

1 Now, on page 16 there is another statement, the
2 second paragraph from the bottom of the page, "Underflow
3 through the alluvial in Devil's Gate from Antelope and Kobeh
4 Valleys into Diamond Valley is estimate by Eakin to be small.
5 For the purposes of this report, the same conclusion is made.
6 Devil's Gate at its narrowest place is only 100 yards wide.
7 The depth and width between the bedrock walls probably is
8 less." It just doesn't appear, based upon the information
9 that we have available to us at this time, that there is any
10 leakage through the bedrock formations from Kobeh Valley into
11 Diamond Valley, and secondly, that outflow from Kobeh Valley
12 into Diamond Valley, through Devil's Gate area, would
13 probably be on the order of something, somewhere between 200
14 and 500 acre feet per year, and in your studies and the
15 conclusions that you reached, could you comment on that?

16 MR. CHARLES E. DOWNS: Well, sir, we are using the
17 definition of "minimal," which was developed in these studies,
18 which said that "Groundwater discharge in the range of 200 to
19 500 acre feet is considered to be minimal," and we adopted
20 that term since it is used in these studies.

21 MR. MORROS: Well, we have taken measurements,
22 our office, Mr. Gamboa has taken measurements, just recent
23 measurements on some wells just west of the Devil's Gate area
24 and it appears that the water table in that area is extremely
25 shallow. I think as I recall, Ralph, you mentioned something
26 like six foot depth to the water table. That would be some

1 indication, I guess, that the bedrock is fairly shallow.

2 MR. CHARLES E. DOWNS: It seems to act as an
3 effective barrier there.

4 MR. MORROS: I think in the report that we did on
5 Water Resources Bulletin No. 35, which is the hydrolizing
6 response to irrigation pumping in Diamond Valley, Eureka and
7 Elko Counties, there is a comment made in that report on
8 page 34 that the inflow into Diamond Valley through the
9 Devil's Gate, which is under the south Diamond sub-area, is
10 150 acre feet.

11 Mr. DOWNS: I believe on page 22 it shows the
12 estimated total of around 40 acre feet per year. Top of the
13 page.

14 MR. MORROS: Maybe I'll just read this into the
15 record because I think it is relevant. This is page 21 of the
16 Water Resources Bulletin 35, the paragraph entitled "Inflow
17 from the Devil's Gate."

18 "Water from Monitor, Antelope and Kobeh Valleys
19 enters Diamond Valley at surface and sub-surface flows at
20 Devil's Gate. Surface flow is intermittent, the most occur-
21 ing in early spring and usually diminishing to near zero by
22 summer. The channel is dry during most of the summer, except
23 for short periods of flow after summer storms and in very wet
24 years a very small amount of flow may be maintained throughout
25 the year. Recharge to the valley fill reservoir from the
26 infiltration of surface waters occurs mainly during spring

1 runoff because this is the only time during the year when
2 appreciable flow is maintained. The estimated average annual
3 surface water inflow is 100 acre feet per year, on the basis
4 of channel geometry measurements made by R. D. Lamke."

5 It would appear that even the surface on the
6 average, talking about an average, and this is probably not
7 an average because there is a considerable more amount of
8 water this year entering Diamond Valley, but on an average
9 it would appear, even on the surface there is only some 100
10 acre feet of water a year flowing into Diamond Valley.

11 Did you have anything else?

12 MR. DOWNS: The additional continuation of that
13 comment, I think it calculates groundwater outflow.

14 MR. MORROS: I think they refer to approximately
15 150 acre feet.

16 MR. DOWNS: I think the one additional comment I
17 would like to make is that if you look, use my illustration
18 here, it looks like the Kobeh Valley bowl, if I may use that
19 term, is full, and given the different grading across that
20 boundary of the Sulphur Springs Range, if this boundary was
21 transmitting to any significant degree, we would expect to
22 see a reflection of the influence of the Diamond Valley
23 activities in the water levels over in Kobeh Valley Basin and
24 we do not see this in our studies. Thank you.

25 MR. E. E. EYRE: May I ask a question?

26 MR. MORROS: Just relative to his direct testimony,

1 now, Mr. Eyre, because these applications are not under
2 protest, but if there is some clarification you want, that's
3 fine. I will allow that.

4 MR. E. E. EYRE: Is the State Engineer aware and
5 are you aware that there are wells that are located in, it
6 would be the southwestern corner of Kobeh Valley, which are
7 giving ranchers problems? They are drying up. I'm not a
8 hydrologist, but would it not be correct to assume that
9 perhaps this water table is dropping down here so that this
10 line is becoming more flat at this stage of the game?

11 Secondly, I ask the question, do we actually know?
12 It seems to me that most of what we have heard is we feel that
13 there is no water flowing underground of any appreciable
14 amount through Devil's Gate.

15 MR. MORROS: Well, that is primarily based on the
16 best information we have available to us at this time.

17 MR. E. E. EYRE: What we are requesting is to have
18 better information made available through a study, because
19 the point that I'm trying to make is that be it written or not
20 written, everything that I have seen indicates a lack of
21 knowledge in this regard, and we feel that it would be --
22 There are many of us that feel that it would be ill advised
23 to grant water rights on the basis of the information that
24 we have today. But the point is this, that I am trying to
25 make, and again, I'm asking the question: If there is a
26 barrier, for instance, here in Devil's Gate, and if this

1 gradient runs, for instance, this level is flattened out, is
2 it possible, would that explain why these wells might be
3 going dry up here in this part of the Kobeh Valley?

4 MR. MORROS: Probably, in my opinion, I think the
5 decline in those water tables is probably more associated
6 with the lack of precipitation and recharge over the last
7 ten years than anything else. I think you are going to find
8 a marked change probably in the water level this year.

9 MR. E. E. EYRE: Again, it is your guess, and that
10 might be my guess.

11 MR. MORROS: Well, my guess is based on a lot of
12 experience.

13 MR. EYRE: But in other words, would it not be
14 possible if a gradient exists here, for instance, and the
15 water from Diamond Valley, for instance, in other words, if
16 that gradient, if this water is permeating down underneath
17 this barrier, be it in Devil's Gate or some other location,
18 it would tend to flatten out these gradients here. These
19 wells here where the barrier may be, those wells could remain
20 at the same level, but these wells would decrease, and that
21 would be one explanation of why those wells are decreasing.

22 MR. MORROS: That's a possibility, I suppose, but
23 again we are back to the fact, is there any evidence there is
24 any leakage between Kobeh Valley and Diamond Valley? The only
25 way that a lowering of the water table in Kobeh Valley could
26 affect Diamond Valley is if there was an inter-connection.

1 MR. E. E. EYRE: Is there any evidence there isn't
2 any leakage?

3 MR. MORROS: There is no evidence there is leakage
4 based upon the best information we have available to us now.

5 I share your concerns. I don't want you to think
6 for a minute that I don't. Every time we issue a permit in
7 any groundwater basin in this state, in most cases we would
8 like to have more information. There is no question about
9 that. We have got 232 groundwater basins in this state, and
10 I guess the only thing that stops you from developing more
11 information is just money, funds. Obviously, we would like
12 to initiate some more advanced studies in a lot of these
13 groundwater basins, but it is just impossible to address all
14 of them every time there is applications to appropriate filed
15 in the state, and you know, these applications could very
16 well be applications for other than irrigation water. It just
17 so happens they are for mining and milling, and the same
18 questions could be raised, which means that every groundwater
19 basin in the state where there is applications pending for
20 irrigation purposes, then action on those applications should
21 be withheld until additional studies are made, and I don't
22 think really that is, you know, I can't believe that any
23 requirement in the act would support the State Engineer
24 taking that position.

25 MR. EYRE: The fact remains that there evidently
26 is some interchange of water, appears to be some interchange

1 of water, not moving just in the Devil's Gate area, but in
2 other areas other than Devil's Gate. There seems to be a
3 lot of unknown factors in this particular instance. The
4 amount of water we are talking about here is a critical amount
5 of water, a tremendous amount of water that has direct impact
6 on those water rights that already exist in Diamond Valley.
7 It is not, quote, unquote, a typical water experience that we
8 might have in this state.

9 MR. MORROS: Well, Mr. Eyre, if these applications
10 were irrigation applications for a farming operation or
11 Desert Land Entry in Kobeh Valley, you're looking at 8700
12 acre feet of water, which would be approximately enough water
13 to support 2000 acres of farming or DLE, would your position
14 be the same?

15 MR. EYRE: Yes.

16 MR. MORROS: In any groundwater basin you think
17 the State Engineer should withhold taking action on applica-
18 tions, pending applications in any groundwater basin until
19 more information is developed on the inter-connection between
20 that groundwater basin and an adjacent basin?

21 MR. EYRE: I feel in this particular instance that
22 the knowledge that we have available to us is not sufficient
23 to make a determination on a water right of this size, be it
24 for farming or for mining.

25 MR. MORROS: All right. Mr. Barrett?

26 MR. KENNETH BARRETT: May I make another statement,

1 please?

2 MR. MORROS: Certainly.

3 MR. KENNETH BARRETT: I would like to go on record

4 --

5 MR. MORROS: Oh, I'm sorry. We're not through with
6 Mr. Downs yet. Excuse me. Let's finish up with Mr. Downs
7 first.

8 MR. CHARLES E. DOWNS: I had completed my statement.

9 MR. MORROS: Okay. Does anybody have any more
10 questions related to Mr. Downs' direct testimony? Walt?

11 MR. WALTER PLASKETT: A lot of testimony has been
12 hinged on state reports done by the State Engineer, and the
13 U.S.G.S. The question relates to a man who apparently did
14 some original research which was then referenced in another
15 report which you mentioned, and then you in turn have based
16 your research on, I suspect, on these earlier reports, and
17 my question was this: Was Eakins correct? Do you have any
18 indication that Eakins' work was true? I have a little
19 problem with my whole livelihood and property values being
20 hinged on somebody named Eakins having made a correct guess
21 on what the chain of ensuing hydrologists have taken very
22 important notice of. Who is Eakins and how can you qualify
23 his earlier work?

24 M R. CHARLES E. DOWNS: May I respond?

25 MR. MORROS: Yes. Go ahead.

26 MR. DOWNS: Mr. Eakins is a hydrologist and

1 geologist with the U. S. Geological Survey, and from our
2 review of his report, it appears that he used correct methods
3 in studying and trying to collect as best he could the hydro-
4 geologic evidence that related to the hydrologic characteris-
5 tics of this basin. We could find no fault with his interpre-
6 tation. We feel that the information that we have, we agree
7 there is lack of information, but given the studies that have
8 been done, we felt that it has been done correctly, we feel
9 that their conclusions are valid based on the extent that
10 they were able to collect information, which is sufficient.

11 MR. MORROS: I might add to that, Walt, that Eakins
12 worked for the U. S. Geological Survey for a number of years
13 and he was involved in several hundred groundwater hydrology
14 evaluations and studies and a lot of the positions, conclus-
15 ions in these reports that he made or that he had a part in
16 preparing we found to be extremely accurate.

17 A good example of the type of work that the U.S.G.S.
18 does, this report here on Diamond Valley, this report was
19 prepared back in 1968 and there were some predictions that
20 were made in this report on what was going to happen out in
21 Diamond Valley under the present pumping conditions, and if
22 you go through this report and then you go through what is
23 happening in Diamond Valley, you'll find that the predictions,
24 the predictions in Diamond Valley today are exactly what was
25 predicted in this report in 1968. So you know, I put a lot
26 of faith in these U.S.G.S. reports. That's why we are

1 involved in the cooperative program with them, and we have
2 gained a lot of experience in the groundwater basins through-
3 out the state, you know, and we have made some mistakes in
4 some groundwater basins, and hopefully, we were correct in
5 most of the state.

6 Yes, Mr. Eyre?

7 MR. E. E. EYRE: If a more intense study were
8 possible, would you withhold the approval of these applica-
9 tions in the Kobeh Valley until that study were made so long
10 as it did not impair the preliminary work which Exxon had to
11 do?

12 MR. MORROS: Well, I don't think that I want to
13 withhold taking action on these applications, Ned. I think
14 that we are at a point --

15 MR. E. E. EYRE: In light of a possible study?

16 MR. MORROS: Well, just let me finish now. We are
17 at a point now where I have got to make a decision on whether
18 to approve or deny these applications. Now, I think the
19 alternative is for Exxon to set up a full scale monitoring
20 program in Kobeh Valley and will probably have to install
21 some monitoring wells along the east side of the valley to
22 monitor the effects of this pumping and see if in fact there
23 is any effect that develops from this pumping on those water
24 tables in that area. I think from that we will be able to
25 determine whether there is any interaction between the two
26 valleys. When we get to Mr. Barrett again, we'll talk about

1 that.

2 MR. EYRE: But this appears to me to be after the
3 fact. If it were possible to conduct a study now, which
4 would not impair or prevent the preliminary work that Exxon
5 has to do to get the mining operation by '89 --

6 MR. MORROS: Without water rights it is going to
7 impair whatever they have got to do. They are not going to
8 make an investment out there without water rights to back it
9 up. They would be damn fools to do that. It's as simple as
10 that. You know, you're talking about several million
11 dollars. Now, either we tell them "No" or we let them go
12 ahead, one of the two.

13 MR. E. E. EYRE: I have seen a lot of ranchers'
14 applications held up for a lot longer period of time than
15 this. Maybe it isn't several million dollars.

16 MR. MORROS: All right. Yes, Ma'm, would you
17 identify yourself, please?

18 MRS. LAUREI MARSHALL: Yes. Laurel Marshall,
19 Eureka. If the applications are granted and Exxon puts the
20 monitoring system in Kobeh Valley, what legal recourse would
21 the water holders have that are currently water holders now
22 if for some reason or other that amount of water lowered the
23 water in the valley? Wouldn't it be too late at that time to
24 say, "We protest it now," as seems to have happened?

25 MR. MORROS: Yes, but the point is, you did not.
26 Nobody filed a formal protest against these applications.

1 Nobody complied with the law and filed formal protest.

2 MRS. LAUREI MARSHALL: My question is, if Exxon
3 sets up a monitoring system after they have already gotten it
4 and it is found that Exxon drawing water out of Kobeh Valley
5 there has a major impact on the water rights that Diamond
6 Valley has, and these people held water rights for many,
7 many years, what recourse will the Diamond Valley farmers
8 have?

9 MR. MORROS: If these applications are granted and
10 some time in the future it was determined that the pumping
11 under these applications is having a major effect on the
12 water levels or the water table in Diamond Valley, the State
13 Engineer will be bound under the law to curtail the pumping
14 under these applications. It's as simple as that.

15 MR. E. E. EYRE: On which side?

16 MR. MORROS: Obviously on the Kobeh Valley side.

17 MR. E. E. EYRE: Why obviously?

18 MR. MORROS: Because they are later in priority.

19 MR. E. E. EYRE: It is a designated valley. If
20 that's a designated valley over there it stands on its own
21 two feet, as I understand it, and I don't see the clarity
22 between --

23 MR. MORROS: Sir, if there is an interconnection
24 between those two valleys, which I don't believe there is,
25 I think that these reports are accurate, I don't think there
26 is an interconnection between those, but if there is, if

1 there is an interconnection between those two valleys and if
2 the pumping under these Exxon applications was to have an
3 adverse effect on existing water rights in Diamond Valley,
4 then the pumping under the Exxon application would have to be
5 curtailed. It's as simple as that, if it is an adverse
6 effect on the existing rights. The designation of the two
7 groundwater basins really has nothing to do with it. The law
8 says that you will not adversely affect existing rights. That
9 is all there is to it. Yes, Ma'm?

10 MRS. LAUREI MARSHALL: At that point in time, the
11 designation of two separate valleys would become nil?

12 MR. MORROS: From the standpoint of effect on exist-
13 ing rights, yes, if it is demonstrated there is an inter-
14 connection. You know, the same thing could be occurring in
15 Diamond Valley right now. Let me give you another scenario:
16 There might be other groundwater basins that are adjacent to
17 Diamond Valley, Newark Valley, several others, there is a
18 substantial amount of pumping going on in Diamond Valley.
19 If it was ever determined that there was a connection between
20 Diamond Valley and those other valleys and there were earlier
21 priority rights in those other valleys that would be adversely
22 affected by the pumping in Diamond Valley, I may well, you
23 know, the State Engineer may well have to come in here and
24 curtail the pumping in Diamond Valley. You know, it's a chain
25 reaction that develops.

26 MR. E. E. EYRE: But again I ask the question now:

1 Are we not in the position or in the particular point where
2 we should know more about the interchange of this water? If
3 it is possible to get a study to find out, does it not
4 benefit not only Exxon but the farmers of Diamond Valley and
5 the knowledge by the state for all of these valleys in the
6 state?

7 MR. MORROS: I wouldn't argue with that statement
8 at all. I wouldn't argue with that at all.

9 MR. E. E. EYRE: Then we formally request that you
10 allow time to have this study at least explored and perfected.

11 MR. MORROS: Okay. State your name for the record,
12 please?

13 MRS. MARI KEPHART: My name is Mari Kephart. The
14 Conservation District is presently trying to put in a snow
15 survey site so we will be in a better position to know what
16 we will have. We are asking for donations. The snow survey
17 site has been partly underwritten by the SCS, the county
18 commissioners have donated two thousand dollars. We hope to
19 put one in Diamond and one maybe up on Prospect Peak. This
20 will not only tell us the amount of snow that has fallen over
21 the areas, but we can put other units or other places and get
22 a lot of information from one snow melt, and we would
23 certainly appreciate anything the Division of Water Resources
24 can do to promote this and ask for donations from the Depart-
25 ment.

26 MR. MORROS: Okay. The only comment I can make is,

1 you know, we welcome any additional monitoring of our water
2 and precipitation and our runoff, believe me. There is a
3 drastic deficiency in this part of the state on that type of
4 equipment being in place.

