

IN THE OFFICE OF THE STATE ENGINEER

OF THE STATE OF NEVADA

1169

ORDER

HOLDING IN ABEYANCE CARBONATE-ROCK AQUIFER SYSTEM GROUNDWATER APPLICATIONS PENDING OR TO BE FILED IN COYOTE SPRINGS VALLEY (BASIN 210), BLACK MOUNTAINS AREA (BASIN 215), GARNET VALLEY (BASIN 216), HIDDEN VALLEY (BASIN 217), MUDDY RIVER SPRINGS aka UPPER MOAPA VALLEY (BASIN 219), LOWER MOAPA VALLEY (BASIN 220), AND FOR FURTHER STUDY OF THE APPROPRIATION OF WATER FROM THE CARBONATE-ROCK AQUIFER SYSTEM, LINCOLN AND CLARK COUNTIES, NEVADA.

**WHEREAS**, the Nevada State Engineer is designated by the Nevada Legislature to perform the duties related to the management of the water resources belonging to the people of the State of Nevada.<sup>1</sup>

**WHEREAS**, the State Engineer is empowered to make such reasonable rules and regulations as may be necessary for the proper and orderly execution of the powers conferred by law.<sup>2</sup>

**WHEREAS**, the State Engineer is empowered to conduct such studies as are necessary.<sup>3</sup>

**WHEREAS**, a large portion of the State of Nevada consisting of approximately 50,000 square miles of sparsely populated land is underlain by significant carbonate-rock sequences.<sup>4</sup>

**WHEREAS**, the carbonate-rock sequences contain groundwater aquifers, which are believed to contain significant, but undetermined, quantities of ground water.

**WHEREAS**, many persons or entities have filed water right applications requesting permission to appropriate substantial quantities of underground water from the carbonate-rock aquifer system.

**WHEREAS**, 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, which includes the carbonate-rock aquifers of the areas referenced above. This study was proposed because the water resources of the Carbonate Terrane were not well defined, the hydrology and geology of the area are complex, and data was sparse.<sup>5</sup>

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<sup>1</sup> See, Nevada Revised Statutes chapters 532, 533, 534, 535 and 536.

<sup>2</sup> NRS § 532.120.

<sup>3</sup> NRS § 532.165(1), 533.368 and 533.370(2).

<sup>4</sup> 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, p. 3, 1989. See also, Memorandum dated August 3, 1984, from Terry Katzer, Nevada Office Chief, Water Resources Division, United States Department of Interior Geologic Survey, Carson City, Nevada, to Members of the Carbonate Terrane Study, Attachment p. 8, which indicates that 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.

<sup>5</sup> Memorandum dated August 3, 1984, from Terry Katzer, Nevada Office Chief, Water Resources Division, United States Department of Interior Geologic Survey, Carson City, Nevada, to

**WHEREAS**, it has been known since 1984 that to arrive at some reasonable understanding of the carbonate-rock aquifer system, substantial amounts of money would be required to develop the science, a significant period of study would be required, and that "unless this understanding is reached, the development of carbonate water is risky and the resultant effects may be disastrous for the developers and current users."<sup>6</sup>

**WHEREAS**, the United States Geological Survey has indicated that given the multiple 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 aquifer system in Nevada is undoubtedly a difficult undertaking.

**WHEREAS**, an investigation of the carbonate-rock aquifer system is additionally complicated by factors including:<sup>7</sup>

- basic hydrologic data such as groundwater levels in the basin-fill aquifers and the carbonate-rock aquifers, and reliable flow measurements for important springs and major streams are scarce or infrequently obtained in much of the area;
- secondary hydrologic and other data, such as hydraulic parameters, geophysical and geochemical, are lacking in many areas;
- 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 within the carbonate-rock aquifer are even more uncertain;
- uncertainties and inaccuracies exist in current methods of estimating precipitation;
- 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;
- only a small number of wells tap the deep carbonate-rock aquifer system;
- because there has been no significant historical pumping of ground water from the carbonate-rock aquifer system, groundwater models can only be used as a limited predictive tool for estimating the principle location and magnitude of the impacts of pumping ground water from the system;
- 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; and
- the relationship between geothermal systems and the deep carbonate-rock aquifers and groundwater flow systems is not well understood.

