State Engineer has reacted to a petition to forfeit 74 water right certificates representing approximately 20,000 acre-feet of water rights in the Amargosa Desert for non-use. Those proceedings are still pending, but the State Engineer has declared forfeited approximately 4,600 acre-feet in the Amargosa Desert.

also presented that the quantity of water pumped from the Amargosa Desert, the groundwater basin closest to DVNM in the Pahute Mesa Subsystem, has gone from 3,900 acre-feet in 1989 to 12,500 acre-feet in 1994[71]. The State Engineer finds that no evidence showed any variation in the flows in any of the springs in the DVNM relating to the wide range of pumping in the Amargosa Desert Groundwater Basin, and the Crater Flat Groundwater Basin is a greater distance away from the DVNM than the Amargosa Desert Ground Water Basin.

XIV.

The protestant's analysis of perennial yield suggests that all water discharged by evaporation or evapotranspiration would be a loss to the system and should be deducted from any analysis of water available for appropriation. The State Engineer finds that every well that is drilled in a groundwater basin has an effect on the recharge/discharge relationship, and natural discharge has historically been considered water available for appropriation.

XV.

Although the proposed point of diversion and the water rights claimed by the protestant are part of a larger regional flow system, the recharge/discharge relationship has some wide boundaries. Even on a smaller scale when looking only at the Central Death Valley flow systems there are certain unknowns. Witnesses for both the applicant and the protestant testified that only drilling, pumping and monitoring of the flow system leads to a better understanding.[72] The State Engineer finds that actual data from the pumping of the ground water would significantly add to the conceptual information presently available.

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[71]Exhibit No. P11, p. 97.

[72]Transcript, pp. 142, 285.

XVI.

In the late 1960's the water level in Devil's Hole began to drop due to what was believed localized irrigation pumping of ground water,[73] and when pumping was curtailed the water level began to dramatically rise, but it never fully recovered to the level prior to the localized pumping. Testimony and evidence indicates that since 1988 the water level has gradually declined in the Devil's Hole pool;[74] however, the cause has not yet been isolated.[75] Furthermore, monitoring of the pumping of the ground water at the Bullfrog mine in the northern end of the Amargosa Valley has not been shown to impact DVNM.[76]

The manner in which Devil's Hole pool is hydraulically linked to the regional aquifer is complex and not well understood.[77] Factors that have been evaluated with regard to the gradual decline in the water level elevation at Devil's Hole have included short-term climatic fluctuations,[78] changes in pumping rates from selected wells, and seismic activity that occurred at about the time water levels began to decline.[79]

The protestant presented evidence of estimated quantities of ground water pumped in the Amargosa Valley Groundwater Basin from 1966 through 1994.[80] Those records show that in the Amargosa

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[73]Exhibit No. P11, pp. 43-46.

[74]Exhibit No. P2; Transcript, pp. 195-199.

[75]Exhibit No. P11, p. 46.

[76]Transcript, p. 198.

[77]Exhibit No. P11, p. 70.

[78]Protestant provided testimony which indicates that a long-term natural drying of the area is occurring. Transcript, pp. 21, 28-29.

[79]Exhibit No. P11, p. 46.

[80]Exhibit No. P11, p. 97.

Valley, the groundwater basin closest to DVNM in the Pahute Mesa Subsystem, in 1966 ground water pumping was at 4,203 acre-feet annually. In 1968 ground water pumpage went up to approximately 9,000 acre-feet, dropping to 3,900 acre-feet in 1989. The protestant also supplied evidence of the water levels in the pool at Devil's Hole. Pumpage in Amargosa Desert ranged from 3,900 acre-feet in 1989 to 12,500 acre-feet in 1994.[81]

The State Engineer finds that no evidence was provided which sufficiently identifies the cause of the gradual decline of the water level at the Devil's Hole pool since 1988, or that ground water pumping from the Amargosa Groundwater Basin in the Pahute Mesa Subsystem will have any effect or correlates to the water level in the pool at Devil's Hole or interferes with any water rights at DVNM. The State Engineer further finds that if a correlation cannot be demonstrated in the groundwater basin closest to DVNM, it is unlikely that the pumping of ground water from the Crater Flat Groundwater Basin source 40 miles away can be shown to correlate to the water level in the pool at Devil's Hole or spring flows at DVNM.