5 Okay. Mr. Barrett, do you want to go ahead? I'll
6 remind you, you are still under oath.

7 MR. KENNETH E. BARRETT: Mr. Morros, I would just
8 like to go off the record from Exxon's point of view in
9 posing the additional study that Mr. Eyre recommends. I am
10 very confident, as you indicated earlier, in the result of
11 these studies. We never have as much information in the area
12 of geology as we would like to have, but I think it has been
13 evidenced over the past that predictable results have been
14 able to be achieved from studies similar to this. We are
15 very confident that this particular series of studies done by
16 the U.S.G.S. in conjunction with the State Engineer's Office
17 has been in depth and it has been accurate. I think probably
18 to me the strongest evidence that what those reports say are
19 true is the diagram that Charles Downs drew on the blackboard.
20 Those water level measurements came from the 1982 water
21 levels in wells reported in the State Engineer's Office in
22 Diamond and Kobe Valley. You can plot the gradients equally
23 as well as we can and get the same answer. We would submit
24 that with a significant pumpage from Diamond Valley, I think
25 we would have seen a significant impact on Kobe from that
26 pumping if there had been significant communication. There is

1 none.

2 As the State Engineer mentioned earlier, there is
3 no evidence of any kind that we have been able to find in a
4 very exhaustive search of our own and through the State
5 Engineer's Office and with a consultant in Reno to indicate
6 that the conclusion should be anything but a negligible
7 transfer of water from Kobeh to Diamond Valley.

8 I would further say that I am confident enough in
9 these results that I certainly agree with the statement the
10 State Engineer made earlier, that if in the future there
11 happens to be the occasion where proof can be made that
12 pumping from Kobeh in our wells would affect those wells in
13 Diamond Valley, he does have every right, and we would
14 support that right, to change our pumping in Kobeh to
15 eliminate the detrimental effects, if any, if they can be
16 proved in Diamond Valley.

17 MR. MORROS: Thank you.

18 MR. E. E. EYRE: Can I ask --

19 MR. MORROS: We can sit here and argue about this
20 all evening --

21 MR. E. E. EYRE: I'm not arguing. I'm just curious
22 about something.

23 MR. MORROS: All right.

24 MR. E. E. EYRE: Were these water rights to be
25 delayed for the study which is being proposed by the U. S.
26 Geological Survey preliminary proposal, were your water rights

1 grant to be delayed until 1986, would that impose a great
2 hardship on you and if so, what would it be?

3 MR. MORROS: Do you want to respond to that, Mr.
4 Barrett?

5 MR. KEN E. BARRETT: Yes. Mr. Eyre, it would
6 impose hardship on us. We have certain philosophies that we
7 follow when we look at investments the size we are looking at
8 at Mt. Hope. One of those investments criteria, and in this
9 very same room some two months ago that we had a sufficient
10 amount of lands that we are going to build on, so that we
11 have a number, and what we build those facilities that are
12 the homes, and the other is that we own the significant water
13 that would be required, and as you very well know, water is
14 very critical to your farming operations, and it is equally
15 as critical in our mining operation, and without it and with-
16 out that tied down, we can not go forward with any recommenda-
17 tions on the Mt. Hope project if that were not nailed down at
18 a very early point.

19 MR. E. E. EYRE: I guess what I'm trying to figure
20 out, what physically is going to be done as far as the mining
21 operation in the next three years?

22 MR. KEN E. BARRETT: Well, you sat in on the same
23 meetings that I presented the information at on Kobeh. Over the
24 next three years we will be doing continuing studies, but
25 nothing done on the ground other than drilling. We will be
26 making recommendations based on results of those studies, and

1 part of the things that I just mentioned that has to be
2 identified as properly nailed down in those studies, and one
3 of those studies is coming up at the end of this year. We
4 will have to make a recommendation to our board of directors,
5 as to what we do with the project to go forward, and one of
6 the criteria that we feel is necessary to have it nailed
7 down is water rights in our hands, so that that is no longer
8 a part of the project.

9 Physically, as I told you in January, we are not
10 going to be doing anything out on the ground, but from a
11 philosophical, planning standpoint, and that is what these
12 things are, it takes years of planning to get there, we have
13 those critical things to identify along the way, and water
14 rights is very high in that.

15 MR. MORROS: Mr. Barrett, one question: On your
16 proposed withdrawals from these wells, do you have -- How
17 do I want to ask the question? What you are asking for is
18 a maximum withdrawal of 8700 acre feet per year?

19 MR. KEN E. BARRETT: Yes.

20 MR. MORROS: Would you be gradually reaching that
21 pumpage, or will you start your operation and you actually
22 go into production, will you be putting that demand on the
23 groundwater basin at that time?

24 MR. KEN E. BARRETT: That demand, Mr. Morros, would
25 be from the very beginning. It's an average over the life.
26 The day that mill starts up, it will require that volume of

1 water to process. As we continue the processing, as I
2 mentioned in part of my earlier testimony, if we find ways
3 through state of the art technology to increase the amount of
4 water we can in fact recycle from the settling basins or other
5 places, to minimize those losses so it can be re-used, that
6 could eventually affect and therefore decrease the amount of
7 water we take from Kobeh Valley. That is directly our intent.
8 It is very expensive to pump that water from these locations
9 and we don't want to pump any more than we have to pump, and
10 we will work very hard to maximize the recycling and minimize
11 the use of the groundwater.

12 MR. MORROS: Yes, Ma'm?

13 MRS. LAUREI MARSHALL: Have you put what the influx
14 of 500 people to Eureka County is going to do to the water
15 table when they drill that many domestic wells?

16 MR. MORROS: No, I have not.

17 MRS. LAUREI MARSHALL: Is it possible that will
18 significantly affect the current water system and should this
19 be taken into consideration?

20 MR. MORROS: Well, I think it is possible it may
21 have some effect on the water table in Eureka, but I don't
22 know how significant it would be.

23 MRS. LAUREI MARSHALL: Will this be taken into
24 consideration prior to granting this application?

25 MR. MORROS: It has nothing to do with Kobeh Valley.

26 MRS. LAUREI MARSHALL: But it does have to do with

1 Exxon bringing people into this valley which will affect the
2 Diamond Valley water table?

3 MR. MORROS: Definitely a possibility.

4 Any other comments? Yes, Walt?

5 MR. WALTER PLASKETT: Yes, a comment.

6 MR. MORROS: Any other questions or comments?

7 MR. WALTER PLASKETT: The current Diamond Valley
8 water right holders are not in the enviable position of Exxon
9 in having services of Mr. Downs there. I wish it did. I
10 would like to have seen some testimony prepared by people of
11 their quality and background looking for reasons perhaps this
12 should be delayed until more information is derived. I think
13 as a group we have not done that. However, I do think we do
14 have a great strength in that since we do not, I don't think
15 anybody expects that growers or water right holders would have
16 to go out and hire hydrologists. I think we would all agree
17 that with you as our hydrologist, if there is anybody in the
18 world that would look for a reason that perhaps some of these
19 permits should be withheld or delayed, waiting for more
20 information, you sure are the man by law required to look at
21 any possibility of protecting existing water right holders,
22 and I'm sure you will and you have been looking.

23 MR. MORROS: Well, I do have the responsibility to
24 protect the water rights of Diamond Valley and I intend to
25 carry out that responsibility. There is no question about it.
26 These are always difficult decisions and never easy, and as

1 the availability of our resources in this state diminishes,
2 they become more and more difficult.

3 Yes, Mr. Stenton? Do you want to state your name
4 for the record?

5 MR. KENNETH P. STENTON: Yes. Ken Stenton, farmer
6 in Diamond Valley. I have been listening to some of this
7 testimony and talking about millions of dollars that Exxon
8 has, and I probably got a million dollars tied up in my place
9 myself.

10 MR. MORROS: Probably just in litigation.

11 MR. KENNETH P. STENTON: It seems to me if there is
12 a possible chance that any water is coming in there, we should
13 just hold that up for every test we can possibly make, and
14 any more that they are going to come up with, that's just
15 going to be five or ten more pieces of property that are
16 going to go down. In my opinion, we are going down. In my
17 opinion, that book, that red book that you just held up there
18 is entirely correct from everything that I have seen in my
19 sixteen years in this valley, so I'll just put that statement
20 in the record.

21 MR. MORROS: Okay, Mr. Stenton. Thank you.

22 MR. WALTER PLASKETT: I would just like to make
23 one more comment: The tone of this meeting has sort of
24 slipped in my estimation from when it first started to the
25 present time. I am not that good with words, but I guess it
26 has become more of an adversary situation as the morning has

1 gone on, and again I would like to say that I don't think
2 anybody here feels Exxon should be deprived of water. I
3 think every one of us whose livelihoods are involved in real
4 properties in Diamond Valley based on maintaining their
5 valid water rights has enough water to come out on now, and
6 we'll make a crop, but we would like to work in any way
7 possible with Exxon to insure that both interests are served,
8 and indeed, I don't think anybody here wants to become a bad
9 man, and I have sort of had that feeling. It did not feel
10 that way to me when it started, but I think at this point it
11 has certainly, from my viewpoint at this time, it's "Hey, we
12 don't think we are going to stop you from getting water, but
13 please help us in any way you can so we can guard against
14 future problems," and so on. We are not hydrologists. I
15 think probably the closest we have ever come to hydrology is
16 our water wells and we have a problem in that area, and none
17 of us really understands how a hydrologist looks down there
18 to see what is happening, and all of us who have lived all of
19 our lives have no feeling as to what happened. We have
20 guesses, that's all.

21 But we would like to work with them. I want to
22 work with them, as I told you, so let's work together for
23 everybody and we're all going to be here together so let's
24 start together like this and stay together.

25 MR. MORROS: I think, Mr. Barrett, you wanted to
26 make a comment?

1 MR. KEN E. BARRETT: Yes, Mr. Plaskett. I don't
2 consider this adversary situation. We knew that there was
3 concern over the water, and Ned and I talked over a month
4 ago about the concerns you had, and we also recognize you
5 don't have hydrologists and the fact that we do. I told Ned
6 at that time we would be certain all the data that we had,
7 and we are as concerned as you are, if there really is an
8 interchange, and we don't want to do harm to your wells. We
9 just have not found that, and we have tried to use the
10 resources we have available to us, not only hydrologists,
11 but information from the State Engineer's Office, and try to
12 present it in a fashion that even those schematics I think
13 are understandable, conceptually anyway, as to what we think
14 is happening there. We intended it in that light, and it was
15 intended for all of us and we didn't come here just to
16 prove for our benefit there was no communication. That is
17 just the conclusion and the result we came to after evaluat-
18 ing all the data that is available.

19 I appreciate your comments. We are going to be
20 neighbors and for a long time. I think we are going to try
21 to be good neighbors and certainly we don't believe we will
22 have any problems at all.

23 MR. MORROS: Mr. Eyre?

24 MR. E. E. EYRE: With your permission, I won't
25 read the whole thing, but this is just a preliminary propos-
26 al by the United States Department of the Interior, Geological

1 Survey, and just one sentence here I think will indicate
2 something which is important to this hearing: "The possibili-
3 ty that something from Diamond Valley may significantly
4 affect groundwater flow in adjacent valleys, and conversely,
5 that pumping in adjacent valleys may affect groundwater flows
6 in Diamond Valley has been raised, but can not be either fully
7 confirmed or denied on the basis of existing information."

8 In that light and because of the time factor, I
9 won't read the rest of this. I would, if you felt it
10 permissible, like to submit this proposal with the understand-
11 ing that it is a preliminary proposal, to this hearing is a
12 matter of record.

13 MR. MORROS: Certainly.

14 MR. E. E. EYRE: May I get a copy of it made down
15 there?

16 MR. MORROS: I guess the statement you just read
17 in that proposal there is basically the same type of state-
18 ments that appear in these reports. You know, it's interest-
19 ing that you want me to take note of that, that the pumpage
20 in Diamond Valley is not affecting any water rights in adjac-
21 ent groundwater basins, but then you take exception to the
22 statement made in these reports, there is no evidence of any
23 leakage out of Kobeh Valley or any surface flow into Diamond
24 Valley.

25 MR. E. E. EYRE: Well, I think when you re-read
26 this you'll get a different interpretation of what that said.

1 May I have permission to get a copy of this made?

2 MR. MORROS: Okay. Why don't we take a five
3 minute recess and you can go ahead and have a copy made and
4 bring it in, and we'll enter it into the record as an exhibit,
5 and is there anybody else that wishes to say anything? If
6 not, we are going to take a break and I am going to rule on
7 these applications.

8 Okay. We'll be off the record -- Let's be off the
9 record for ten minutes.

10 (The hearing was thereupon recessed from 10:40
11 o'clock, a. m., until 10:55 o'clock, a. m.)

12 MR. MORROS: We'll be back on the record.

13 Let the record show that Mr. Eyre has provided me
14 with a copy of the information that he testified to earlier
15 and we'll have this marked as Ned Eyre Exhibit 1 for identifi-
16 cation.

17 MR. E. E. EYRE: U. S. Geological Survey.

18 MR. MORROS: But the U. S. Geological Survey is not
19 asking it be submitted into the record, Mr. Eyre.

20 MR. E. E. EYRE: No. Excuse me.

21 MR. MORROS: We'll have it marked for purposes of
22 identification as Ned Eyre Exhibit No. 1, and it will be
23 received into the record, but it is with the understanding
24 that the information was received from the U. S. Geological
25 Survey.

26 (The statement of the U. S. Geological Survey was

1 received and marked Ned Eyre Exhibit No. 1.)

2 MR. E. E. EYRE: And in that light, I would like to
3 make a motion, in just having reviewed this very, very briefly
4 in the last few minutes, that if it becomes apparent there is
5 a great deal of information provided in this particular
6 proposal, which should be made part of the decision, I would
7 make a motion that the decision not be made until the State
8 Engineer and the proper employees have had an opportunity to
9 review the information which has been submitted.

10 MR. MORROS: Okay, Mr. Eyre. I'm going to deny
11 your motion and at this time I am going to indicate that I am
12 prepared to approve publications 44430, 44431 and 44436, but
13 that there is going to be some conditions attached to that
14 approval.

15 The most important condition, of course, is going
16 to be that Exxon; the applicants under these applications
17 will submit to the State Engineer an acceptable monitoring
18 program primarily centered on the area in the eastern part of
19 Kobeh Valley, along the face of the mountain range that
20 separates Kobeh Valley and Diamond Valley.

21 My suggestion is that you prepare some kind of a
22 proposal and bring it to our office and we'll get together
23 with the U.S.G.S. too and set up the monitoring program so
24 that at any time in the future if there is any effect detected
25 from the pumpage under these permits, we will be able to
26 detect it at the earliest possible moment and take corrective

1 action at that time.

2 My decision is based on the best information that
3 is available to us at this time and that is the reports that
4 were entered into the evidence and exhibits at this hearing,
5 so it is my ruling that Applications 44430, 44431 and 44436
6 will be granted upon the receipt of the statutory permit fees,
7 subject to existing rights, and there will be a requirement
8 for the installation of totalizing meters on all three wells.

9 Now, I believe, Mr. Barrett, you indicated that you
10 were going to formally withdraw your applications in Pine
11 Valley and Diamond Valley?

12 MR. KEN E. BARRETT: Yes, Mr. Morros. We will
13 agree to withdraw the remaining applications in Diamond and
14 Pine Garden Valleys.

15 MR. MORROS: Okay. Those applications that were
16 noticed for this hearing today, in Pine Garden Valley and
17 Diamond Valley, will not be heard since they have been with-
18 drawn.

19 If there is nothing else, we will conclude the
20 hearing on Kobeh Valley and one last remark: I will instruct
21 my staff to prepare a designation order for Kobeh Valley.
22 Kobeh Valley will be designated. Okay.

23 We are going to go off the record for a minute now
24 so we can put up our exhibits on Diamond Valley.

25 (Short off the record.)

26 MR. MORROS: We are going to be back on the record

1 now.

2 Also noticed for this hearing today was the time
3 and place for receiving any additional testimony and evidence
4 or public comment concerning the expansion of the designated
5 area within the Diamond Valley Groundwater Basin.

6 The State will enter into the record the next
7 exhibit in order, which is No. 5, I believe, a map of Diamond
8 Valley. The map delineates the present designated area
9 within Diamond Valley, designated under the provisions of
10 Chapter 534, and that area is outlined with the red border.
11 The area that the State Engineer proposes to include within
12 the designated area of Diamond Valley is that area delineated
13 on Exhibit 5 and shaded in blue. That area presently is not
14 within the designated area of Diamond Valley, and I don't
15 know, maybe the best thing to do now is just to go off the
16 record for about five minutes, and if there is any of you
17 people that would like to come up and take a closer look at
18 the exhibit, you can do so.

19 (The map as described of Diamond Valley was then
20 received and marked State's Exhibit No. 5.)

21 MR. WALTER PLASKETT: Can someone just explain what
22 those perimeters are? Is it the mountain tops or certain
23 elevations down?

24 MR. MORROS: Okay. I think probably the best thing
25 to do, Jerry, if you want to raise your right hand, I'll
26 swear you in and I think you can go ahead and give a full

1 explanation of what the exhibit represents.

2 (Jerry Brownfield was thereupon duly sworn by Mr.
3 Morros.)

4 MR. MORROS: The record will show Jerry Brownfield
5 is the Chief of the Groundwater Section, Division of Water
6 Resources, Carson City. Go ahead.

7 TESTIMONY OF
8 JERRY BROWNFIELD,

9 who, called to testify, having been duly
10 sworn, testifies as follows:

11 MR. JERRY BROWNFIELD: Okay. This is the map which
12 shows the Diamond Valley designated basin. The outside line,
13 dark outside line, is the top of the basin. In other words,
14 any precipitation that falls within any part of this basin
15 runs into the basin. Okay? And any that would fall outside
16 of this would fall into basins on the outside of Diamond
17 Valley.

18 Now, within the red line is the present designated
19 area of Diamond Valley, which included most of the flatter
20 ground where we have most of the irrigation taking place.
21 The area outside of that goes up the hills to the top so that
22 you have everything included now as far as this map is
23 concerned in blue.

24 MR. MORROS: It is basically all the natural
25 drainage in Diamond Valley.

26 MR. WALTER PLASKETT: All the surface drainage?

1 MR. MORROS: All the surface drainage, right.
2 Anything outside of the black border on the side of the map
3 would drain into the adjacent basins.

4 MR. WALTER PLASKETT: Except some unknown things
5 like what is coming through Devil's Gate and whatever comes
6 down Garden.