**WHEREAS**, in 1985, the Nevada Legislature authorized a program for the study and testing of the carbonate-rock aquifer system 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, with a summary of findings to be prepared at the end of each

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Members of the Carbonate Terrane Study.

<sup>6</sup> Ibid.

<sup>7</sup> Id., Attachment p. 7.

phase. A report, Distribution of Carbonate-Rock Aquifers in Southern Nevada and the Potential for their Development, Summary of Findings, 1985-1988,<sup>8</sup> 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 summary indicated that:

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.

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.

\* \* \*

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.<sup>9</sup>

**WHEREAS**, because assurances that the adverse effects of development will not overshadow the benefits cannot be made with a high degree of confidence, development of the carbonate-rock aquifer system must be undertaken in gradual stages together with adequate

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<sup>8</sup> 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.

<sup>9</sup> Id, pp. 1-2.

monitoring in order to predict, through the use of a calibrated model, the effects of continued or increased development with a higher degree of confidence.

**WHEREAS**, staging development gradually means not developing the resources in one large step, but rather starting with small projects that are possibly augmented gradually if 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 detrimental to existing rights and the environment. This approach would hopefully avoid the havoc that could be created by the curtailment of water use by those who have come to rely on it if impacts occur requiring curtailment of the water use.

**WHEREAS**, the 1995 Water-Resources Investigations Report 91-4146<sup>10</sup> estimates the total water budget of all southern Nevada aquifers from the natural recharge to the mountains and subsurface inflow to the study area<sup>11</sup> to be about 160,000 acre-feet annually, and discharges from major discharge areas to be about 77,000 acre-feet annually.<sup>12</sup>

**WHEREAS**, it is believed that all of the recharge and subsurface inflow cannot be captured for use.

**WHEREAS**, in July and August of 2001 nearly four weeks of public administrative hearings were conducted on applications filed by the Las Vegas Valley Water District (Applications 54055 - 54059, inclusive) and Coyote Springs Investment, LLC (Applications 63272 - 63276, inclusive, and 63867 -63876, inclusive), which together request to appropriate approximately 135,000 acre-feet of water annually from the carbonate-rock aquifer system within the Coyote Springs Valley Hydrographic Basin.<sup>13</sup>

**WHEREAS**, testimony and evidence from the administrative hearing on the Las Vegas Valley Water District's applications indicates that using the standard Maxey-Eakin technique for estimation of groundwater recharge from precipitation, the recharge for the Coyote Springs Valley, Muddy River Springs, Hidden Valley, Garnet Valley, Black Mountains and Lower Moapa Valley

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<sup>10</sup> Michael D. Dettinger, et al., Distribution of Carbonate-Rock Aquifers and the Potential for Their Development, Southern Nevada and Adjacent Parts of California, Arizona and Utah, U.S. Geological Survey, Water-Resources Investigations Report 91-4146, p. 50, 1995.

<sup>11</sup> The study area is defined on p. 5 of Water-Resources Investigations Report 91-4146 to be most of southern Nevada south of Tonopah and Pioche.

<sup>12</sup> Discharge areas are identified as Muddy River Springs 36,000 acre-feet annually (afa) of spring flow, Blue Point Spring 240 afa of spring flow, Rogers Spring 920 afa of spring flow, Frenchman Mountain 2,100 afa of underflow toward Colorado River, Pahrump Valley 18,000 afa of underflow to California, Ash Meadows 17,000 afa of spring flow and evapotranspiration, Amargosa Desert 3,000 afa of underflow to Death Valley, and Grapevine Canyon 400 afa of underflow to Death Valley. Water-Resources Investigations Report 91-4146 at 53.