XVII.

A cone of depression develops around large capacity wells when they are pumped to the maximum. The depth and aerial extent of the cone are dependent on the ability of the saturated soil to give up the water (tranmissivity) and the change in pore pressure within the soil particles (storage coefficient). Testimony indicates that the life of the mining operation the subject applications support is six to nine years, with an additional two years for rinsing.[82] These applications represent an additional 500 acre-feet per year above the water rights already owned by Rayrock needed to support

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[81]Exhibit No. P11, p. 97.

[82]Transcript, pp. 210-211, 228.

the mining operation.[83] This equates to a total new demand on the aquifer from this project of 3,000 to 5,500 acre-feet total over the life of the mine.

Testimony and evidence[84] was presented that approximately 400 gallons per minute is needed from the water source for Rayrock's anticipated mining project, and that Rayrock's existing wells cannot produce this quantity of water.[85] Additional production wells are needed; thus the reason for filing the seven different applications to appropriate water.[86]

Applicant's expert witness[87] testified to the estimated potential drawdown of the ground water level at other wells distant from the points of diversion identified under the applications.[88] After nine years of pumping one well at 400 gallons per minute, or four wells at 100 gallons per minute, the drawdown in a well identified as VH-1 approximately 51,000 feet away from Rayrock's wells, would be anywhere from zero to one-tenth to nine-tenths of

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[83]Transcript, pp. 215, 240.

[84]Exhibit No. A5 is a document central to Rayrock's case; however, the State Engineer notes it is very difficult to use as it has no page numbers, index or dividers that identify the different sections. Therefore, the State Engineer will try to, as best as possible, identify the section of the report to which he is referring.

[85]Transcript, p. 259-260.

[86]Figure 1 at the beginning of Exhibit No. A5 is a map which indicates the locations of the applications and other wells in the area.

[87]Transcript, p. 238.

[88]Transcript, pp. 263-266; See Table 3 (3rd section of Exhibit No. A5) and Table 1 (towards the back portion of Exhibit No. A5).

a foot.[89] The State Engineer finds that a drawdown of one-tenth to nine-tenths of a foot is a reasonable lowering of the water table as allowed under Nevada law.[90]

XVIII.

Once the wells are shut down the cone of depression begins to refill. The rate of refill is rapid at first, declining over time because the hydraulic gradient is less steep, but over a short period of years, there is only a slight depression in the water table.[91] In some cases the depression fully recovers,[92] especially following a period of above average precipitation. Testimony indicates that the travel time for water in the aquifer from the proposed well field to either Devil's Hole or the DVNM is anywhere from 1,000 to 10,000 years.[93] The State Engineer finds that given the volume of water anticipated, the duration of pumping, the distance from the well field to DVNM and the slow rate of travel of water through the aquifer, the effect of pumping water under the subject applications on the water rights in the DVNM would be negligible to nil.

XIX.

Testimony was presented that after ten years of pumping there will be some decrease in water stored in the aquifer resulting in a very shallow, flat depression (described as a saucer) in the surrounding water level perhaps on the magnitude of one-tenth of a foot, and that this saucer may move downgradient with the flow of ground water.[94] Testimony and evidence also indicates a fault just

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[89]Transcript, pp. 264-266.

[90]NRS 534.110(5).

[91]Transcript, pp. 295-297.

[92]Transcript, p. 297.

[93]Transcript, pp. 132-134, 242-246.

[94]Transcript, p. 131-132, 170-173.

west of Ash Meadows and Devil's Hole, and that water levels on the west side of the fault are lower than those at Ash Meadows and Devil's Hole on the east side of the fault.[95] At the point where the flow crosses the state line west of Devil's Hole and Ash Meadows water levels are approximately 200 feet lower in elevation than the water levels in the pool at Devil's Hole and Ash Meadows area.[96]

The active life of the mine is approximately ten years and any residual depression in the water table (0.1 ft.) would take 1,000 to 10,000 years to travel through the groundwater system to pose a "potential" threat to either Ash Meadows or Devil's Hole. Even if the subsystems were hydrologically connected, with a water level difference between Ash Meadows/Devil's Hole and wells a few miles west of the fault of approximately 200 feet, the State Engineer finds that the residual water level depression caused by ten years of pumping at the proposed points of diversion, if in fact it could be detected, would be less than 0.1 foot and that an increase of 0.1 foot in an already existing gradient of 200 feet would be negligible to non-existent.