7 MR. MORROS: Well, right. There are probably some
8 areas that are delineated on the map that have some inter-
9 connection with adjacent valley basins and Devil's Gate is a
10 good example.

11 Any questions concerning the exhibit? Any
12 questions concerning the expansion of the designated area?
13 Mr. Eyre?

14 MR. E. E. EYRE: I don't quite understand the inter-
15 relationship here. It is pretty well known that the east
16 side of the Roberts Mountains furnishes a good deal of water
17 into Diamond Valley. How does that fit into the scope and
18 perspective of what you are trying to do here?

19 MR. MORROS: Do you want to respond to that, Jerry?

20 MR. JERRY BROWNFIELD: Basically, the purpose of
21 including all the basin into the designation is that we would
22 a better management tool to evaluate and to make sure all the
23 resources within the whole basin are included when we look at
24 pumping within the Diamond Valley area and appropriations of
25 water.

26 MR. MORROS: Let me make sure I understand your

1 question. Are you saying that the area you are speaking of,
2 did you say the east side of Roberts Mountain? Are you saying
3 that is not included in the area delineated on the map?

4 MR. E. E. EYRE: Is it? I don't know.

5 MR. MORROS: Why don't you come forward and take a
6 closer look and see if you can identify for us whatever area
7 you are speaking of?

8 MR. E. E. EYRE: We are talking about the area down
9 here? It would not be included.

10 MR. MORROS: Then it is not within the natural
11 drainage of the basin.

12 MR. JERRY BROWNFIELD: Roberts Mountain is in
13 Garden.

14 MR. MORROS: Pine Garden Valley.

15 MR. E. E. EYRE: I believe if you look at the U. S.
16 Geological Survey work that has been done, that there is a
17 significant amount of water that evidently originates over
18 here on the Roberts Mountain side that comes into Diamond
19 Valley, some of which is exemplified by the Sadler Springs
20 out there.

21 MR. MORROS: Well, whatever contribution that
22 Roberts Mountain may make to the natural drainage of the
23 Diamond Valley Groundwater Basin is provided for. That
24 border line is established as part of the drainage area.

25 MR. E. E. EYRE: But I think that borderline is
26 listed as the top of the Sulphur Springs Range that is going

1 along and you see, this is water that is recognized as coming
2 in underneath that range.

3 MR. MORROS: Oh. All right. You are not talking
4 about surface water?

5 MR. E. E. EYRE: I'm talking about a large quantity
6 of water which they claim comes into Diamond Valley over here,
7 and they feel the Sadler Springs and other springs along the
8 Sulphur Springs Range originates over here on Roberts Mountain.
9 I was just asking you how this particular proposal works
10 toward the inter-relationship of that, which we feel, in other
11 words, is very important.

12 MR. MORROS: Well, not as far as the natural drain-
13 age of a designated area. If there is any inter-connection,
14 sub-surface inter-connection, we have to address that in a
15 different way. We are talking about a natural drainage,
16 precipitation that contributes to the Diamond Valley Ground-
17 water Basin.

18 MR. E. E. EYRE: But the question is, if someone
19 were to go up on the top of Garden Pass, beyond wherever that
20 area may be and want to take significant quantities of water,
21 doesn't that interchange with the amount that is coming into
22 Diamond Valley? In other words, wouldn't it affect the
23 Diamond Valley situation?

24 MR. MORROS: Well, I suppose it is possible, but
25 at the time those applications were made you could address
26 that concern at that time. You know, it would have to be

1 shown there would be some effect on the recharge available
2 to Diamond Valley.

3 What I am mainly concerned with now is encompassing
4 all of the natural drainage area or tributaries that contrib-
5 utes to Diamond Valley and contributes to that recharge for
6 this designated area, because all of that stuff on the outside
7 of the red border that is delineated on the exhibit, that is
8 shaded in blue, is not within the designated area of Diamond
9 Valley. Now, wells can be drilled in that area without the
10 benefit of a permit now. I don't think that would be --

11 MR. JERRY BROWNFIELD: As far as inflow, there is a
12 local inflow here from one basin to the other, and they want
13 to drill a well in this blue area here, and it possibly could
14 influence that well, then we would have, as far as the State
15 Engineer's Office, we would have more of a management tool in
16 having an evaluation of that well if it is in this area from
17 what we have right now.

18 MR. MORROS: Becuase it is not in a designated area.

19 MR. E. E. EYRE: That's what I'm suggesting, that we
20 are not really taking the whole picture into account.

21 MR. MORROS: Okay. Mari?

22 MRS. MARI KEPHART: My question is: Are there any
23 applications for water in that blue area presently?

24 MR. MORROS: Well, some of the Exxon applications
25 were located in the blue area but they have now been withdrawn.
26 But that is not to say that some time in the future, you know,

1 that the same situation might not apply.

2 MRS. MARI KEPHART: There are no other applications
3 then?

4 MR. MORROS: Not to my knowledge. There may be
5 some stock watering applications pending. I don't know about
6 that, but that's all.

7 Any further comments? Anybody object? Yes, sir?
8 Can you state your name for the record?

9 MR. DENNY S. MULFORD: Denny Mulford. Maybe just
10 more of a question. Would this eliminate any possibility of
11 a well permit in the future?

12 MR. MORROS: For what purpose?

13 MR. DENNY S. MULFORD: For any purpose, stock
14 watering or irrigation?

15 MR. MORROS: It will probably eliminate -- I have
16 to be candid with you, the chances of receiving a permit for
17 irrigation of new land in Diamond Valley is almost nil. But
18 stock watering and other uses, we could consider on a
19 preferred use basis, domestic use, that type of thing. Walt?

20 MR. WALTER PLASKETT: Just a question as to what
21 the effective result of this would be: If someone came in
22 today and filed, they could come in today, drill a well, then
23 find out they had water and then file a permit and request
24 the right to pump that well for irrigation, even though it
25 is not in the basin, you would probably, in view of everything
26 in the past here in the last ten years, deny that application

1 for irrigation water or not?

2 MR. MORROS: Well, don't put me in the position of
3 pre-determining action on an application, but I am sure that
4 you can draw your own conclusion. In other words, we have
5 that statutory process we have to go through and I think the
6 State Engineer has to be somewhat careful about the pre-
7 determining actions on applications that have not completed
8 their publication and protest period. But we are in over-
9 appropriation situation in Diamond Valley right now.

10 MR. WALTER PLASKETT: Well, I have a comment to
11 make and it doesn't exactly fit, but in my mind it does, is
12 that when applications, legal notices, are in the paper, then
13 you attempt in some way in a footnote to describe geographic-
14 ally the location of the site. Many of us are unable to read
15 through two pages of water applications that has any idea
16 whether physically that is even in Diamond Valley. In the
17 case of Exxon, I suspect there may have been a few protests
18 had people read those and pulled out exactly where and what
19 was being requested, and that that was a part of the Diamond
20 Valley basis, and I would really like to see you in some way,
21 by some footnote, clarify where those are.

22 MR. MORROS: Okay. I'll take that into considera-
23 tion and see if we can't make some adjustment in our publica-
24 tion notices to provide that additional information.

25 MR. WALTER PLASKETT: To have a laymen's description
26 of where it might be.

1 MR. MORROS: Well, it may be that we can add some-
2 thing to the effect that the desired appropriation being
3 sought is in the Diamond Valley Groundwater Basin and then
4 the legal description to go with it. By law there are certain
5 things we have to put into that publication notice by law,
6 plus the newspapers are only allowed to charge us, which the
7 applicant pays the fee, are only allowed to charge a fee of
8 \$25.00 for publishing those applications once a week for five
9 weeks, so we try to keep them, you know, as brief as we
10 possibly can, to keep the cost down for the newspapers
11 because believe me, \$25.00 covering a five week publication
12 is not very much.

13 MR. WALTER PLASKETT: For the purpose of the
14 advertisement in mine, it's hard for people looking at those
15 advertisements to evaluate what they mean to them, and
16 whether or not they should protest when we really don't know
17 where they are.

18 MR. MORROS: All right. I will give your request
19 consideration. Thank you, Walt.

20 Yes, Ma'm? Would you identify yourself, please?

21 MR. LAUREI MARSHALL: Laurei Marshall. What would
22 the effect of this have on say not Exxon has their applica-
23 tion and it has been approved, you know, we know they are
24 going to get those wells for the next ten years, but how do
25 we know about getting any new wells, the domestic wells to
26 be drilled, and you say right now there is no chance of

1 getting any irrigation wells. Well, if there is 100 or 200
2 or 300 domestic wells drilled, what are the chances of those
3 being approved if there isn't a chance of an irrigation well?

4 MR. MORROS: Well, domestic wells for homes, single
5 family dwellings, are excluded under the law from requiring
6 a permit.

7 MRS. LAUREI MARSHALL: But when you have 500 of
8 them or 400 of them at once?

9 MR. MORROS: Again, you know, I don't know, it may
10 be that some existing rights in the valley will have to be
11 changed over from irrigation to a quasi-municipal use. I
12 don't know whether you are talking about individual domestic
13 wells or a community water system. Obviously, there is going
14 to have to be some housing provided, I don't think there is
15 any question about that, but those are questions that will
16 have to be addressed locally.

17 MR. JERRY BROWNFIELD: One comment on that: If the
18 lots are not provided for right now and they have to subdivide,
19 that goes before our office also to be reviewed as far as
20 water quantity. We will see it.

21 MR. MORROS: What has happened in a lot of other
22 groundwater basins where the resources are pretty fully
23 permitted is that you will see a change of use of the water
24 under existing water rights from irrigation or whatever
25 present use they are using them over to a quasi-municipal use
26 to support that kind of development. It is not unusual.

1 MRS. LAUREI MARSHALL: Is it something that is done
2 by choice?

3 MR. MORROS: It is usually done by choice of the
4 person that owns the property and that's his choice, whether
5 he wants to farm or build houses. We don't make the choice
6 for them, let me put it that way. Yes, Mr. Stenton?

7 MR. KENNETH STENTON: I have heard that quasi-
8 municipal, or for your own house, that has priority over
9 irrigation anyway, and they can be drilled at any time.

10 MR. MORROS: Not necessarily. That quasi-municipal
11 use has not been declared for a preferred use in Diamond
12 Valley. That has not happened. The domestic well is
13 excluded under the law from the requirement of a permit as
14 long as it only serves one house, and you are limited to a
15 draft of 1800 gallons a day. You can drill a domestic well
16 for your home without having to get a permit under the
17 provisions of Chapter 533.

18 MR. KENNETH STENTON: At any time, in any piece of
19 your land?

20 MR. MORROS: Regardless of whether you are in a
21 designated basin or not. The only time that the State
22 Engineer can exclude the drilling of domestic wells, and this
23 can only happen in a designated groundwater basin, is where
24 there is a water purveyor, or water from another source
25 available to that home. Like, you know, Sierra Pacific Power
26 Company or the Eureka Water Company, or something like that.

1 Then you could preclude drilling of a domestic well. But if
2 there is not another source of water available, then you
3 could drill your domestic well. Your use is limited to one
4 house.

5 MR. KENNETH STENTON: I would just like to state
6 that I'm in favor of expanding that personally, as long as
7 you have the problem, get it all.

8 MRS. JANET EYRE: Can I ask a question? Where is
9 the town of Eureka on that map? Is it below it?

10 MR. MORROS: Okay. Could you identify yourself?

11 MRS. JANET EYRE: Yes. I'm Janet Eyre from Diamond
12 Valley.

13 MR. MORROS: It's probably off the map.

14 MR. JERRY BROWNFIELD: No, it's on the map. Right
15 here.

16 MR. E. E. EYRE: So it is on the map?

17 MR. JERRY BROWNFIELD: In Section 24, Township 19
18 North, Range 53. It's in the blue area.

19 MR. MORROS: It is not in the designated area at
20 the present time.

21 MR. E. E. EYRE: But it would be designated?

22 MR. MORROS: Yes. Larry, did you have a question?
23 I thought I saw you raise your hand? Yes, sir?

24 MR. JAMES ITHURRALDE: Yes. I'm Jim Ithurralde,
25 and you know we have stock water up there, and we're waiting
26 to get our adjudication and that's not until 1984, I believe?

1 MR. MORROS: That is under the adjudication.

2 MR. JAMES ITHURRALDE: Right. Will that affect us
3 in that process at all?

4 MR. MORROS: No. This designation will not affect
5 that.

6 MR. JAMES ITHURRALDE: That is in that blue area.

7 MR. MORROS: But it is on surface water.

8 MR. JAMES ITHURRALDE: Right.

9 MR. MORROS: Okay. This designation does not
10 affect surface water sources and will not, definitely will
11 not affect the adjudication proceeding.

12 MR. WALTER PLASKETT: Did you want comment on
13 whether we favor this or not?

14 MR. MORROS: I would like an expression from the
15 people.

16 MR. WALTER PLASKETT: I would favor it to this
17 extent, and I would recommend exploring some obvious areas
18 that could somehow be included that would prevent people from
19 looking at an area for mining or some other use without some
20 way to put them on notice that this is a known supply source
21 or a recorded supply source of Diamond Valley, and they may
22 be cautioned in respect to the use of that water, and maybe
23 by this courthouse, so that people will know they are affected
24 and how it is going to affect them. Whether you can have an
25 almost designated basin or too close to one for comfort, or
26 whatever you might want to call it, whatever you might do to

1 perhaps eliminate this sort of problem in the future. Maybe
2 you better just designate Central Nevada.

3 MR. MORROS: That suggestion has been made, saying
4 why don't I just designate the whole state and then I can
5 choose the areas that we want to un-designate. It would be
6 easier that way.

7 MR. WALTER PLASKETT: I believe you're right. I
8 would definitely favor going to at least this one.

9 MR. MORROS: Okay. Thank you. Anybody else?

10 Maybe I could just ask for a show of hands just for
11 my own information. Everybody who is in favor of designation,
12 if you could just raise your right hand?

13 (Hands were raised.)

14 MR. MORROS: Okay. Thank you. I appreciate that.

15 With that, I will declare the hearing closed, and
16 I thank you all for taking the time out to come down.

17 (The hearing was thereupon concluded and closed at
18 11:25 o'clock, a. m.)

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20 ---oOo---

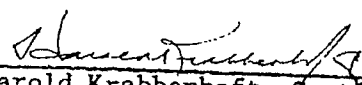
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5 REPORTER'S CERTIFICATE

6 ----oOo----

7 This is to certify that I, Harold Krabbenhoft, a
8 Certified Shorthand Reporter, was present at the time and
9 place the foregoing proceedings were had and taken, at
10 Eureka, Nevada, Thursday, March 10, 1983; that I did report
11 the same fully and truly in Stenograph writing to the best
12 of my ability; that thereafter I caused my said Stenograph
13 writing to be transcribed into longhand typewriting, and the
14 foregoing pages, beginning at the top of page 1, through
15 line 18 of page 74 hereof, plus three index pages, constitute
16 a full, true, correct and complete transcription of my said
17 Stenograph writing.

18 Dated at Carson City, Nevada, this 1st day of April,
19 1983.

20
21 
22 Harold Krabbenhoft, Certified
23 Shorthand Reporter, No. 25.
24
25
26

Exxon Exhibit 1
3-10-83

Evidence Relative to Applications to Appropriate 44428, 44429,
44430, 44431, 44432, 44433, 44434, 44435, and 44436.

Presented by K. E. Barrett, Project Manager

Exxon Minerals Company

P. O. Box 4508

Houston, Texas 77210

In September, 1981 Exxon Corporation made application to appropriate underground water in Eureka County. The applications were made in support of potential development of a major molybdenum deposit near Mt. Hope. Exxon made applications for 12 cfs, (8700 acre feet per year) in each of the three hydrographic areas, Diamond, Pine/Garden, and Kobeh, to establish a time-right-of-priority. When these applications were made, we explained to the State Engineer that Exxon's intent was to obtain approved permits for 12 cfs (8700 acre feet per year) and then all other applications would be dropped. That is still Exxon's intent. There were no formal protests to the Kobeh Valley applications within the allowed protest period following the publication of notice, although protests were received in Diamond and Pine/Garden Valleys.

Following filing the applications, a regional hydrology study led Exxon to conclude that the area of significant promise for water availability was in Kobeh Valley. Since that time Exxon's water exploration and testing program has been concentrated in Kobeh Valley.

Our plan today, is to present evidence supporting applications 44431 and 44436 for 6 cfs each (total of 8700 acre feet/year) in Kobeh Valley and for application 44430 for 0.1 cfs (72 acre feet/year) also in Kobeh Valley. It is our plan to not present evidence for the applications in Diamond or Pine/Garden Valleys, since as stated earlier, we would plan to drop those applications if the Kobeh applications are approved.

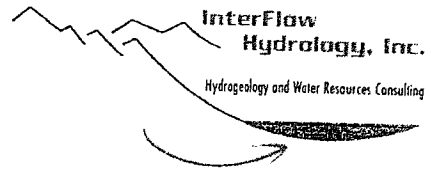
The 12 cfs (8700 acre-feet per year) use applied for in Exxon's applications is that amount of water required as make up or fresh water, to support a mining/processing operation of the size envisioned at Mt. Hope. An estimated 60 percent of the total water required in the Mining/Processing operation will be satisfied by reuse or recycle of water from the tailings basin. It is Exxon's plan to use state-of-the-art technology to maximize conservation of this important resource by reusing as much water as possible thus minimizing consumption of new water.

Insert →

At this time I would like to have C. E. Downs, Staff Hydrologist for Exxon, present evidence in support of the Kobeh Valley applications.