<sup>13</sup> It is noted that at the administrative hearing on Coyote Springs Investment, LLC Applications 63272 - 63276, inclusive, and 63867 -63876, inclusive, the applicant indicated they are requesting the State Engineer "to issue the permits as requested but limit their full use until the monitoring and mitigation program is in effect." Transcript, public administrative hearing before the State Engineer, August 20, 2001, p. 58. However, the applicant further indicated that it requested that a minimum of four permits be issued, two in each county, with the second permit in each county to be used to stress the aquifer. Two permits for a total amount of 14,478 afa would be for development, two permits for a total amount of 14,478 afa would be to stress the aquifer under some temporary development. Transcript, public administrative hearing before the State Engineer, August 20, 2001, pp. 91-96. This is after the 27,504 afa requested by the Las Vegas Valley Water District.

areas combined is approximately 3,550 acre-feet annually. Using the modified Maxey-Eakin technique introduced at the administrative hearing (known as the Donovan-Katzer 2000 technique), the recharge is estimated at approximately 6,761 acre-feet annually for the combined areas.<sup>14</sup>

**WHEREAS**, testimony and evidence from the administrative hearing on the Las Vegas Valley Water District's applications indicates that approximately 50,000 acre-feet of groundwater inflow comes into the Coyote Springs Valley from northern groundwater basins and approximately 53,000 acre-feet annually outflows<sup>15</sup> from Coyote Springs Valley of which a portion may be available for capture from that groundwater underflow. While testimony presented indicated a belief that significant quantities of water may be available for capture from storage, it is unknown what quantity that would be and if any underground water could be appropriated without unreasonable and irreversible impacts.<sup>16</sup>

**WHEREAS**, testimony and evidence from the administrative hearing on the Las Vegas Valley Water District's applications indicates that a portion of the ground water outflow from Coyote Springs Valley is believed to discharge at a rate of approximately 37,000 acre-feet annually at the Muddy River Springs area and approximately 16,000 to 17,000 acre-feet annually flows to groundwater basins further south.<sup>17</sup> This 37,000 acre-feet is counted as part of the 53,000 acre-feet outflow from Coyote Springs Valley resulting in 16,000-17,000 acre-feet annual flow that bypasses the Muddy River Springs area.

**WHEREAS**, these referenced large springs located near the central part of the Upper Moapa Valley, which that collectively discharge approximately 37,000 acre-feet annually of underground water, are fully appropriated pursuant to the Muddy River Decree.<sup>18</sup> It is believed that the source of water discharged originates mainly from the carbonate-rock aquifer system, but it is unknown if the discharge originates solely from the White River Flow System or is also influenced by discharge from the Meadow Valley Flow System or if there is influence from the alluvial aquifer.

**WHEREAS**, listed endangered and/or potential threatened species exist in the Muddy Springs/Muddy River area.

**WHEREAS**, testimony and evidence from the administrative hearing on the Las Vegas Valley Water District's applications indicates that their own expert witnesses are unable to make a suggestion to the State Engineer as to what part of the water budget could be captured without a great deal of uncertainty, and that the question cannot be resolved without stressing the system.<sup>19</sup>

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<sup>14</sup> See, testimony of Terry Katzer and David Donavan; Exhibit 54, p. 4-25, public administrative hearing before the State Engineer, July 16-24, 2001.

<sup>15</sup> Taking into account for 4,000 afa of in-basin recharge and 1,000 afa of evapotranspiration.

<sup>16</sup> See, testimony of Terry Katzer and David Donavan, public administrative hearing before the State Engineer, July 16-24, 2001.

<sup>17</sup> See, testimony of Terry Katzer and David Donavan, public administrative hearing before the State Engineer, July 16-24, 2001.

<sup>18</sup> Judgment and Decree, In the Matter of the Determination of the Relative Rights In and To the Waters of the Muddy River and Its Tributaries in Clark County, State of Nevada, March 12, 1920, Tenth Judicial District Court of the State of Nevada, In and For the County of Clark.

<sup>19</sup> See, testimony of Terry Katzer and David Donavan, public administrative hearing before the State Engineer, June 16-24, 2001.