XX.

On the basis of Rayrock's monitoring plan and early warning system, the United States Department of Energy withdrew its protests to these applications. The State Engineer finds that while the NPS approved Rayrock's monitoring plan it did not withdraw its protests to these applications.[97]

XXI.

Mining has been a predominant economic force in Nevada since before statehood. It has had such an impact that the Nevada legislature declared mining and mining related activities to be

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[95]Transcript, p. 174; Exhibit P11, at A.2-5.

[96]Exhibit No. A5, Plate 1.

[97]Transcript, pp. 274-277; Exhibit A5.

recognized as a paramount interest of the State.[98] The Nevada legislature has gone further in that they authorized the State Engineer to designate preferred uses within a groundwater basin in need of additional administration.[99] Mining has been designated as the preferred use of water in many groundwater basins in Nevada; however, no such designation has been made in Crater Flat Valley. Nonetheless, the State Engineer finds that the mining and milling uses of water contemplated under the applications are beneficial uses of water and approval of the use of ground water for these purposes does not threaten to prove detrimental to the public interest.

XXII.

The State Engineer finds that the applicant has provided satisfactory proof of its good faith intent to construct the works necessary to apply the water to the intended beneficial use with reasonable diligence and has the financial ability to do so.

XXIII.

The protestant presented a witness who testified as to the fragile nature of the hydraulic habitat for the endangered Desert Pupfish at Devil's Hole and many other species of plants and animals at the springs in DVNM.[100] The State Engineer is cognizant of the public interest values in the area; however, the evidence does not support a finding that this area would be further imperiled by the approval of these applications. To the contrary, the U.S. Department of Energy, which also protested these applications on the basis of potential harm to the Ash Meadows area, withdrew its protest based on the monitoring plan proposed by

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[98]NRS 37.010(6)(a).

[99]NRS 534.120.

[100]Testimony of Doug Threloff, Transcript, pp. 68-83.

Rayrock. The State Engineer finds that the monitoring plan is indeed sufficient to yield an indication of water level declines and radius influence caused by the pumping of the subject wells.

CONCLUSIONS OF LAW

I.

The State Engineer has jurisdiction over the parties and the subject matter of this action and determination.[101]

II.

The State Engineer is prohibited by law from granting a permit under an application to appropriate the public waters where:[102]

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, based on the uncertainty as to the actual recharge to Crater Flat Groundwater Basin and the fact that the actual withdrawal of ground water within the basin is well below the perennial yield, water is available for appropriation for the temporary use contemplated under these applications.

IV.

The State Engineer concludes that the wells contemplated by the applicant will produce water from an aquifer and flow system that is unconnected or slightly connected to the aquifer or flow system that flows toward Ash Meadows and Devil's Hole and no evidence was provided as to the quantity of any connection between

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[101]NRS Chapters 533 and 534.

[102]NRS 533.370(3).

the Crater Flat Groundwater Basin and DVNM, and the granting of Applications 60985 through 60992 will not interfere with the water level in the pool at Devil's Hole nor interfere with any existing rights that may exist on behalf of the NPS at DVNM.

V.

The State Engineer concludes that mining is considered a paramount industry in the State of Nevada and that it will not threaten to prove detrimental to the public interest to grant these applications, particularly in light of the early warning and monitoring system to be implemented by the applicant.

VI.

The State Engineer concludes that he has the authority to regulate groundwater basins[103] in the event the early warning well or the monitoring program indicates a need to do so.

RULING

The NPS protests to Applications 60985 through 60992 are overruled and the subject applications are hereby granted subject to:

1. Existing rights;
2. Payment of the statutory fees;
3. A monitoring program approved by the State Engineer;
4. The permits will automatically expire on January 1, 2008; and,

[103]NRS 534.120.

5. The total combined duty under Permits 60985 through 60992, inclusive, Certificate 13786 and Certificate 13788 shall be limited to 645.7 acre-feet annually.

Respectfully submitted,

R. MICHAEL TURNIPSEED, P.E.
State Engineer

RMT/SJT/ab

Dated this 23rd day of
April, 1996.