NAME	Address
LEN E. BARRETT	P.O. Box 4508 Houston TX 772
JAMES D. PATTON	P.O. Box 4508 Houston, TX 772
FREDERICK SCHWARZ	Box 616 Eureka Nev.
James Muth	Box 307 ELKO
LAUREI MARSHALL	DV Rte Box 23A EUREKA
JAMES EYRE	Box 331, Eureka, NV 89316
E E Eyre	"
Kenneth F. Benson	Box 158 Eureka 89316
Wigford Bailey	Box 66 " "
Walt Puskott	Box 10 " "
Mike Robaleati	Box 556 " "
Allan Voss	150 WATT ST #60-6 BATTLE MTN, NV 89820
NEIL TALBOT	Box 194 Battle Mtn, NV 89820
Thommas P. Stanton	Box 126 Eureka Nev 89316
Denny S. Mulford	#53 D.V.Rt Eureka, N. 89316
JOHN V. DAMELE	Box 295 EUREKA, NEV.
JIM & VERA BAUMANN	P.O. Box 308, EUREKA, NV. 893
JERRY SESTANOVICH	PO Box 352 EUREKA NEV
MARI KEPHART	DV Rte Box 28 EUREKA
DAVE PASTORINO	Box 525 Eureka, NV
ROBERT O. BURNETTANI	DV Rte, Box 33, Eureka, Nev
Mike Buschelman	424 Court St. Elko, NV 89801
Frank Peyton	J.O. RANCH, CARLIN, NEV. 89820
WILLIAM E. NORK	1024 W 1ST ST - RENO 89503
Dongary Jarma	Box 332 Eureka Nev 89316
Donald F. Palmer	Box 92 " " "
Jim GALLAGHER	D.V. Rte Box 27 " " "
Jimmy Todd	Box 73 " " " "
JIM ITURRALDE	P.O. Box 26 " " "
CHARLES DOWNS	P.O. Box 4508, Houston, TX 77210

Jack M. Childress, PG
Senior Hydrogeologist



Education

B.S. Earth Sciences-Geology Option, Montana State University, May 2002

Graduate Certificate in GIS and Spatial Analysis, University of Montana, May 2005

Employment Summary

2007 – Present: Senior Hydrogeologist, InterFlow Hydrology, Inc., Truckee, CA
2004-2007: Hydrogeologist, South Carolina Department of Health and Environmental Control (SC DHEC), Columbia, SC
2002-2004: Geologist, Clear Creek Hydrology, Inc., Bozeman, MT

Professional Registrations

Registered Professional Geologist – California – P.G. 8508

Professional Summary

Mr. Childress holds a bachelor's degree in Earth Sciences- Geology Option and has five years of experience in water resources investigations. Additionally he has served as GIS analyst, database manager, and manager of water quality monitoring for saltwater intrusion studies in the Hilton Head Island area. Recently he has completed the University of Montana's Certificate in GIS and Spatial Analysis program (9 graduate credits).

Mr. Childress is experienced with many phases of field investigations including surveying, exploration drilling and logging, well installation, geophysical logging and interpretation, aquifer testing, stream flow gaging, and water quality sampling. He has participated in numerous regional (multi-basin) studies of groundwater resources and its relation to regional hydrogeology and water uses.

In addition to these tasks, he has participated in numerous soil, and surface/groundwater sampling and analysis programs, and has participated in the development of complex hydraulic and hydrologic models for both surface water and groundwater projects.

Professional Affiliations

- Geological Society of America
- National Ground Water Association
- Nevada Water Resources Association

Jack M. Childress, PG
Senior Hydrogeologist

Representative Professional Experience

Exploration Drilling and Aquifer Testing, Royal Gorge, Placer County, California:

Responsible for siting exploration boreholes and test wells in a fractured granite and volcanic rock environment, including aquifer testing and evaluations for long-term sustainable yield for proposed municipal water supply.

Well Siting Evaluation, Community of Big Bend, Placer County, California:

Review of hydrogeologic setting and fracture trends for siting of a well in fractured bedrock to serve as a community water supply source.

Aquifer Testing and Analysis, Great Basin Ready Mix, Mustang, Nevada:

Performed aquifer testing and analysis of the main production well completed in fractured volcanic rock, at an industrial facility along the Truckee River in preparation for modification of water rights.

Irrigation Well Design and Testing in Granite Springs Valley, North-Central Nevada:

Assisted with test well drilling, design and aquifer testing, followed by construction of five large-diameter irrigation wells completed in mixed basin-fill materials. Conducted pumping tests for each well to determine sustainable yield. The wells have subsequently been connected to 10 center pivot irrigation systems.

Hydrogeologic Assessment of Granite Springs Valley, North-Central Nevada:

Assisted in basin-scale assessment of surface and groundwater resources of this closed hydrologic basin. Assisted in the collection and interpretation of detailed water chemistry, including stable isotopes (oxygen and hydrogen) and radiogenic carbon, and prepared a potentiometric map of the main basin-fill aquifer. Additionally responsible for interpretation of hydrostratigraphy based on geophysical logs.

Well Field Aquifer Testing for the Mount Hope Project, Eureka County, Nevada:

Conducted detailed aquifer test analyses for 6 test wells along with review of additional pumping test data for 7 existing wells and other test wells, completed in limestone, shale, volcanic rock, and basin-fill materials. Evaluations included detailed geologic interpretations, aquifer transmissivity and storage coefficient computations, and up-dated potentiometric water level maps.

Hydrogeologic Assessment and Regional Groundwater Modeling, Mount Hope Mine, Eureka County, Nevada:

Responsible for collecting model input for a region groundwater model encompassing several hydrographic areas around the Mount Hope mine. Responsibilities include the collection of, and construction of a transient database of both groundwater levels and pumping distributions within Diamond and Kobeh Valleys, and the construction of hydrogeologic units for model input. Additionally responsible for initial distribution of hydraulic parameters for basin fill material based on previous published work and well logs.

Stream and Spring Monitoring Program, Warm Spring Valley, Washoe County, Nevada:

Responsible for monthly stream gage and weir measurements, stage-discharge rating curve development, and computing discharge records from automatic data recorders. Additionally responsible for quantifying annual flow through the upper reaches of Warm Springs Creek and estimation of stream flow loss to recharge.

Jack M. Childress, PG
Senior Hydrogeologist

Travis and Beale Air Force Bases, Groundwater Sampling and Analysis Programs, California:

Responsible for bi-annual water level measurements, groundwater micropurging, field parameter measurement, and staff gage readings. Also responsible for base-wide monitoring, and sample collection and handling from hundreds of surface and groundwater sampling locations impacted by hydrocarbons, perchlorate, pesticides, and metals. Varieties of sampling techniques are utilized depending on well depth, and include: gas bladder, peristaltic, and submersible electric pumps.

Hydrologic Analysis of the Idaho National Engineering and Environmental Laboratory (INEEL), Idaho Nuclear Technology Engineering Center (INTEC) Facility, Idaho:

Personally inspected approximately 130 hydraulic structures, canals, ditches, bridges, culverts, inlets, and lift stations to determine the storm sewer system's ability to withstand a 25-year flooding event. Personally created a large database of survey/hydrologic/hydraulic data for use in HEC-1 and SWMM models, assisted in watershed delineation (difficult urban setting), and participated in cross sectional surveys of the Big Lost River. Additionally assisted in soil delineations to determine site-specific infiltration rates around the facility. Prepared custom Arc View maps representing inundation-prone areas, regional hydrography, and storm water infrastructure locations and connectivity. The project was undertaken to determine RCRA compliance, and the probability of flood inundation of radioactive soils and sensitive government resources.

Dry Creek Watershed Restoration, Phase I, Montana:

Completed stream channel cross-section surveys/assessment in an effort to characterize the existing physical and biological components of the watershed. Conducted surface water sampling for chemical constituents including nutrients, metals, and total dissolved solids, assisted in staff gage installation, and was responsible for discharge permitting and compliance. Mr. Childress also assisted in construction oversight for stream bank reconstruction activities. Additionally responsible for project mapping which included geology, land use, hydrography, and monitoring and restoration project locations.

Newsome Creek Channel and Floodplain Restoration Feasibility Study, Idaho:

Responsible for mine tailings delineation and mapping, as well as sediment size fraction analysis of tailings material and channel substrate. Assisted in cross sectional surveys, and the development of a HEC-RAS model depicting stream hydraulics and geometry. Responsible for analysis of data pertaining to: aquatic habitat, riparian area degradation, and distribution of mine tailings. Assisted in the development of conceptual stream channel design alternatives based on natural geomorphic analogs found throughout the undisturbed upper watershed. The designs balance the need for restoration and projected project funding. Responsible for Arc View mapping of six conceptual design alternatives encompassing 4 miles of stream.

Tenneson Entities, LLC, Helena, Montana:

Member of team that performed aquifer characterization, well log correlation, and non-degradation analysis for elevated nitrate (background ~7.5 mg/l) groundwater beneath a rural residential community. The investigation prevented further residential development without appropriate wastewater treatment facilities, and was coordinated with the Montana Department of Environmental Quality.

Tongue River Hydrologic Survey and Analysis, Southeastern Montana:

Assisted in RTK (real time kinematic) cross-section surveys using survey-grade GPS (global positioning system) on the main channel of the Tongue River (208 river miles) for incorporation into a water quality study in defense of Fidelity Mining Company, and the Montana Department of Environmental Quality. Surveying involved extensive use of boats and often-difficult field conditions. Personally responsible for data validation, survey note reduction, and the creation of a preliminary HEC-RAS model representing the hydrologic geometry of the river (with oversight). Responsible for model calibration

Jack M. Childress, PG
Senior Hydrogeologist

based on surveyed water surface elevations and local USGS stream gage networks. Completed associated Arc View mapping of the survey as well as analyses of existing USGS cross-section data for incorporation into the modeling effort.

Overlook Estates Subdivision Design, Helena, MT:

Responsible for quantifying the impacts of all aspects of subdivision implementation, including soil delineation, depth to bedrock analysis, and property environmental analysis. Additionally, addressed natural hazards and traffic/social impacts in an Environmental Assessment (EA) to the city and county planning boards and the Montana Department of Environmental Quality.

Malmstrom Air Force Base, Montana:

Assisted with soil vapor surveys and groundwater sampling of Landfill 19 (LF19) and the bulk fuel storage terminal. Additionally responsible for preparation of potentiometric and contaminant iso-concentration maps for the project.

Hydrogeologic Data Collection, Beaufort County, South Carolina

Collected, summarized and published water quality, water-level, and geophysical data pertaining to dozens of test wells in the Beaufort County area. The publication is available at the following address: http://www.scdhec.gov/eqc/water/pubs/Basedatareport_2005.pdf

Evaluation of Downward Flow of Saltwater in the Savannah, GA - Hilton Head Island, SC Area:

Personally created an ArcGIS-based Darcian one-dimensional model for vertical flow through the upper confining unit above the Upper Floridan aquifer for the Savannah-Hilton Head Island area. As the model was refined, methods were added to include advection-dispersion equations to account for variable density flow for prediction of breakthrough time of salt into the aquifer. Publication available at the following address: <http://www.scdhec.net/environment/water/docs/capacitytecpub011-06.pdf>

Publications & Presentations

Childress, J.M., Smith, D.L., and Katzer, T.K., 2010, **Hydrogeology of Granite Springs Valley, Nevada & Geochemical Evidence for Pleistocene-Age Recharge Waters in a Closed-Basin Valley-Fill Aquifer**, 2010 NWRA Nevada Water Conference, Las Vegas, NV, abstract and presentation.

South Carolina State Government Special Publications:

Childress, Jack M., Ransom, Camille III, 2005, **Hydrogeologic Data Summary for the Upper Floridan Aquifer, Southern Beaufort County, South Carolina**, SC DHEC technical report 015-05, Columbia, SC

Ransom, Camille III, Logan, Robert W., Landmeyer, James, Childress, Jack M., 2006, **Evaluation of the Downward Migration of Saltwater to the Upper Floridan Aquifer in the Savannah, Georgia, and Hilton Head Island Area**, SC DHEC technical publication 011-06 (Also presented to the Geological Society of America Southeastern Regional Conference, March 2007)

South Carolina State Government Annual Publications:

Childress, Jack M., 2002, **South Carolina Ambient Groundwater Quality Report: Catawba and Santee Basins**, SC DHEC technical report, Columbia, SC

Jack M. Childress, PG
Senior Hydrogeologist

- Childress, Jack M., 2003, **South Carolina Ambient Groundwater Quality Report: Pee Dee Basin**, SC DHEC technical report 011-05, Columbia, SC
- Childress, Jack M., 2004, **South Carolina Ambient Groundwater Quality Report: Broad River Basin**, SC DHEC technical report 005-06, Columbia, SC
- Childress, Jack M., 2005, **South Carolina Ambient Groundwater Quality Report: Savannah and Salkehatchie River Basins**, SC DHEC technical report 007-06, Columbia, SC
- Childress, Jack M., Bristol, Paul L., 2005, **South Carolina Water Use Report , 2004 Annual Summary**, SC DHEC technical publication 004-05, Columbia, SC
- Childress, Jack M., 2006, **South Carolina Water Use Report, 2005 Annual Summary**, SC DHEC technical publication 003-06, Columbia, SC

SECRETARY OF STATE



CORPORATE CHARTER

I, ROSS MILLER, the duly elected and qualified Nevada Secretary of State, do hereby certify that **DIAMOND VALLEY AGRICULTURAL SUSTAINABILITY TRUST**, did on November 15, 2010, file in this office the original Articles of Incorporation; that said Articles of Incorporation are now on file and of record in the office of the Secretary of State of the State of Nevada, and further, that said Articles contain all the provisions required by the law of said State of Nevada.



IN WITNESS WHEREOF, I have hereunto set my hand and affixed the Great Seal of State, at my office on November 16, 2010.

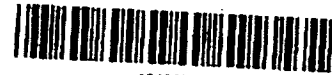
A handwritten signature in black ink, appearing to read "Ross Miller".

ROSS MILLER
Secretary of State

Certified By: Sandra Kraatz
Certificate Number: C20101115-2458
You may verify this certificate
online at <http://www.nvsos.gov/>



ROSS MILLER
Secretary of State
204 North Carson Street, Suite 4
Carson City, Nevada 89701-4520
(775) 684-6708
Website: www.nvsos.gov



040601

**Nonprofit
Articles of Incorporation**
(PURSUANT TO NRS CHAPTER 82)

Filed in the office of <i>[Signature]</i> Ross Miller Secretary of State State of Nevada	Document Number 20100855475-77 Filing Date and Time 11/16/2010 2:05 PM Entity Number E0549262010-8
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USE BLACK INK ONLY - DO NOT HIGHLIGHT

ABOVE SPACE IS FOR OFFICE USE ONLY

1. Name of Corporation:	DIAMOND VALLEY AGRICULTURAL SUSTAINABILITY TRUST
2. Registered Agent for Service of Process: (check only one box)	<input type="checkbox"/> Commercial Registered Agent: _____ <input checked="" type="checkbox"/> Noncommercial Registered Agent (name and address below) OR <input type="checkbox"/> Office or Position with Entity (name and address below) JAMES P. PACE, ESQ. Name of Noncommercial Registered Agent OR Name of Title of Office or Other Position with Entity 448 HILL STREET RENO Nevada 89501 Street Address City State Zip Code Mailing Address (if different from street address) _____ City State Zip Code
3. Names and Addresses of the Board of Directors/Trustees: (each Director/Trustee must be a natural person at least 18 years of age; attach additional page if more than four directors/trustees)	1) WILLIAM H. NORTON, JR. Name P.O. BOX 462 Street Address EUREKA NV 89316 City State Zip Code 2) _____ Name Street Address _____ City State Zip Code 3) _____ Name Street Address _____ City State Zip Code 4) _____ Name Street Address _____ City State Zip Code
4. Purpose: (required; continue on additional page if necessary)	The purpose of the corporation shall be: The Diamond Valley Agricultural Sustainability Trust is organized (continued on attached page)
5. Name, Address and Signature of Incorporator: (attach additional page if more than one incorporator)	JAMES P. PACE, ESQ. Name 448 HILL STREET RENO NV 89501 Address City State Zip Code <i>[Signature]</i> Incorporator Signature
6. Certificate of Acceptance of Appointment of Registered Agent:	<input checked="" type="checkbox"/> I hereby accept appointment as Registered Agent for the above named Entity. <i>[Signature]</i> Authorized Signature of Registered Agent or On Behalf of Registered Agent Entity 11-12-10 Date

This form must be accompanied by appropriate fees.

Nevada Secretary of State NRS 82 Articles
Revised: 4-14-08

003103

JA4515

Diamond Valley Agricultural Sustainability Trust
Nonprofit Articles of Incorporation
Item 4. Purpose

PURPOSE

and operated exclusively as a nonprofit Corporation under the provisions of Chapter 82 of the Nevada Revised Statutes and is not organized for the private gain of any person. The Diamond Valley Agricultural Sustainability Trust shall be operated and organized exclusively for agricultural and general economic improvement purposes under section 501 (c) of the Internal Revenue Code. Subject to the restrictions set forth below, the objects and purposes of the Diamond Valley Agricultural Sustainability Trust and the nature of the business to be carried on by it are as follows:

- A. To develop and implement programs that will serve to enhance the sustainability and well being of the agricultural economy in the Diamond Valley Hydrographic Basin.
- B. The Board of Trustees shall have the discretion to develop programs it deems appropriate and said programs may include purchasing and relinquishing water rights in Diamond Valley.
- C. In the event that water rights are acquired by the Diamond Valley Agricultural Sustainability Trust, adequate provisions shall be developed to insure that the Diamond Valley Agricultural Sustainability Trust obtains water rights with clear and marketable title.
- D. To receive, maintain, and administer a fund, derived from all sources whatsoever, and to use, apply and distribute the income from and/or the principal of such fund exclusively too for the benefit of, or to carry out the purposes of the corporation;
- E. To do any and all acts that are necessary, proper, useful, incidental or advantageous to the foregoing purposes.