**WHEREAS**, testimony and evidence from the administrative hearing on the Las Vegas Valley Water District's applications indicates that the State Engineer's ability to determine if development of the carbonate-rock aquifer system will impact existing rights is dependent on how the water rights are brought "on-line" and monitored.<sup>20</sup>

**WHEREAS**, testimony and evidence from the administrative hearing on the Las Vegas Valley Water District's applications indicates that little is known about the hydrologic connectivity between the groundwater basins, that virtually nothing is known about the mountain blocks, estimates of recharge to the area can vary by a factor of two, there is probably some connectivity between the water in the carbonate-rock aquifers and the alluvial groundwater basins,<sup>21</sup> there is still little data available and not much has changed from the information known in 1984.

**WHEREAS**, the State Engineer has been provided several different models, which though based on little pumping data, all provide the State Engineer with different analyses, and which all indicate that the pumping of substantial amounts of carbonate-rock aquifer water will likely impact the sources of the Muddy River.

**WHEREAS**, the State Engineer has previously granted groundwater permits, which authorize use of underground water in the area underlain by the carbonate-rock aquifer system or directly from the carbonate-rock aquifer system in the following quantities:

Coyote Springs Valley (Basin 210)	16,300 acre-feet
Black Mountain (Basin 215)	10,216 acre-feet
Garnet Valley (Basin 216)	3,380 acre-feet
Hidden Valley (Basin 217)	2,200 acre-feet <sup>22</sup>
Muddy River Springs aka Upper Moapa Valley (Basin 219)	14,756 acre-feet
Lower Moapa Valley (Basin 220)	5,813 acre-feet
	50,465 acre-feet

**WHEREAS**, of all the water rights issued from the carbonate-rock aquifer system, to date very few have actually been pumped.

**WHEREAS**, if 16,000 to 17,000 acre-feet is believed to by-pass the Muddy River Springs area, the water right permits already issued in Coyote Springs Valley alone equal the estimate of the amount of carbonate flow that by-passes the region and is not part of the flow discharged from the Muddy River Springs area.

**WHEREAS**, Nevada Revised Statute § 533.370(2)(b) provides that the State Engineer may postpone action on an application in areas where studies of water supplies are necessary.

**WHEREAS**, Nevada Revised Statute § 533.368 provides that if the State Engineer determines that a hydrological study, an environmental study or any other study is necessary before he makes a final determination on an application, and the applicant, a governmental agency or other person has not conducted such a study or the required study is not available, the State Engineer shall advise the applicant of the need for the study and the type of study required.

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<sup>20</sup> Ibid.

<sup>21</sup> Ibid.

<sup>22</sup> This 2,200 acre-feet is combined with 2,200 acre-feet issued in Garnet Valley for a total of 2,200 afa between the two basins.

**WHEREAS**, Nevada Revised Statute § 533.368(4) provides that the State Engineer shall consult with the applicant and the governing body of the county or counties in which the point of diversion and place of use are located concerning the scope and progress of the study.

**WHEREAS**, the State Engineer believes it is prudent to work with a model, and the appropriate model will be determined in conjunction with the parties identified below who are responsible for participating in the study.

**WHEREAS**, the State Engineer does not believe it is prudent to issue any additional water rights to be pumped from the identified portions of the carbonate-rock aquifer until a significant portion of the water rights which have already been issued are pumped for a substantial period of time in order to determine if the pumping of those water rights will have any detrimental impacts on existing water rights or the environment.

**NOW THEREFORE**, the State Engineer orders:

1. All applications pending and any new filings for the appropriation of water from the carbonate-rock aquifer system in Coyote Springs Valley (Basin 210), Black Mountains Area (Basin 215), Garnet Valley (Basin 216), Hidden Valley (Basin 217), Muddy River Springs aka as Upper Moapa Valley (Basin 219), and Lower Moapa Valley (Basin 220) will be held in abeyance until further information is obtained by stressing the aquifer by those water right permits already issued to appropriate water from the carbonate-rock aquifer system.
2. While the studies proposed in 1985 were a beginning, those studies indicated that large-scale developments with sustained withdrawals of water from the carbonate-rock aquifers would result in water-level declines and depletion of stored water, but that isolated smaller groundwater developments or developments of limited duration may result in water-level declines and springflow reductions of manageable and acceptable magnitudes. However, very little additional information based on hard science has been produced since that time. Nevada Revised Statute § 533.368 provides the State Engineer with the authority to withhold action on pending applications and to advise the applicant of the need for additional study. The State Engineer finds that further hydrological study is needed before a final determination can be made on carbonate-rock aquifer system water right applications in the referenced basins.
3. The State Engineer, in conjunction with those identified below as applying for additional water rights and already having an interest in water rights permitted from the carbonate-rock aquifer system, or their successors in interest, will conduct a study to provide information on the effect of pumpage of those water rights which have already been issued from the carbonate-rock aquifer.

The entities that shall participate in the study must at a minimum include:

Las Vegas Valley Water District  
Southern Nevada Water Authority  
Coyote Springs Investment, LLC  
Nevada Power Company  
Moapa Valley Water District.

The study must cover a 5-year minimum period during which at least 50% of the water rights currently permitted in the Coyote Springs Valley groundwater basin are pumped for at least 2 consecutive years.

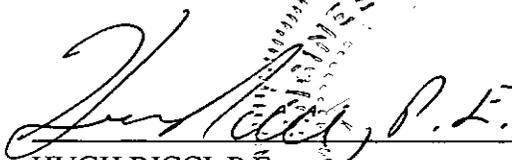
4. These referenced applicants or permittees shall bear the cost of the study, and a cash deposit divided pro rata among them will be required as set forth in NRS § 533.368(3) after a determination of the estimate of cost to complete the study.

5. The State Engineer will arrange meetings between the State Engineer and the Las Vegas Valley Water District, Southern Nevada Water Authority, Coyote Springs Investment, LLC, Nevada Power Company, and Moapa Valley Water District, or their successors, and the governing bodies of the counties in which there are proposed points of diversion and places of use under their pending applications concerning the scope of the study.

6. The State Engineer orders the Las Vegas Valley Water District, Southern Nevada Water Authority, Coyote Springs Investment, LLC, Nevada Power Company, Moapa Valley Water District, Dry Lake Water Company, LLC, Republic Environmental Technologies, Inc., Chemical Lime Co., Nevada Cogeneration Associates, or their successors, who presently hold water rights authorized for appropriation from the carbonate-rock aquifer, to provide the other parties to the study and the State Engineer with data on a quarterly basis as to the rate at which water was diverted under the specific water right permits issued, total acre-feet diverted per month, and monthly water level measurements

7. After the study period, the Las Vegas Valley Water District; Southern Nevada Water Authority; Coyote Springs Investment, LLC; Nevada Power Company; and Moapa Valley Water District are ordered to file with the State Engineer, within 180 days of the end of the fifth consecutive year, a report as to the information obtained and any impacts seen to the groundwater or surfacewater resources of the carbonate-rock aquifer or alluvial aquifer systems from the pumping of those rights presently permitted.

8. At the end of the study period, the Las Vegas Valley Water District/Southern Nevada Water Authority will update Exhibit 54 from the July 2001 hearings in order to show the State Engineer the effects, if any, of the water it requested for appropriation under Applications 54055 - 54059, inclusive, as they are filed. The State Engineer will then make a determination if he has sufficient information to proceed with ruling on those applications for which hearings have already been conducted, i.e., Las Vegas Valley Water District (Applications 54055 - 54059, inclusive) and Coyote Springs Investment, LLC (Applications 63272 - 63276, inclusive, and 63867 -63876, inclusive), and other applications pending for the appropriation of water from the carbonate-rock aquifer system.

  
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HUGH RICCI, P. E.  
State Engineer

*(Faint circular seal of the State Engineer of Nevada is visible in the background)*

Dated at Carson City, Nevada,

this 8<sup>th</sup> day of March, 2002

CERTIFICATE OF SERVICE

I, the undersigned, declare under penalty of perjury, that I am an employee of the Nevada Division of Water Resources, that I am over the age of eighteen (18) years, and that I am not a party to, nor interested in, this action. On this date, I mailed a true and correct copy of Nevada Division of Water Resources' Order No. 1169, addressed to the following:

Las Vegas Valley Water District  
Attn: Kay Brothers  
1001 S. Valley View  
Las Vegas, NV 89153  
Cert. Mail #7000 0520 0023 8555 9034

Coyote Springs Investment, L.L.C.  
7755 Spanish Springs Road  
Sparks, NV 89436  
Cert. Mail #7000 0520 0023 8555 9041

C.S. Inc.  
Judy Kuban  
1625 Wendy Way  
Reno, NV 89509  
Cert. Mail #7000 0520 0023 8555 9058

Dry Lake Water, LLC  
2701 North Tenaya Way, Suite 200  
Las Vegas, NV 89128  
Cert. Mail #7000 0520 0023 8555 9065

Bonneville Nevada Corp.  
257 East 200 South, Suite 800  
Salt Lake City, UT 84111  
Cert. Mail #7000 0520 0023 8555 9072

C.O. Myers, Exec. Dir.  
Nevada Cogeneration Ass.  
P.O. Box 81378  
Bakersfield, CA 93380  
Cert. Mail #7000 0520 0023 8555 9089

Nevada Power Co.  
Attn: Craig York  
P.O. Box 230  
Las Vegas, NV 89151-0001  
Cert. Mail #7000 0520 0023 8555 9096

Oxford Energy of Nevada, Inc.  
3510 Unocal Place  
Santa Rosa, CA 95403  
Cert. Mail #7000 0520 0023 8555 9102

James W. Adams  
7439 La Palma Ave., Suite 234  
Buena Park, CA 90620  
Cert. Mail #7000 0520 0023 8555 9119

Stallion Sand & Gravel, LLC  
624 Casa del Norte  
North Las Vegas, NV 89031  
Cert. Mail #7000 0520 0023 8555 9126

Moapa Band of Paiute Indians  
P.O. Box 340  
Moapa, NV 89025  
Cert. Mail #7000 0520 0023 8558 4562

Moapa Valley Water District  
P.O. Box 257  
Logandale, NV 89021  
Cert. Mail #7000 0520 0023 8558 4579

Three Kids Enterprises  
4055 S. Spencer St., Suite 106  
Las Vegas, NV 89119  
Cert. Mail #7000 0520 0023 8558 4586

Sandia Construction Inc.  
c/o Cameron Adams  
Box 1297  
Susanville, CA 96103  
Cert. Mail #7000 0520 0023 8558 4593

Nevada Cogeneration Associates  
420 N. Nellis Blvd., #A3-148  
Las Vegas, NV 89110  
Cert. Mail #7000 0520 0023 8558 4609

N. Burgess  
420 N. Nellis Blvd., #A3-117  
Las Vegas, NV 89110  
Cert. Mail #7000 0520 0023 8558 4616

North Valley Holdings  
500 Damonte Ranch Parkway, Suite 1056  
Reno, NV 89511  
Cert. Mail #7000 0520 0023 8558 4623

Michael Buschelman  
P.O. Box 51371  
Sparks, NV 89435  
Cert. Mail #7000 0520 0023 8558 4630

William Penn  
CMS Generation Co.  
330 Town Center Drive, Ste. 1100  
Dearborn, MI 48126  
Cert. Mail #7000 0520 0023 8558 4647

Thomas Shelton  
CMS Generation Co.  
2154 Hastings Ct.  
Santa Rosa, CA 95495-8577  
Cert. Mail #7000 0520 0023 8558 4654

Wyman Engineering Consultants  
P.O. Box 60473  
Boulder City, NV 89006-0473  
Cert. Mail #7000 0520 0023 8558 4661

John E. Hiatt  
8180 Placid St.  
Las Vegas, NV 89123  
Cert. Mail #7000 0520 0023 8558 4678

City of Caliente  
Attn: George T. Rowe, Mayor  
P.O. Box 158  
Caliente, NV 89008  
Cert. Mail #7000 0520 0023 8558 4685

County of Nye  
P.O. Box 1767  
Tonopah, NV 89049  
Cert. Mail #7000 0520 0023 8558 4692

Ely Shoshone Tribe  
16 Shoshone Circle  
Ely, NV 89301  
Cert. Mail #7000 0520 0023 8558 4708