CERTIFICATE OF SERVICE

Pursuant to NRAP Rule 25(1)(c), I hereby certify that I am an employee of ALLISON, MacKENZIE, PAVLAKIS, WRIGHT & FAGAN, LTD., Attorneys at Law, and that on this date, I caused a CD-ROM version of same to be served to all parties to this action by:

_____	Placing a true copy thereof in a sealed postage prepaid envelope in the United States Mail in Carson City, Nevada
_____	Hand-delivery - via Reno/Carson Messenger Service
_____	Facsimile
_____	Federal Express, UPS, or other overnight delivery
<u> X </u>	E-filing pursuant to Section IV of District of Nevada Electronic Filing Procedures

fully addressed as follows:

Bryan L. Stockton	bstockton@ag.nv.gov
Senior Deputy Attorney General's Office	
Nevada Attorney General's Office	
100 North Carson Street	
Carson City, NV 89701	

Ross E. de Lipkau	rdelipkau@parsonsbehle.com
Parsons Behle & Latimer	
50 West Liberty Street, Ste 750	
Reno, NV 89501	

Therese A. Ure	t.ure@water-law.com
Laura A. Schroeder	schoeder@water-law.com
Schoeder Law Offices, P.C.	
400 Marsh Avenue	
Reno, NV 89509	

X

Placing a true copy of a CD-ROM version thereof in a sealed postage prepaid envelope in the United States Mail in Carson City, Nevada

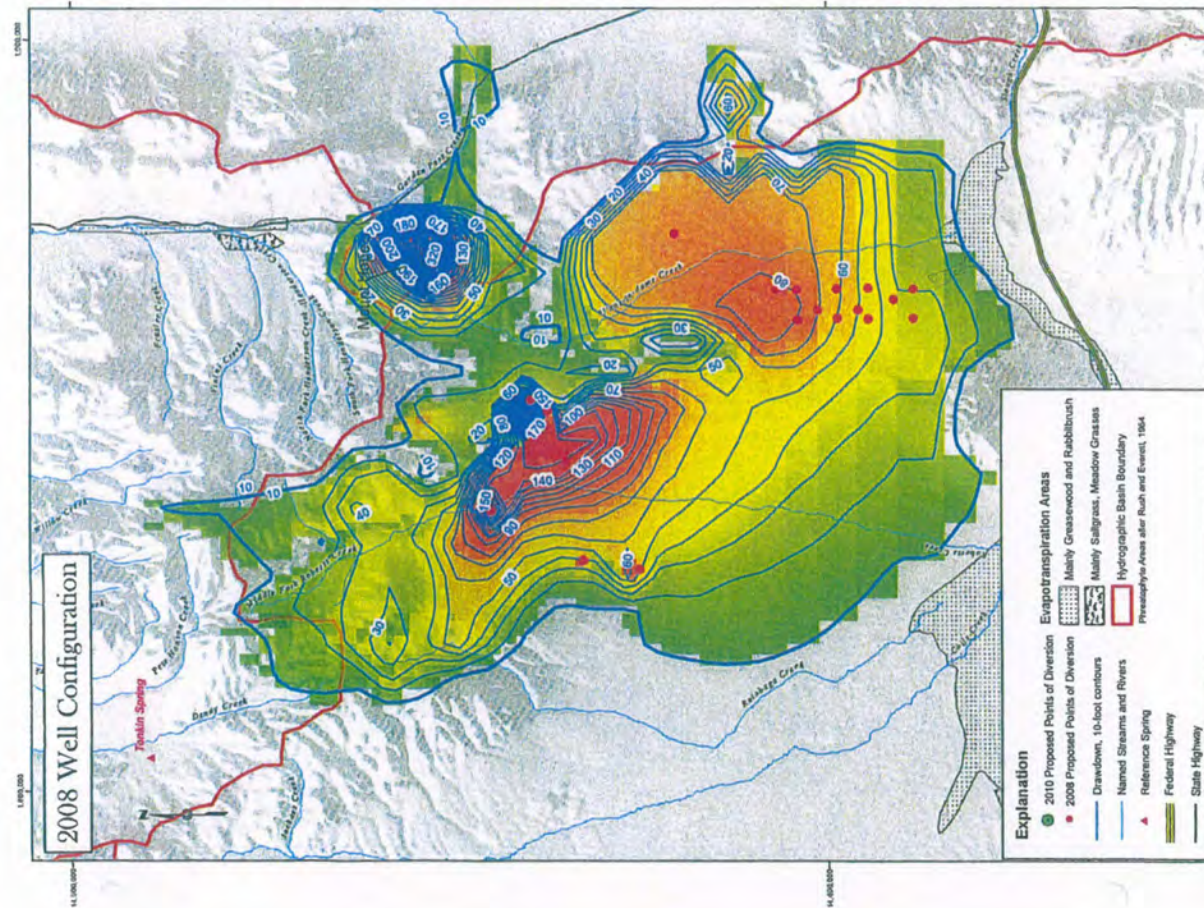
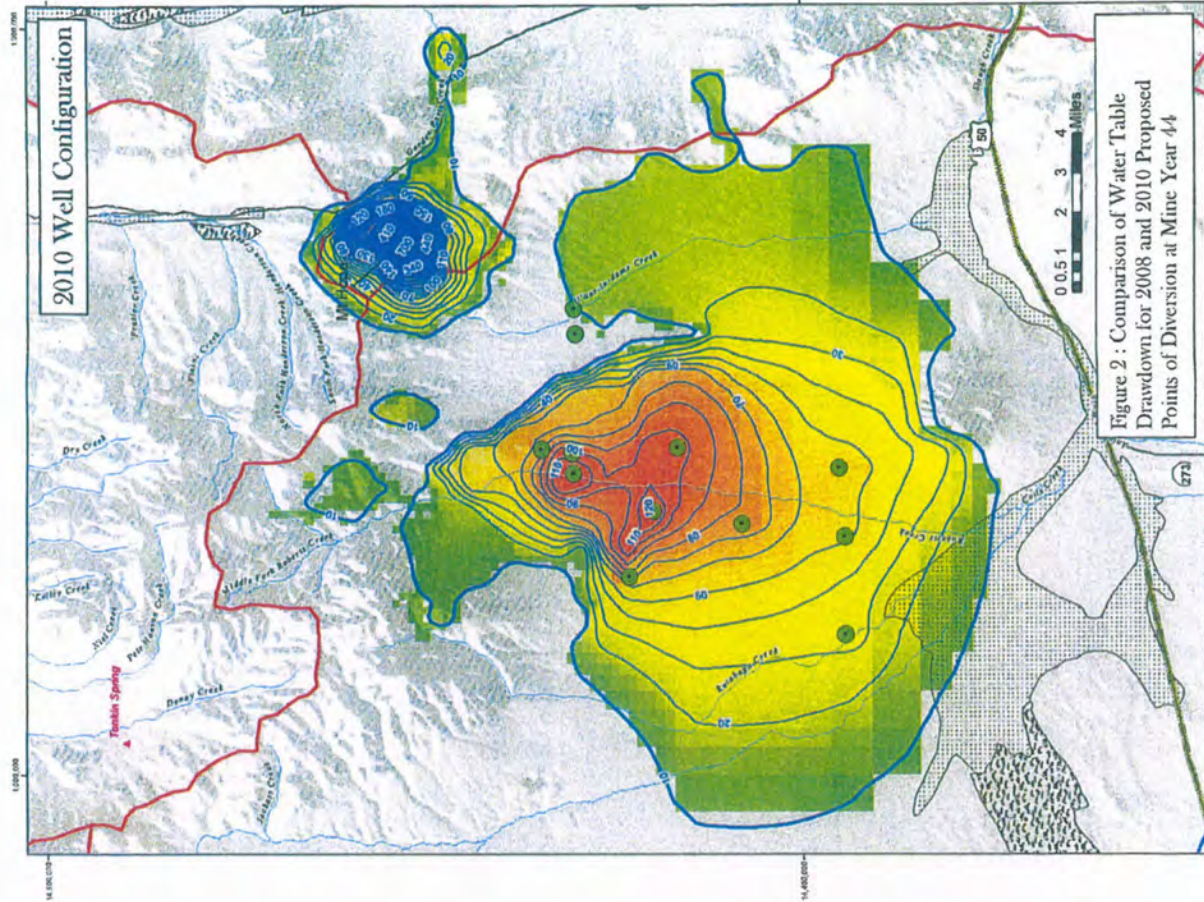
fully addressed as follows:

John R. Zimmerman jzimmerman@parsonsbehle.com
Parsons Behle & Latimer
50 West Liberty Street, Ste 750
Reno, NV 89501

Francis M. Wikstrom
Parsons Behle & latimer
201 South Main Street, Ste 1800
Salt Lake City, UT 84111

DATED this 21st day of December, 2012.

/s/ Nancy Fontenot



Diamond Natural Resources Protection and Conservation Association

October 1, 2010

Eureka County Commissioners:
P.O. Box 677
Eureka, Nevada 89316

Dear Sirs;

The Diamond Natural Resources Protection and Conservation Association water committee would like to present to you our points for a settlement with General Moly (GMO) and all its subsidiaries. We feel that our plan is reasonable and equitable to deal with the water concerns of Diamond Valley and Southern Eureka County.

This committee has worked long and hard and put considerable effort into this process. It is our hope that the county commissioners will maintain their water protest until such time that GMO agrees to settle. It is important to mention that the county might need to appeal the upcoming decision of the State Water Engineer if it is not in the best interest of maintaining the Diamond Valley Flow System, DNRPCA and Eureka County.

On September 30, 2010 Diamond Valley water users met to lay the groundwork to establish a conservation association for the Diamond Valley Flow System here-to-for called the Diamond Natural Resources Protection and Conservation Association (DNRPCA). It was the consensus of DNRPCA to settle with GMO with the main points being:

1. A conservation fund established by DNRPCA and funded by GMO to retire a minimum of 33 quarter sections of water.
2. An annual contribution by GMO to the conservation association to fund further conservation practices.

Thank you for your time and consideration in this matter. If you have any questions or concerns please feel free to contact anyone from the water committee.

Sincerely, Water Committee Board.

Mark Moyle - 775-761-4725

Mark Moyle
Vickie Buchanan - 775-318-0322

Vickie Buchanan
Marty Plaskett - 775-721-0087

Marty Plaskett
Fred Etchegary - 775-340-7336

Fred Etchegary
Tim Bailey - 775-761-6328

Tim Bailey

Ken Conley - 775-318-0172

Ken Conley
Dusty Moyle - 774-934-1382

Dusty Moyle
Jim Baumann - 775-237-5452

Jim Baumann
Jerry Sestanovich - 775-237-5259

Jerry Sestanovich

002998

JA4410

AMENDED

ASSIGNED
Nº 44431

APPLICATION FOR PERMIT
TO APPROPRIATE THE PUBLIC WATERS OF THE STATE OF NEVADA

Date of filing in State Engineer's Office..... **SEP 16 1981**
Returned to applicant for correction..... **DEC 30 1981**
Corrected application filed..... **FEB 25 1982**
Map filed..... **FEB 25 1982**

The applicant..... **Exxon Corporation, c/o Exxon Minerals Company**
P.O. Box 4508..... of **Houston**
Street and No. or P.O. Box No. City or Town
Texas 77210.....
State and Zip Code No. hereby make application for permission to appropriate the public
waters of the State of Nevada, as hereinafter stated. (If applicant is a corporation, give date and place of incorpora-
tion; if a copartnership or association, give names of members.) **incorporated on August 5, 1882**
in the State of **New Jersey**

1. The source of the proposed appropriation is..... **underground**
Name of stream, lake or other source.
2. The amount of water applied for is..... **6.0**..... second-feet
One second-foot equals 448.83 gals. per min.
(a) If stored in reservoir give number of acre-feet..... acre-feet
3. The water to be used for..... **mining, milling and domestic purposes**
Irrigation, power, mining, manufacturing, domestic, or other use. Must limit to one use.
4. If use is for:
(a) Irrigation (state number of acres to be irrigated).....
(b) Stockwater (state number and kinds of animals to be watered).....
(c) Other use (describe fully under "No. 12. Remarks") (see No. 12, Remarks).....
(d) Power:
(1) Horsepower developed.....
(2) Point of return of water to stream.....
5. The water is to be diverted from its source at the following point: **within the SE1/4 SE1/4 of Section 26,**
T.22N., R.50E., M.D.M. or at a point from which the NE corner of Section 31 of
Describe as being within a 40-acre subdivision of public survey, and by course and distance to a section corner. If on unsurveyed land,
T.22N., R.51E., bears south 88°07'00" east a distance of 11,420.0 feet
it should be stated.
6. Place of use..... **all Sections, some of which are unsurveyed in the following: T.21N.,**
Describe by legal subdivision, if on unsurveyed land it should be so stated.
R.50E., R.51E., R.52E., R.53E: T.21N., R.51E., R.52E., R.53E., T.22N., R.50E.,
R.51E., R.51E., R.52E., R.53E., T.23N., R.50E., R.51E., R.52E., R.53E., T.23N.,
R.50E., T.24N., R.50E., R.51E., R.52E., R.53E. M.D.M.
7. Use will begin about..... **January 1**..... and end about..... **December 31**....., of each year.
Month and Day Month and Day
8. Description of proposed works. (Under the provisions of NRS 535.010 you may be required to submit plans and
specifications of your diversion or storage works.) **well, pump, and distribution system to**
mining, milling and domestic use sites
State manner in which water is to be diverted, i.e. diversion structure, ditches and flumes, drilled well with pump and motor, etc.

copy of 0002999

9. Estimated cost of works.....\$200,000
10. Estimated time required to construct works.....3 years
If well completed, describe works.
11. Estimated time required to complete the application to beneficial use.....5 years
12. Remarks: For use other than irrigation or stock watering, state number and type of units to be served or annual consumptive use.
4,343.82 acre feet per year, being 161,578.8 gallons per hour, 24 hours a day,
7 days per week, throughout the year

EXXON CORPORATION

By: s/D. B. Achttien

Compared: bc/vjw

br/ja

D.B. Achttien, P.O. Box 4508, Houston, Texas 77210

APPROVAL

OF STATE ENGINEER

This is to certify that I have examined the foregoing application, and do hereby grant the same, subject to the following limitations and conditions:

This permit is issued subject to existing rights. It is understood that the amount of water herein granted is only a temporary allowance and that the final water right obtained under this permit will be dependent upon the amount of water actually placed to beneficial use. It is also understood that this right must allow for a reasonable lowering of the static water level. This well shall be equipped with a two (2) inch opening for measuring depth to water. If the well is flowing, a valve must be installed and maintained to prevent waste. A totalizing meter must be installed and maintained in the discharge pipeline near the point of diversion and accurate measurements must be kept of water placed to beneficial use. The totalizing meter must be installed before any use of water begins, or before the Proof of Completion of Work is filed. This source is located within an area designated by the State Engineer, pursuant to NRS 534.030. The State retains the right to regulate the use of the water herein granted at any and all times.

This Permit does not extend the permittee the right of ingress and egress on public, private or corporate lands.

This permit is issued under the preferred use provisions of NRS Chapter 534. The manner of use of water under this permit is by nature of its activity a temporary use and any application to change the manner of use granted under this permit will be subject to additional determination and evaluation with respect to the permanent effects on existing rights and the resource within the ground water basin.

The issuance of this permit does not waive the requirements that the permit holder obtain other permits from State, Federal, and local agencies. (PERMIT TERMS

CONTINUED)

The amount of water to be appropriated shall be limited to the amount which can be applied to beneficial use, and not to exceed 6.0 cubic feet per second, but not to exceed 4343.82 acre-feet annually.

Actual construction work shall begin on or before.....N/A

Proof of commencement of work shall be filed before.....N/A

Work must be prosecuted with reasonable diligence and be completed on or before.....May 23, 1985

Proof of completion of work shall be filed before.....June 23, 1985

Application of water to beneficial use shall be made on or before.....May 23, 1989

Proof of the application of water to beneficial use shall be filed on or before.....June 23, 1989

Map in support of proof of beneficial use shall be filed on or before.....

Commencement of work filed.....

Completion of work filed.....

Proof of beneficial use filed.....

Cultural map filed.....

Certificate No. Issued.....

IN TESTIMONY WHEREOF, I, PETER G. MORROS
State Engineer of Nevada, have hereunto set my hand and the seal of
my office, this 23rd day of MAY

A.D. 19 89



State Engineer

The following monitoring requirements shall be complied with:

1. Three monitoring wells shall be drilled near the point of diversion of Permit 44431 at the following locations:
 - A. NE $\frac{1}{4}$ Section 25, T. 22 N., R. 50 E.
 - B. SE $\frac{1}{4}$ Section 35, T. 22 N., R. 50 E.
 - C. SE $\frac{1}{4}$ Section 27, T. 22 N., R. 50 E.
2. The monitoring wells shall be drilled and cased to an approximate minimum depth of 400 feet and approximately the bottom 100 feet of casing will be perforated.
3. Ground water depth in these wells shall be monitored and reported to the Division of Water Resources as follows:

<u>Time Period</u>	<u>Monitoring Frequency</u>	<u>Reporting Frequency</u>
Mine Construction (1st year)	monthly	quarterly
Remainder Mine Construction	quarterly	quarterly
Mine Production (1st 2 years)	quarterly	quarterly
Remainder Mine Production	semi annually	semi annually

ASSIGNED
Nº 44436

~~AMENDED~~

**APPLICATION FOR PERMIT
TO APPROPRIATE THE PUBLIC WATERS OF THE STATE OF NEVADA**

Date of filing in State Engineer's Office..... **SEP 16 1981**
Returned to applicant for correction..... **DEC 30 1981**
Corrected application filed..... **FEB 25 1982**
Map filed..... **FEB 25 1982**

The applicant..... **Exxon Corporation, c/o Exxon Minerals Company**
P.O. Box 4508....., of..... **Houston**
Street and No. or P.O. Box No. City or Town
Texas 77210
State and Zip Code No.
....., hereby make^s application for permission to appropriate the public
waters of the State of Nevada, as hereinafter stated. (If applicant is a corporation, give date and place of incorpora-
tion; if a copartnership or association, give names of members.) **incorporated on August 5, 1882,**
in the State of New Jersey

1. The source of the proposed appropriation is..... **underground**
Name of stream, lake or other source.
2. The amount of water applied for is..... **6.0**..... second-feet
One second-foot equals 448.83 gals. per min.
(a) If stored in reservoir give number of acre-feet..... acre-feet
3. The water to be used for..... **mining, milling and domestic purposes**
Irrigation, power, mining, manufacturing, domestic, or other use. Must limit to one use.
4. If use is for:
 - (a) Irrigation (state number of acres to be irrigated).....
 - (b) Stockwater (state number and kinds of animals to be watered).....
 - (c) Other use (describe fully under "No. 12. Remarks")..... **(see No. 12. Remarks)**
 - (d) Power:
 - (1) Horsepower developed.....
 - (2) Point of return of water to stream.....
5. The water is to be diverted from its source at the following point: **within the SE¼ SE¼ of Section 24,**
T.21N., R.51E., M.D.M. or at a point from which the SE corner of said Section
Describe as being within a 40-acre subdivision of public survey, and by course and distance to a section corner. If on unsurveyed land,
bears south 53°20'00" east a distance of 686.0 feet
It should be stated.
6. Place of use..... **all Sections, some of which are unsurveyed in the following:**
Describe by legal subdivision, if on unsurveyed land it should be so stated.
T.21N., R.50E., R.51E., R.52E., R.53E., T21¼N., R.51¼E., R.52E., R.53E., T.22N.,
R.50E R51E., R.51¼E., R.52E., R.53E., T.23N., R.50E, R51E., R.52E., R.53E.
T.23¼N. R.50E., T.24N., R.50E., R.51E., R.52E., R.53E, M.D.M.
7. Use will begin about..... **January 1**..... and end about..... **December 31**....., of each year.
Month and Day Month and Day
8. Description of proposed works. (Under the provisions of NRS 535.010 you may be required to submit plans and
specifications of your diversion or storage works.) **well, pump, and distribution system to**
mining, milling and domestic use sites
State manner in which water is to be diverted, i.e. diversion structure, ditches and flumes, drilled well with pump and motor, etc.