Lincoln County, Board of Commissioners  
P.O. Box 90  
Pioche, NV 89043  
Cert. Mail #7000 0520 0023 8558 4715

Clark County Commissioners  
500 S. Grand Central Parkway  
Las Vegas, NV 89106-4506  
Cert. Mail #7000 0520 0023 8558 4807

Muddy Valley Irrigation District  
P.O. Box 160  
Logandale, NV 89021  
Cert. Mail #7000 0520 0023 8558 4722

U.S. Bureau of Indian Affairs  
Attn: Barry Welch  
P.O. Box 10  
Phoenix, Az. 85001  
Cert. Mail #7000 0520 0023 8558 4739

U.S.D.I., B.L.M.  
Attn: Ben F. Collins, District Manager  
P.O. Box 26569  
Las Vegas, NV 89126  
Cert. Mail #7000 0520 0023 8558 4746

U.S. Fish and Wildlife Service  
911 NE 11th Ave.  
Portland, OR 97232-4184  
Cert. Mail #7000 0520 0023 8558 4753

U.S. National Park Service  
Dan McGlothlin  
1201 Oak Ridge Drive, Suite 250  
Fort Collins, CO 80525  
Cert. Mail #7000 0520 0023 8558 4760

Republic Environmental Technologies, Inc.  
770 E. Sahara Ave.  
Las Vegas, NV 89104  
Cert. Mail #7000 0520 0023 8558 4777

Chemical Lime Co.  
P.O. Box 3609  
North Las Vegas, NV 89036  
Cert. Mail #7000 0520 0023 8558 4784

Nevada Cogeneration Associates  
420 N. Nellis Blvd., A3-148 and 117  
Las Vegas, NV 89110  
Cert. Mail #7000 0520 0023 8558 4791

Richard Berley/Mark Slonim  
Ziontz, Chestnut, Varnell, Berley and Slonim  
2101 4th Ave., Suite 1230  
Seattle, WA 98121

Robert Johnston  
Kilpatrick, Johnston & Adler  
412 North Division St.  
Carson City, NV 89703

Ross de Lipkau  
Marshall Hill Cassas & de Lipkau  
P.O. Box 2790  
Reno, NV 89505

Peter Fahmy  
U.S. Dept. of Interior  
755 Parfet St., Suite 151  
Lakewood, CO 80215

Robert Marshall  
Marshall Hill Cassas & deLipkau  
P.O. Box 2790  
Reno, NV 89505

Byron Mills  
732 S. 6th St.  
Las Vegas, NV 89101

Steve Palmer  
Office of the Regional Solicitor  
U.S. Dept. of Interior  
2800 Cottage Way, Room E-2753  
Sacramento, CA 95825-1890

Karen Peterson  
Allison, MacKenzie, Hartman, et. al.  
P.O. Box 646  
Carson City, NV 89702

Peggy Twedt  
Frank Flaherty  
Dyer, Lawrence, Cooney & Penrose  
2805 N. Mountain St.  
Carson City, NV 89703

Harvey Whittemore  
Carl Savely  
Lionel, Sawyer & Collins  
50 West Liberty St. Suite 1100  
Reno, NV 89501

Don Winter  
Agent C.S. Inc.  
P.O. Box 35136  
Las Vegas, NV 89133

Charles Cave  
2325 W. Charleston Blvd.  
Las Vegas, NV 89102

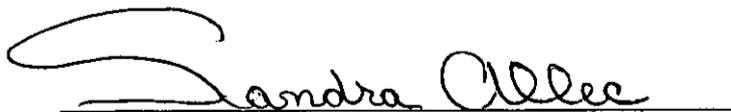
Dale Ferguson  
Woodburn & Wedge  
6100 Neil Road, Ste. 500  
Reno, NV 89511

Mark Stock  
Global Hydrologic Services, Inc.  
561 Keystone Ave. #200  
Reno, NV 89503

Linda Bowman  
540 Hammil Lane  
Reno, NV 89511

George Benesch  
P.O. Box 3498  
Reno, NV 89505

Dated this 8 day of March, 2002.

  
Sandra Allee