003002

JA4414

9. Estimated cost of works..... \$200,000.00
10. Estimated time required to construct works..... 3 years
If well completed, describe works.....
11. Estimated time required to complete the application to beneficial use..... 5 years
12. Remarks: For use other than irrigation or stock watering, state number and type of units to be served or annual consumptive use.
4,343.82 acre feet per year, being 161,578.8 gallons per hour, 24 hours a day,
7 days per week, throughout the year

EXXON CORPORATION
By s/D. B. Achttien

Signature, applicant or agent

Compared bc/vjw

br/ja

D. B. Achttien, P.O. Box 4508, Houston, Texas 77210

APPROVAL OF STATE ENGINEER

This is to certify that I have examined the foregoing application, and do hereby grant the same, subject to the following limitations and conditions:

This permit is issued subject to existing rights. It is understood that the amount of water herein granted is only a temporary allowance and that the final water right obtained under this permit will be dependent upon the amount of water actually placed to beneficial use. It is also understood that this right must allow for a reasonable lowering of the static water level. This well shall be equipped with a two (2) inch opening for measuring depth to water. If the well is flowing, a valve must be installed and maintained to prevent waste. A totalizing meter must be installed and maintained in the discharge pipeline near the point of diversion and accurate measurements must be kept of water placed to beneficial use. The totalizing meter must be installed before any use of water begins, or before the Proof of Completion of Work is filed. This source is located within an area designated by the State Engineer, pursuant to NRS 534.030. The State retains the right to regulate the use of the water herein granted at any and all times.

This Permit does not extend the permittee the right of ingress and egress on public, private or corporate lands.

This permit is issued under the preferred use provisions of NRS Chapter 534. The manner of use of water under this permit is by nature of its activity a temporary use and any application to change the manner of use granted under this permit will be subject to additional determination and evaluation with respect to the permanent effects on existing rights and the resource within the ground water basin.

The issuance of this permit does not waive the requirements that the permit holder obtain other permits from State, Federal, and local agencies. (PERMIT TERMS

CONTINUED)

The amount of water to be appropriated shall be limited to the amount which can be applied to beneficial use, and not to exceed 6.0 cubic feet per second; but not to exceed 4343.82 acre-feet annually.

Actual construction work shall begin on or before..... N/A

Proof of commencement of work shall be filed before..... N/A

Work must be prosecuted with reasonable diligence and be completed on or before..... May 23, 1985

Proof of completion of work shall be filed before..... June 23, 1985

Application of water to beneficial use shall be made on or before..... May 23, 1989

Proof of the application of water to beneficial use shall be filed on or before..... June 23, 1989

Map in support of proof of beneficial use shall be filed on or before.....

Commencement of work filed.....
Completion of work filed.....
Proof of beneficial use filed.....
Cultural map filed.....
Certificate No..... Issued.....

IN TESTIMONY WHEREOF, I, PETER G. MORROS,
State Engineer of Nevada, have hereunto set my hand and the seal of
my office, this 23rd day of MAY

A.D. 1983

Peter G. Morros
State Engineer

(PERMIT TERMS CONTINUED)

The following monitoring requirements shall be complied with:

1. Four monitoring wells shall be drilled near the point of diversion of Permit 44436 at the following locations:
 - A. NE $\frac{1}{4}$ Section 25, T. 21 N., R. 51 E.
 - B. SE $\frac{1}{4}$ Section 30, T. 21 N., R. 52 E.
 - C. SE $\frac{1}{4}$ Section 36, T. 21 N., R. 51 E.
 - D. NE $\frac{1}{4}$ Section 26, T. 21 N., R. 51 E.
2. The monitoring wells shall be drilled and cased to an approximate minimum depth of 500 feet and approximately the bottom 100 feet of casing will be perforated.
3. Ground water depth in these wells shall be monitored and reported to the Division of Water Resources as follows:

<u>Time Period</u>	<u>Monitoring Frequency</u>	<u>Reporting Frequency</u>
Mine Construction (1st year)	monthly	quarterly
Remainder Mine Construction	quarterly	quarterly
Mine Production (1st 2 years)	quarterly	quarterly
Remainder Mine Production	semi annually	semi annually

State Exhibit 1
3/10/83

NOTICE OF HEARING TO RECEIVE TESTIMONY AND INFORMATION
CONCERNING DESIGNATION OF KOBEH VALLEY AND THE REMAINING
NON-DESIGNATED PORTION OF DIAMOND VALLEY, EUREKA,
ELKO AND LANDER COUNTIES, NEVADA, AND NOTICE OF
HEARING REGARDING PENDING APPLICATIONS 44428, 44429,
44430, 44431, 44432, 44433, 44434, 44435, 44436 and 42978


In conformance with NRS 534.030, on March 10, 1983, the State Engineer will hold a public hearing to receive testimony and evidence to be used to determine if the Kobe Valley Hydrographic Area and the remaining non-designated portion of Diamond Valley Hydrographic Area, Eureka, Elko and Lander Counties, Nevada, should be designated pursuant to NRS 534 as critical ground water areas. Any interested party may submit written testimony or evidence that will be useful in making this determination.

The hearing will be held at the Eureka County Courthouse, Eureka, Nevada, beginning at 9:00 A.M. The order of receiving evidence and testimony will be as follows:

1. Kobe Valley Designation;
2. Diamond Valley Designation;
3. Applications to appropriate 42978, 44428, 44429, 44430, 44431, 44432, 44433, 44434, 44435 and 44436 for mining, milling, industrial and domestic purposes.

Application 42978, 44428, 44429, 44430, 44431, 44432, 44433, 44434, 44435 and 44436 are to appropriate underground water in Kobe Valley, Diamond Valley and Pine Valley. The applicants may submit additional information to support their applications at the hearing. The protestants of the applications may submit additional information to support their protests at the hearing.

The applicants and protestants will be required to defray the pro rata share of the costs of transcribing and reporting the portion of the hearing relating to the applications.


Peter G. Morros
State Engineer

003005

JA4417

Testimony Relating to Exxon Minerals Company's Kober Valley
Water Rights Applications

Presented by: Charles E. Downs, Ph.D.
Hydrologist, Mine Engineering Division
Exxon Minerals Company
P. O. Box 4508
Houston, Texas 77210

KOBER VALLEY GEOHYDROLOGY

Exxon Minerals Company agrees with the findings and conclusions presented
in the following four hydrologic reports:

- enter*
1. Water for Nevada, Nevada's Water Resources, Report No. 3,
prepared by the Nevada State Engineer's Office, Department of
Conservation and Natural Resources, Carson City, Nevada, October
1971.
 2. Ground Water Resources - Reconnaissance Series Report No. 6,
Ground Water Appraisal of Diamond Valley, Eureka and Elko
Counties, Nevada, by Thomas E. Eakin, Prepared Cooperatively by
the Nevada Department of Conservation and Natural Resources and

the U. S. Geological Survey, February 1962.

- # 3. Ground Water Resources - Reconnaissance Series Report No. 30,
Ground Water Appraisal of Monitor, Antelope, and Kobeh Valleys,
Nevada, by F. Eugene Rush and D. E. Everett, Prepared
Cooperatively by the Nevada Department of Conservation and
Natural Resources and the U. S. Geological Survey, November 1964.
- # 4. Hydrologic Response to Irrigation Pumping in Diamond Valley,
Eureka and Elko Counties, Nevada, 1950-1965, Water Resources
Bulletin No. 35, by J. R. Harrill and R. D. Lamke, Prepared
Cooperatively by the Nevada Department of Conservation and
Natural Resources and the U. S. Geological Survey, 1968.

These reports conclude that:

- . Kobeh Valley is essentially a closed alluvial-filled basin.
- . Interbasin flow from Kobeh Valley to Diamond Valley is minor or negligible.
- . Kobeh Valley is essentially in hydrologic equilibrium with ground

water recharge balanced by evapotranspiration discharge.

Hydrographic Basin Characteristics

The Kobeh Valley basin, designated as Hydrographic Area No. 139 by the State Engineer of Nevada, is essentially a closed alluvial basin, bowl shaped in nature, bounded on the west by the Simpson Park Mountains, on the north by the Roberts Mountains, on the east by the Sulphur Springs Range, and on the south by the Antelope Mountains and Mahogany Hills.

The Kobeh basin receives most of its ground water recharge from the snowmelt and rainfall run-off infiltration processes from the mountain ranges which surround the basin as summarized in Reference 1, Table 3, page 46. Kobeh Valley receives approximately 11,000 acre-feet per year of precipitation recharge and an additional 6,000 acre-feet per year of interbasin recharge in the form of ground-water inflow from Monitor and Antelope Valleys to the south and southwest of Kobeh Valley for a total recharge of approximately 17,000 acre-feet per year. In contrast, discharge from the basin is about 15,000 acre-feet per year by evapotranspiration which is a non-beneficial

use of the resource.

Ground water outflow from the basin is negligible or minor as concluded by both the USGS and the State of Nevada in references 1-4 cited earlier. Surface water outflow occurs intermittently and only in response to intense rainfall events in Kobeh Valley which generate streamflow through Devils Gate which connects Kobeh Valley to Diamond Valley at the surface.

Boundary Conditions Affecting Hydrologic Flow Processes

The Kobeh Valley is separated from the Diamond Valley to the east by the Sulphur Springs Range. The Sulphur Springs Range is a barrier to ground-water flow between the basins as is shown on the Geologic Map of Eureka County, Nevada (Reference 5: Geology and Mineral Resources of Eureka County, Nevada; Bulletin 64, by R. J. Roberts, K. M. Montgomery and R. E. Lehner; prepared cooperatively by the U. S. Geological Survey and the Mackay School of Mines, University of Nevada; 1967.)

The Sulphur Springs Range is composed of Tertiary volcanics and intrusives

(Whistler Mountain) and older Western Assemblage rocks comprised of shale, chert, quartzite, and andesitic volcanics, all of which are relatively impermeable to ground water flow.

The lack of hydraulic communication between the Kobeh and Diamond basins is further evidenced by the difference in ground-water levels between the two basins. While there exist heavy ground water withdrawals for agricultural activities in Diamond Valley, the effects of this ground water pumping have not influenced the water levels in Kobeh Valley. In essence, the Kobeh Valley bowl is full of ground water and is in hydrologic balance between recharge and evapotranspiration discharge. Conversely, Diamond Valley ground water levels are steeply dipping toward the center of the basin in response to pumping discharge. This distinction between hydrologic conditions in the two basins is schematically illustrated in Figure 1.

Water Budget

Given the total amount of recharge to, and discharge from Kobeh Valley, an

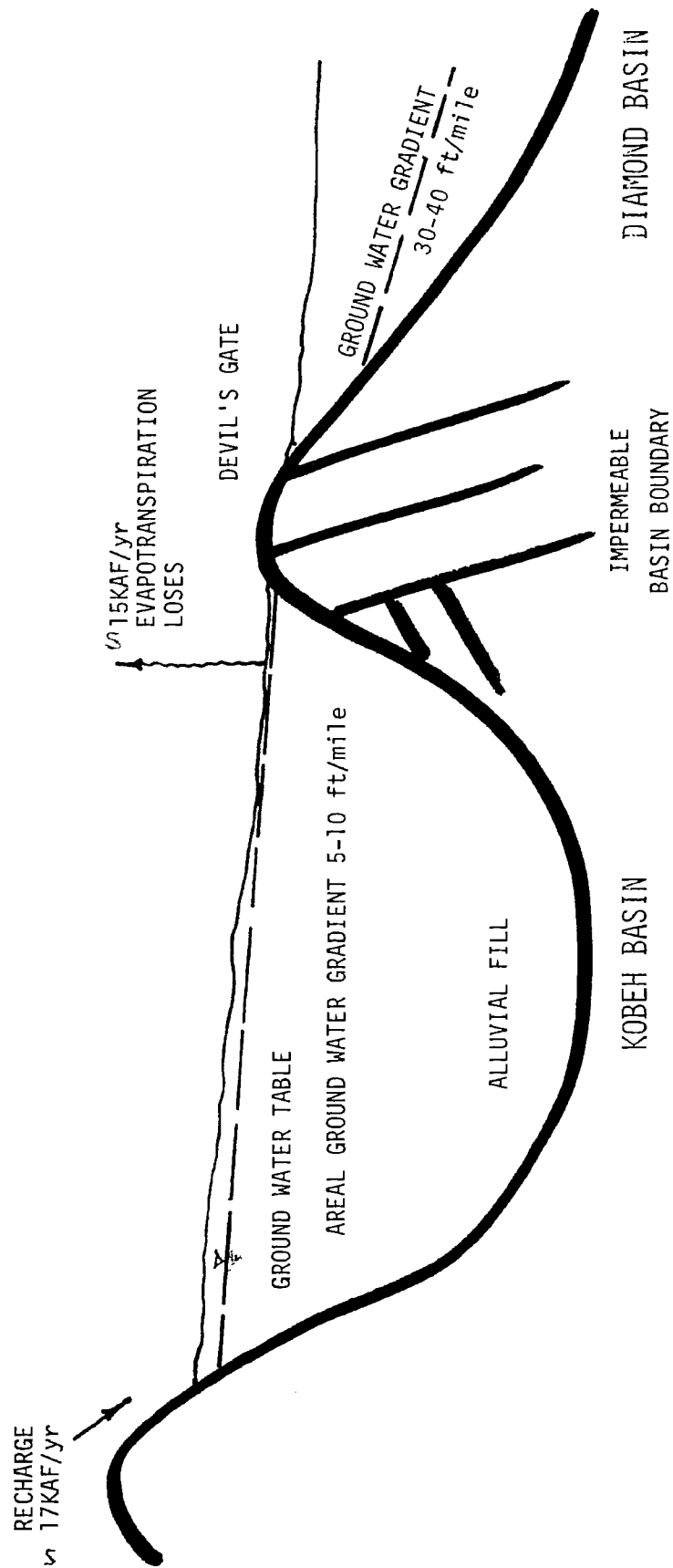


Figure 1: Schematic Illustration of the Separation of the Kobeh and Diamond Valley Ground Water Systems

estimate can be made of perennial yield for the system. Perennial yield, as defined by Rush and Everett (Reference 3, p. 26) is the maximum amount of water that can be withdrawn from a ground-water reservoir and used economically each year for an indefinite period of time. The perennial yield for Kobeh Valley is taken as the average of total recharge and discharge, or 16,000 acre-feet per year (Reference 1, Table 1, p.22, and Ref. 2).

The area of alluvial fill in Kobeh Valley is about 270,000 acres. Assuming a specific yield value of about 10 percent, 27,000 acre-feet of ground water are in storage per foot of the alluvial aquifer (Ref. 3, p.29; Ref. 2, p. 22). Exxon proposes to withdraw approximately 8,700 acre-feet per year from the aquifer for mining and milling processes. This would result in a total withdrawal of 174,000 acre feet over a 20-year period and in an average lowering of the water table by about 6.5 feet over the entire Kobeh Valley basin. These figures involve only ground water in near surface

storage and do not consider that recharge to the basin will continue to occur and that non-beneficial evapotranspiration losses will be reduced.

The State of Nevada has given appropriations for about 13,000 acre-feet per year of Koebe Valley ground water to date. Exxon's request to appropriate 8,700 acre-feet per year for mining and milling purposes would appear to overdraft the perennial yield of the basin. However, the safe yield of Koebe Valley will not be adversely impacted, in view of: 1) the large volume of ground water in storage; 2) the minimization of pumping impacts offset by recharge and the salvage of non-beneficial evapotranspiration losses; 3) the under utilization of currently appropriated water rights; and, 4) the temporary nature of Exxon's use.

In summary, Exxon's water supply would come from a combination of natural recharge, transitional storage reserve as ground water levels are lowered to salvage non-beneficial evapotranspiration losses, and from the salvaged ground water.

Conclusions and Recommendations

1. There is adequate ground water in Kobeh Valley to satisfy Exxon's mining and milling water requirements without adversely impacting other users.
2. Kobeh Valley is essentially a closed alluvial basin in hydrologic equilibrium.
3. Interbasin ground-water flow from Kobeh Valley to Diamond Valley is minimal or negligible.
4. The Nevada State Engineer should ^{continue to} administer water rights in Kobeh Valley separate and apart from Diamond Valley.
5. The State Engineer should grant Exxon's water appropriation applications in Kobeh Valley.

STATE OF NEVADA
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

---oOo---

ORIGINAL

In the Matter of:

Hearing to Receive Testimony and
Information Concerning Designation
of Kobeh Valley and the Remaining
Non-Designated Portion of Diamond
Valley, Eureka, Elko and Lander
Counties, Nevada, and Hearing Regard-
ing Pending Applications 44428, 44429,
44430, 44431, 44432, 44433, 44434,
44435, 44436 and 42978.

---oOo---

REPORTER'S TRANSCRIPT OF HEARING

Held Before

PETER G. MORROS, State Engineer

Held At

Eureka County Courthouse
Eureka, Nevada

Thursday, March 10, 1983
9:00 o'clock, a. m.

---oOo---

CAPITOL REPORTERS

OFFICIAL AND GENERAL COURT REPORTERS

820 ALHAMBRA BLVD. SACRAMENTO, CALIFORNIA 95816
(916) 446-2757

108 W. TELEGRAPH, CARSON CITY, NEVADA 89701
(702) 882-5322

003015

JA4427

A P P E A R A N C E S

---oOo---

For the Department of Water
Conservation and Natural Resources:

PETER G. MORROS, State Engineer,
HEARING OFFICER.

JERRY BROWNFIELD, Chief,
Ground Water Section, State
Division of Water Resources.

RALPH GAMBOA, Supervising Water
Commissioner, Elko Branch,
Division of Water Resources.

Reported by:

HAROLD KRABBENHOFT
Certified Shorthand Reporter, #25
Capitol Reporters
108 West Telegraph Street
Carson City, Nevada 89701.

I N D E X

	<u>Page</u>
Call to order at 9:00 a. m. by Peter G. Morros, State Engineer	3
Introduction of state personnel and statement of purpose of and authority for the hearing	3
Presentation of exhibits	4
Identification of witnesses Ken Barrett, Charles Downs, E. E. Eyre, Jr., and later when they came in, Mr. Robert O. Burnham and Walter Plaskett	5
<u>WITNESSES</u>	
Kenneth E. Barrett, statement	6
Statement of E. E. Eyre	8
Statement of Walter Plaskett	13
Mr. Morros questions Mr. Eyre	18
Testimony of Robert O. Burnham	19
Questioned by Mr. Morros	21
Further testimony of Kenneth E. Barrett	23
Reading of statement by Mr. Barrett and entering of exhibits	23
Charles E. Downs	25
Questioning of Mr. Downs by Mr. Morros after Mr. Downs' prepared report	33
Reading by Mr. Morros of portion of Water Resources Bulletin #35, beginning on page 21	35
Question by Mr. Eyre	36
Statement by Mr. Plaskett	41
Question by Mrs. Laurei Marshall, Eureka	44
Further questioning by Mr. Eyre	46
Statement by Mrs. Mari Kephart	47

1	<u>INDEX</u> (Continued)	
2	Statement of Mr. Barrett in answer to question of Mr.	
3	Eyre	50
4	Statement of Mr. Ken Stenton, Diamond Valley farmer	54
5	Statement of Mr. Walter Plaskett	54
6	Statement of Mr. Ken Barrett	56
7	Statement of Mr. E. E. Eyre	56
8	Ruling of Mr. Morros re Applications 44430, 44431 and 44436	60
9	Mr. Barrett withdraws Pine Garden Valley and Diamond Valley applications	60
10	(Hearing on Kobeh Valley concluded.)	
11		
12	Testimony of Jerry Brownfield as to map of Diamond Valley	62
13	Question of Mr. Eyre	65
14	Question of Mrs. Kephart	66
15	Statement of Mr. Plaskett	67
16	Statement of Mr. Plaskett as to location descrip- tions for the layman	68
17	Question of Mrs. L. Marshall	70
18	Question of Mr. Ken Stenton	71
19	Question of Mr. James Ithurralde	73
20	Statement of Walter Plaskett	73
21	Mr. Morros asks for show of hands re designation	74
22		
23	---oOo---	
24		
25		
26		

1 INDEX (Continued)

2 E X H I B I T S

3 For the State:

4	1 - Notice of Hearing	4
5	2 - Abstract of Filings	5
6	3 - Resource Reconnaissance Report	5
7	4 - Water Resources Bulletin #35	5
8	5 - Map of Diamond Valley	61

9
10 For Exxon:

11	1 - Statement entitled "Evidence Relating to Applica-	
12	tions to Appropriate 44428, 44429, 44430, 44431,	
	44432, 44433, 44434, 44435 and 44436"	23
13	2 - Testimony of Mr. Barrett re "Exxon Mineral Company's	
14	Kobeh Water Rights Applications"	26
15	3 - Document, "Water for Nevada, Nevada's Water	
16	Resources," Report #3, prepared by Nevada State	
	Engineer's Office	27
17	4 - Document, "Ground Water Resources, Reconnaissance	
	Report No. 6"	27

18
19 For Mr. E. E. Eyre:

20	1 - Statement of U. S. Geological Survey, Preliminary	
21	Proposal	58

22
23 ----oOo----

1 EUREKA, NEVADA, THURSDAY, MARCH 10, 1983,

2 9:00 O'CLOCK, A.M.

3 ---oOo---

4 MR. PETER G. MORROS (Hearing Officer): All right.
5 We'll be on the record.

6 By way of introduction, my name is Pete Morros.
7 I am the State Engineer of Nevada, and with me here today is
8 Jerry Brownfield, the Chief of our Groundwater Section, in
9 the State Division of Water Resources.

10 This is the time and place set for the hearing in
11 the matter of consideration of the designation of Kobeh
12 Valley, under the provisions of NRS 534, Nevada Statutes.
13 The purpose of the hearing is to receive any testimony, pub-
14 lic comments, or evidence to assist the State Engineer in
15 making his decision on whether Kobeh Valley should be
16 considered for a designation under the provisions of Chapter
17 534.

18 The authority for this hearing is set out under
19 NRS 534.030.

20 I have one comment I want to read into the record.
21 If anybody has any objections to the time and set for this
22 hearing, I will hear those objections. The statutes provide
23 that the State Engineer will hold a public hearing, and the
24 exact wording in the statute is, "within the basin, to take
25 testimony concerning the designation of a groundwater basin."
26 Obviously, Kobeh Valley, to our knowledge, does not have a

1 facility where a public hearing could be held, short of
2 convening this thing on an alkali flat some place, so for
3 that reason, the time and place for this hearing has been set
4 here in Eureka, the county seat of Eureka County. Portions
5 of the Kobeh Valley Basin do lie in Lander County, but the
6 major portion of the groundwater basin is in Eureka County.
7 For that reason, this hearing was noticed and the time and
8 place was set here in Eureka.

9 Is there anybody that objects to that?

10 (No objections were voiced.)

11 MR. MORROS: Okay. Let the record show there is no
12 comment, no objection.

13 Notice of this hearing was published in the Elko
14 Free Press and the Eureka Sentinel.

15 I think initially the State is going to enter into
16 the record some exhibits.

17 Identified as Exhibit 1 and received as Exhibit 1
18 into the record, Notice of Hearing to Receive Testimony and
19 Evidence Concerning Designation of Kobeh Valley and the
20 Remaining Non-Designated Portions of Diamond Valley, Eureka,
21 Elko and Lander Counties, Nevada, and Notice of Hearing
22 Regarding Pending Applications 44428, 44429, 44430, 44431,
23 44432, 44433, 44434, 44435, 44436 and 42978.

24 (The Notice of Hearing was then received and marked
25 State Exhibit No. 1.)

26 MR. MORROS: Marked as State's Exhibit 2 and

1 received into the record will be an Abstract of Filings on
2 the underground sources within the Kōbeh Valley Groundwater
3 Basin, designated as Hydrographic Basin 139. The Abstract is
4 dated February 25, 1983. We do have some extra copies of
5 these exhibits, if anybody desires a copy.

6 (The Abstract of Filings as described was then
7 received and marked for identification as State Exhibit No. 2.)

8 MR. MORROS: Exhibit No. 3, State's Exhibit No. 3
9 will be marked for identification purposes and received into
10 the record is groundwater Resource Reconnaissance Series
11 Report No. 30 on the groundwater appraisal of Monitor, Antelope
12 and Kōbeh Valleys, Nevada, by Eugene Rush and D. E. Everett.
13 This report was prepared cooperatively by the Nevada Depart-
14 ment of Conservation and Natural Resources and the Geological
15 Survey of the U. S. Department of Interior. The report is
16 dated November, 1964.

17 (The Resource Reconnaissance Series Report was then
18 received and marked for identification as State Exhibit No.3.)

19 MR. MORROS: Marked for identification purposes as
20 State's No. 4 and received into the record will be a Water
21 Resources Bulletin No. 35, entitled "Hydrologic Response to
22 Irrigation Pumping in Diamond Valley, Eureka and Elko Counties,
23 Nevada, 1950 to 1965," offered by J. R. Harrill and R. B.
24 Lamke. This report was also prepared through the cooperative
25 program of the Nevada State Department of Conservation and
26 Water Resources and the Geological Survey of the U. S.

1 Department of the Interior.

2 The State Engineer will take administrative notice
3 of all the records in the State Engineer's Office that are
4 relevant to Kobeh Valley.

5 I think the best procedure to follow now will be
6 maybe if we can get a statement of appearances on those
7 people who desire to testify at this hearing. If you could
8 just raise your hand? Yes, sir? State your name for the
9 record?

10 MR. KEN BARRETT: My name is Ken Barrett. I live
11 in Houston, Texas, and I work for Exxon Minerals Company.
12 I am the Project Manager for the Mt. Hope Project in Eureka
13 County.

14 MR. MORROS: Yes, sir?

15 MR. CHARLES DOWNS: My name is Charles Downs. I
16 live in Houston, Texas. I work for Exxon Minerals Company as
17 a hydrologist.

18 MR. MORROS: Anybody else that wishes to testiy on
19 the designation of Kobeh Valley? State your name for the
20 record, please?

21 MR. NED EYRE: My name is Ned Eyre. I'm a foreman
22 in Diamond Valley.

23 MR. MORROS: Okay, Mr. Eyre. Thank you.

24 Anybody else?

25 (There was no response.)

26 MR. MORROS: All right, Mr. Barrett. I think as I

1 recall, you requested that you be allowed to make a statement
2 an opening statement concerning Exxon's applications?

3 MR. KEN E. BARRETT: Yes.

4 MR. MORROS: I think it would be better maybe if
5 you could sit on this side of the table with us. That way
6 you will be facing the audience. The acoustics in here are
7 somewhat difficult. If you want to raise your right hand,
8 we'll have Mr. Brownfield swear you in.

9 (Ken E. Barrett was thereupon duly sworn by Mr.
10 Jerry Brownfield.)

11 MR. MORROS: Okay. Mr. Burnham and Mr. Plaskett
12 just came in. Walt, are you going to testify concerning the
13 designation of Kobeh Valley?

14 MR. WALTER PLASKETT: Yes.

15 MR. MORROS: Okay. Walt Plaskett. Mr. Burnham,
16 are you going to have any testimony concerning the designa-
17 tion of Kobey Valley?

18 MR. ROBERT O. BURNHAM: I hadn't prepared anything,
19 no, sir.

20 MR. MORROS: Okay. Mr. Barrett?

21 TESTIMONY OF

22 KENNETH E. BARRETT,

23 who, coming forward to testify, having been
24 duly sworn, testifies as follows:

25 MR. KENNETH E. BARRETT: Mr. Morros, basically what
26 I would like to say at the beginning of the hearing is

1 something that we have discussed with the State Engineer
2 and with some of the local people here since we made our
3 formal applications back in late 1981.

4 Exxon Minerals Company's intent has been to obtain
5 enough water rights in the area to support a proposed mining
6 operation in Eureka County. We made application in September
7 of 1981 in each of the three basins, Diamond, Pine Garden and
8 Kobeh, to gain a time right of priority for those applica-
9 tions. We applied for a full 12 cubic feet per second in
10 each of those basins for the sole purpose of gaining time
11 right priority. It was our intent to come into the area to
12 do exploration activities, to find the best place that we
13 felt that water could be obtained and once we found that
14 information out, to pursue the approval of applications in
15 one area that would provide us with the full 12 cubic feet
16 per second required for the eventual operation.

17 It was our intent at that time and continues to be
18 our intent once those applications are approved that give us
19 the 12 cubic feet per second to drop the applications in the
20 other basins. We have been pursuing this activity in Kobeh
21 Valley. We feel that is the right place to gain the water
22 and it is our intent, if our Kobeh Valley applications are
23 approved, to drop the applications in Diamond and Pine Garden
24 Valley.

25 MR. MORROS: Thank you, Mr. Barrett.

26 Mr. Downs, did you have anything you wanted to add?

1 MR. CHARLES DOWNS: I will have no additional
2 comment.

3 MR. MORROS: Okay. Mr. Eyre? We are only taking
4 testimony at this time on the potential designation of Kobeh
5 Valley. We haven't gotten to the Diamond Valley issue yet.
6 If you wish to testify regarding Kobeh Valley?

7 MR. NED EYRE: Yes.

8 MR. MORROS: Do you want to come forward?

9 Want to raise your right hand and Mr. Brownfield
10 will swear you in and maybe you can spell your last name for
11 the Reporter?

12 (Mr. E. E. Eyre, Jr. was thereupon duly sworn by
13 Mr. Brownfield.)

14 TESTIMONY OF

15 E. E. EYRE, Jr.,

16 who, coming forward to testify, having been
17 duly sworn, testifies as follows:

18 MR. E. E. EYRE: My name is spelled E-y-r-e.

19 MR. MORROS: Okay, Mr. Eyre. Go ahead.

20 MR. E. E. EYRE: I would like to voice a concern
21 that many of us have in Diamond Valley concerning the fact,
22 or the possibility that Kobeh Valley may be a major supply of
23 water for Diamond Valley. In this light, I have talked to
24 many people, including ranchers who have been here all their
25 lives, and the general feeling is that there very definitely
26 is some supply coming from Kobeh Valley into Diamond Valley.

1 The big question raised is as to how much and just where it
2 comes. In speaking to the people of the U. S. Geological
3 Service in Carson City, it has been indicated that really
4 very little is known by actual fact as to where this water
5 in Diamond Valley actually comes from. When they made their
6 initial survey, they felt that the runoff from the Diamond
7 Mountains and the Sulphur Springs Range and the mountains
8 surrounding Diamond Valley immediately was probably not enough
9 water to supply the water that is currently being discharged
10 by the Diamond Valley through the pumping and so forth, which
11 is fairly close to the surface.

12 In that light they felt that some water from Diamond
13 Valley probably was coming off the Roberts Mountains area or
14 the Roberts Mountain Range and was showing up in those springs
15 that are along the Sulphur Springs Range, such as the Sadler
16 Springs and those other springs. They felt that, and it was
17 a guesstimate on their part, but in taking the amount of
18 water that should be coming off Roberts Mountain on that side,
19 that would be on the east side, and so forth, and measuring
20 what was going down Bonini Creek and those drainages going
21 out toward Pine Valley, that the shortage in the amount of
22 water was really made up by the water that was coming into
23 the Sadler Springs area, and so forth.

24 In questioning the U. S. Geological Survey as to
25 water that might be coming through Devil's Gate, they said
26 they didn't know really how much was flowing underground.

1 It was stated that there might very well be a
2 barrier underneath the ground that would prevent a great deal
3 of water in coming through Devil's Gate. We know that it
4 flows on the surface, I guess it's flowing there today,
5 probably, but how much that Kobeh Valley water is allowed to
6 go into Diamond Valley is really an unknown factor as far as
7 they were concerned. They felt that there probably is some
8 spill-over down there underneath the surface if there is a
9 barrier there. But again, how much of it spills over is
10 unknown.

11 They also felt there was a strong possibility there
12 was a leakage or seepage of water, to what degree again is
13 unknown, coming around the corner down here. If you go up
14 Spring Valley and go to the north, there's a dry lake in
15 there and they have been watching the level of the water in
16 this dry lake in a well that is placed in about the center of
17 that dry lake valley, and because of the change in the water
18 condition up there, it has led them to suspect that there
19 definitely is water that is coming from those basins of
20 Antelope and Kobeh Valley, and coming into this area. But
21 their main point that struck me was that they claim or feel
22 very strongly that they just don't know what the situation is
23 as far as the total amount of water that is being supplied
24 into Diamond Valley from the areas over to the west, so as a
25 consequence, we feel very strongly, there are many of us that
26 feel very strongly that we really should know before water

1 rights of this magnitude are granted.

2 In this light, I ask the question, would it be
3 possible to have a study and a model made of this area. I'm
4 sure that some of you are aware of the fact that Los Angeles
5 Light and Power, through the White Pine Power Project in
6 White Pine County, this project is planning to do some pre-
7 liminary studies or some studies in Diamond Valley because
8 it is about the only valley, as far as the state, where there
9 is any knowledge, any real knowledge and background on having
10 pumping levels. They can go back and estimate and pretty
11 well tell what water has been pumped out, and they can get a
12 very good oversight view of what happens to this type of
13 valley, which is typical of other valleys in this part of the
14 state, and they feel it would be very beneficial to have this
15 knowledge.

16 In discussing this with them, it was talked or
17 suggested that perhaps that particular study should be ex-
18 panded to include the possible drainages into Diamond Valley,
19 such as Kobeh Valley, and that in determining or setting up
20 what they call a "model" on this Corbett-type structure, they
21 would have a much better understanding of what is taking
22 place, not only in this area but also what will take place in
23 the valleys in this part of the state. We feel this is
24 extremely important to have important information. We feel
25 that it is information that should be gained and garnered in
26 and can only say this: That it may well be that Kobeh Valley

1 is the best place for Exxon or for any mining operation to
2 get their water. We don't know, what we are asking at this
3 point is to study the feasibility of making a study or a
4 model, however you want to term it, which would give us
5 information as to the impact that might be on the current use
6 of water in Diamond Valley, and then in the same light, this
7 would also be very beneficial to you in the state in the
8 knowledge of what would happen in these other valleys as the
9 water has gone off for such projects as the Intermountain
10 Power or the White Pine Power Project, and so forth.

11 The U. S. Geological Survey is making a preliminary
12 proposal regarding the study. They feel on the outside it
13 would probably take three years, and if my memory serves me
14 correctly, I think Mr. Barrett said that mine was scheduled
15 to be in operation or production in '89, and three years from
16 now would put the water situation, it should be resolved by
17 '86. Just thinking ahead, or whatever, if that should put
18 Exxon in the light where they did not want to do any more
19 development work or could not continue until they had water
20 rights or assurance of water of one sort or another, I again
21 raise the question, would it not be possible for Exxon to
22 receive options on the designated water in Diamond Valley at
23 this time through a purchase-option or whatever, as a last
24 resort, because it may well be not the best way for water to
25 be acquired as far as the farmers are concerned, and certainly
26 may present difficulties from Exxon's standpoint, but I only

1 offer that as a suggestion, that if they are not comfortable
2 with the fact they would have to wait for a study until 1986,
3 to get a determination of whether they could receive that
4 water in Kobeh Valley or not, that at least they had some
5 alternatives.

6 Thank you.

7 MR. MORROS: Okay. Thank you.

8 I would ask perhaps the Exxon representatives to
9 make their presentation of their project if you are in a
10 position to address Mr. Eyre's concerns. Mr. Plaskett? I
11 remind you now, we are on Kobeh Valley only.

12 MR. WALTER PLASKETT: Right.

13 MR. MORROS: Okay. Want to raise your right hand
14 and spell your name for the Reporter?

15 (Mr. Walter Plaskett was thereupon duly sworn by
16 Mr. Brownfield.)

17 TESTIMONY OF

18 WALTER PLASKETT,

19 who, coming forward to testify, having been
20 duly sworn, testified as follows:

21 MR. WALTER PLASKETT: Walt Plaskett, P-l-a-s-k-e-t-t.

22 MR. MORROS: Before we get started with Mr.
23 Plaskett, I want the record to acknowledge the presence of
24 Ralph Gamboa, our Supervising Water Commissioner from our
25 branch in Elko.

26 Okay, Mr. Plaskett.

1 MR. WALTER PLASKETT: I have got the throat bug
2 common in Eureka, and you may not understand every word, but
3 probably you can sense my feeling.

4 MR. MORROS: That's because of all that water you
5 have got out there this year.

6 MR. WALTER PLASKETT: Right. The good news is I
7 did fly to Elko yesterday, and Lake Diamond, the salt flat,
8 is bigger and deeper than I think I have ever seen it in 20
9 years.

10 MR. MORROS: Doesn't make me unhappy one bit.

11 MR. WALTER PLASKETT: And there are some un-named
12 usual streams along there flowing too. For the record, I
13 have been a resident in Diamond Valley for 20 years. I farm
14 and use eight irrigation wells. I am a licensed well drilling
15 contractor, irrigation contractor, pump contractor. We have
16 drilled wells throughout Diamond Valley and have designed
17 irrigation systems and are somewhat familiar with static
18 water tables, and so on.

19 I have no inkling as to what permits issued to
20 Exxon and Kobreh Valley would do to our water supply. I concur
21 very much with Ned Eyre that something, some research should
22 be done with the known potential problem of overdraft in
23 Diamond Valley. I think the State Engineer would be, I would
24 have to say, derelict in his duty to issue those permits
25 without first determining if they would have any effect on
26 Diamond Valley and to what extent they would affect us. If

1 we are already in trouble, the Exxon numbers that I have seen
2 I think indicate a withdrawal if they were to pull that much,
3 of about 10 percent of what is currently being pulled in
4 Diamond Valley now.

5 I am not going to try to tell anybody that I know
6 any facts, but if you can assume that some people that feel
7 that we get a large recharge through Devil's Gate is true,
8 and if that water that Exxon pulls, worst case, could be
9 considered the stream that comes through there, and they pull
10 it and it doesn't come here, this would have to greatly
11 aggravate whatever shortage we might have now. Again, I'm
12 not saying that is true. I have heard people in the State
13 Engineer's Office, and I'm not putting them down, but I don't
14 think they really know any more than I do where our water
15 comes in, how much of it comes in and goes out other than
16 through pumping, but I have heard at least one of those say
17 that they thought if everybody in Diamond Valley drilled their
18 wells very deep, that we would pull water that is now going
19 by us.

20 I have heard others say that they thought that
21 Exxon should drill their wells over in the northwest corner
22 of the valley and would be pulling it out after it had gone
23 past us for our use. I'm not saying again any of these things
24 are true. I do know that when they drilled an oil well on our
25 property they went 10,500 feet deep and they went out there
26 one day when they were attempting to make a bit change and

1 they were in the area of 2200 feet and the driller, the head
2 driller said, "If you ever need more water, that's where you
3 need to go." And they had hit it at 400, or well, even more
4 than that, from about 1600 down to 2300, what they called a
5 fantastic aquifer. They had very heavy mud in the hole and
6 made the bit change and it was clear water 'way up and gave
7 them a terrible time in making the bit change, and he termed
8 that, and this guy was some 60 some years old, and drilled
9 all over the world, and he termed that as a tremendous
10 aquifer. Perhaps this is the place that Exxon should tap,
11 at the closest location to your site, Exxon's site, that
12 would benefit you, and if you can tap a strata that is sealed
13 off by some 1200 feet of clay, as it was under my property,
14 perhaps some hydrologist, or whatever you call the man, that
15 determines inflow and outflow and recharge, maybe he would
16 say this is the place Exxon can pump it cheaper with the
17 least effect on the irrigators in Diamond Valley.

18 I don't really think anybody here believes that
19 the result of this meeting would be that Exxon will not get
20 water. I don't think -- There may be some that don't want
21 to see Exxon going in, but I think Exxon will get its water.
22 I just make the strong, strong plea that the engineer not do
23 something that could further harm our basin and that every-
24 thing possible be done to determine if Exxon would be pulling
25 approximately ten percent of our current use, and if Kobeh
26 Valley is the place, fine. I have no objection. But I would

1 hate to see it happen based on today's information.

2 MR. MORROS: How do you feel about the designation
3 of Kobeh Valley?

4 MR. WALTER PLASKETT: I feel that -- Well, again,
5 my point there would be, I guess, as I say, I think it should
6 be designated, if even only temporarily, until you can deter-
7 mine whether or not it is a function of our water supply.
8 If it is not, then I would have no problem with it not being
9 designated, but I think that we have a number of legal,
10 legitimate and in due course water right holders here that
11 have been fighting this battle for some years at great
12 expense, and you know more of problems than we do, and I
13 would hate to see the problems increase just from a lack of
14 due diligence in determining where this substantial amount of
15 water should be drawn from. If they should buy it from
16 Diamond Valley water right holders, maybe that's the way to
17 go. I really don't know, and I would say one thing as a fact,
18 and I think I said that, that nobody does know.

19 MR. MORROS: There is a problem in purchasing
20 Diamond Valley water rights. You are looking at an inter-
21 basin transfer of water because their operation for the most
22 part is going to be located in Kobeh.

23 MR. WALTER PLASKETT: I know. I know what you're
24 saying, but that is one alternative that has been discussed
25 by Exxon and others. I'm not saying that is a proper choice.
26 My only point is that let's do it in the way that least affects

1 the existing water right holders. I believe we do have some
2 rights, and you have indicated to us in the past that if you
3 felt there would be a negative relationship between Kobeh
4 Valley pumping and Diamond Valley water supply, you would not
5 able to allow those permits, but you have inter-basin
6 authority as well as working within a basin, and I still
7 maintain that I don't think there has ever been research done
8 to tell us where our water really comes from and what impact
9 Kobeh, Garden or pumping from a corner of Diamond or pumping
10 from deep in Diamond would have on existing water right
11 holders.

12 MR. MORROS: Thank you, Mr. Plaskett.

13 Mr. Eyer, I posed one question to Mr. Plaskett, and
14 that was concerning the designation of Kobeh Valley. I would
15 like to ask you the same question since you testified. What
16 is your feeling about designating Kobeh Valley?

17 MR. E. E. EYRE: In what way?

18 MR. MORROS: Well, the provisions of Chapter 534 of
19 the NRS is the authority for designating a groundwater basin,
20 and the designation in effect provides the State Engineer
21 with some additional management tools for one thing. A
22 permit has to be in hand before a well can be drilled, and
23 for another thing, the State Engineer is in a position to
24 consider preferred uses.

25 The purpose of this hearing is to receive any
26 comments, public comments concerning the designation, pending

1 designation of Kobeh Valley.

2 MR. E. E. EYRE: If that is the best way it can be
3 managed in the light of the information that has been given
4 here this morning.

5 MR. MORROS: Okay. Thank you.

6 Anybody else that wishes to speak on the designation
7 of Kobeh Valley? Okay, Mr. Burnham, come forward.

8 (Robert O. Burnham was thereupon duly sworn by Mr.
9 Brownfield.)

10 TESTIMONY OF

11 ROBERT O. BURNHAM,

12 who, coming forward to testify, having
13 been duly sworn, testifies as follows:

14 MR. MORROS: Would you state your full name for
15 the record, please?

16 MR. ROBERT O. BURNHAM: Robert O. Burnham, B-u-r-n-
17 h-a-m.

18 One of the points that hasn't yet been brought out,
19 first of all, I would like to genuinely concur with what Ned
20 Eyres and Walt Plaskett said, and there are many people in
21 the valley who have expressed that very same idea. This is
22 a part of some testimony that was given insofar as the hearing
23 in the valley's water source. The State Engineer's Office
24 does have a wall map where it shows in four different areas,
25 both surface and sub-surface-wise, that water from Kobeh
26 Valley does supply Diamond Valley. A Mr. James Perkins, who

1 had been with the water office for a long period of time
2 twice told Mrs. Burnham and I that this very definitely was
3 something that had been earlier established by the Division of
4 Water Resources, that Diamond Valley does get a portion of
5 its underground resources, water resources, from the Kobeh
6 Valley and Antelope Valley area, and to the extent -- I
7 don't think there is any gross mentioning of the amount of
8 water, and as Mr. Plaskett pointed out, I don't think anybody
9 is begrudging Exxon insofar as both establishing itself here
10 and the securing of waters that are necessary from their
11 operation; as a matter of fact, I think there are several
12 people encouraging that it is going to be of some helpful
13 value as far as the valley is concerned, but the point that I
14 wanted to really bring out was, and Mr. James Moyle, who is
15 one of the irrigators and his farm operation is towards the
16 northern end of the valley, came from an area and he has
17 relatives there, in a place out of Enterprise, Utah, where
18 there is such a mining operation, I understand similar to
19 what Exxon is intending to put in here, and I think the
20 community that is closest to it is called Byrl Junction, I
21 think it's B-y-r-l, or some similar spelling to this.

22 Twelve cubic feet of water is one whale of a lot of
23 water as far as it being sucked out of the underground. If
24 it can be brought back and recharged into the area, it would
25 make a tremendous amount of difference. That mining opera-
26 tion, according to Mr. Moyle, has this as a part of their

1 allowed building, let's say, erection of their operation, and
2 this had to be agreed upon, that they would take their water
3 and once it had been cycled through their plant, it was
4 brought around and recharged to that valley area, and that as
5 a result of this re-insertion of the water into the valley
6 underground formations literally, that portion of the valley
7 did not suffer, and some of the nearby ranchers and farmers
8 have said it had improved the water table and that actually
9 to that degree had not worked a detriment.

10 So those people, even though they knew that this
11 water was being sapped from a lower area, but brought around
12 to the higher area after it was cycled through the mining
13 operations, it did help the valley, and I think this is a
14 real important consideration and should be entertained as a
15 part of the possible way that the water could be recharged
16 and brought back into the source that it originally came from.

17 MR. MORROS: Mr. Burnham, what is your feeling
18 about the designation of Kobeh Valley?

19 MR. ROBERT O. BURNHAM: As it has been expressed
20 here, Mr. Morros, I think that as Walt pointed out, if there
21 is a definite indication and your office has determined that
22 there is, a definite flow from the Kobeh Valley area into
23 Diamond Valley, then you as the authority where there is an
24 inter-basin connection, we had best determine that if there
25 is a depleting from Kobeh Valley of the input into Diamond
26 Valley, then a real important measurement has got to be

1 determined, and insofar as the prior water rights are
2 concerned, they need to be protected, and it has to be that
3 under no circumstances will the people over here from Diamond
4 Valley be jeopardized by a sapping of the water supply of
5 Diamond Valley by taking it out of Kobeh Valley, to the
6 extent that Kobeh Valley does flow into Diamond Valley.

7 MR. MORROS: Well, do I conclude from your state-
8 ment that you are in favor of designating the Kobeh Valley?

9 MR. ROBERT O. BURNHAM: Yes, sir.

10 MR. MORROS: Okay. Thank you.

11 Anybody else that wishes to testify at this time?

12 (There was no response.)

13 MR. MORROS: Okay, Mr. Barrett. Do you want a few
14 minutes or exhibits you want to set up, or anything else?
15 We'll take your applications in Kobeh Valley now.

16 MR. BARRETT: Which ones are we taking?

17 MR. MORROS: For the record, those applications are
18 applications 44430, 44431 and 44436. A lot of 4's.

19 I'll remind you, you are still under oath. If you
20 would like a few minutes, or if you are prepared to go ahead,
21 that's fine.

22 MR. BARRETT: I think we are prepared, Mr. Morros.

23 I will be reading a prepared statement which I would
24 like to enter into the record, Mr. Morros.

25 MR. MORROS: Fine. We'll have it marked as Exxon
26 Exhibit No. 1.

1 (Statement entitled "Evidence Relating to Applica-
2 tions to Appropriate 44428, 44429, 44430, 44431, 44432, 44433,
3 44434, 44435 and 44436" was then received and marked Exxon
4 Exhibit No. 1.)

5 MR. MORROS: It will be received into the record.

6 TESTIMONY OF

7 KENNETH E. BARRETT,

8 who, coming forward to testify, having
9 been duly sworn, testifies further as
10 follows:

11 MR. KENNETH E. BARRETT: I will apologize ahead of
12 time. Some of this may be repetitious to the opening state-
13 ment that I made earlier, but I think it is important that it
14 be repeated.

15 In September, 1981, Exxon Corporation made applica-
16 tion to appropriate underground water in Eureka County. The
17 applications were made in support of potential development of
18 a major molybdenum deposit near Mt. Hope. Exxon made applica-
19 tions for 12 cfs (8700 acre feet per year) in each of the
20 three hydrographic areas, Diamond, Pine/Garden, and Kobeh, to
21 establish a time-right-of-priority. When these applications
22 were made, we explained to the State Engineer that Exxon's
23 intent was to obtain approved permits for 12 cfs (8700 acre
24 feet per year) and then all other applications would be
25 dropped. That is still Exxon's intent. There were no formal
26 protests to the Kobeh Valley applications within the allowed

1 protest period following the publication of notice, although
2 protests were received in Diamond and Pine/Garden Valleys.

3 Following filing the applications, a regional
4 hydrology study led Exxon to conclude that the area of signifi-
5 cant promise for water availability was in Kobeh Valley.
6 Since that time Exxon's water exploration and testing program
7 has been concentrated in Kobeh Valley.

8 Our plan today is to present evidence supporting
9 applications 44431 and 44436 for 6 cfs each (total of 8700
10 acre feet/year) in Kobeh Valley and for application 44430 for
11 0.1 cfs (72 acre feet/year) also in Kobeh Valley. It is our
12 plan to not present evidence for the applications in Diamond
13 or Pine/Garden Valleys, since as stated earlier, we would
14 plan to drop those applications if the Kobeh applications are
15 approved.

16 The 12 cfs (8700 acre feet per year) use applied for
17 in Exxon's applications is that amount of water required as
18 make up or fresh water, to support a mining/processing opera-
19 tion of the size envisioned at Mt. Hope. An estimated 60
20 percent of the total water required in the Mining/Processing
21 operation will be satisfied by reuse or recycle of water from
22 the tailings basin. It is Exxon's plan to use state-of-the-
23 art technology to maximize conservation of this important
24 resource by reusing as much water as possible, thus minimizing
25 consumption of new water.

26 I would also like to add that I feel that it is in

1 the best interests of the state and of this county that these
2 applications be approved in support of the mining operation
3 that will eventually take place at Mt. Hope. That particular
4 operation would bring a significant influx of people into the
5 area, representing a change in the tax base, a positive
6 change to the tax base, and would require, as was indicated
7 in some earlier meetings, relative to our environmental impact
8 statement, a maximum of some 1400 construction workers,
9 peaking at 1400 over a two or three year period, and would
10 represent something on the order of 500 to 550 permanent jobs
11 in the area for at least a 30 year life, that projected life
12 being the life of the mining operation.

13 At this time I would like to have Charles Downs,
14 who is the Staff Hydrologist for Exxon, to present evidence
15 also in support of these Kobeh applications.

16 MR. MORROS: Okay, Mr. Barrett. Thank you.

17 Mr. Downs?

18 Want to raise your right hand and be sworn and
19 state your name for the Reporter?

20 (Charles E. Downs was thereupon duly sworn by Mr.
21 Brownfield.)

22 TESTIMONY OF

23 CHARLES E. DOWNS,

24 who, coming forward to testify, having
25 been duly sworn, testifies as follows:

26 MR. MORROS: Before you get started, Mr. Downs, --

1 I'm sorry, go ahead.

2 MR. CHARLES E. DOWNS: My name is Charles Downs,
3 D-o-w-n-s. I will have a typed copy of my testimony to give
4 you.

5 MR. MORROS: I would like to acknowledge the
6 presence of Mr. James Muth of our statewide Well Drillers'
7 Advisory Board. Mr. Muth is an active well driller out of
8 the Elko area.

9 Okay, Mr. Downs?

10 MR. CHARLES E. DOWNS: Thank you, Mr. Morros.

11 I have a prepared testimony which I will give to
12 the Reporter at the completion of my statement.

13 MR. MORROS: Perhaps we can have it marked as
14 Exxon's Exhibit next in order, which I believe is No. 2, and
15 will be received into the record.

16 (The testimony of Mr. Charles Downs was then
17 received, being "Exxon Mineral Company's Kobreh Water Rights
18 Applications," and marked Exxon Exhibit No. 2.)

19 MR. CHARLES E. DOWNS: At the beginning of the
20 hearing, you entered several documents into evidence. I
21 would like to add a few additional documents, if I may, sir.
22 The first is entitled "Water for Nevada" --

23 MR. ROBERT O. BURNHAM: Could you talk up, please,
24 so we can all hear?

25 MR. CHARLES E. DOWNS: Oh, yes, sir. Excuse me.

26 MR. MORROS: Yes, Mr. Burnham. I know you have a

1 problem. Do you want to come up here and take one of these
2 chairs and get a little closer?

3 MR. ROBERT O. BURNHAM: I didn't think the people
4 in the back here could hear.

5 MR. CHARLES E. DOWNS: The first additional item I
6 would like to enter is entitled "Water for Nevada, Nevada's
7 Water Resources," Report No. 3, prepared by the Nevada State
8 Engineer's Office, Department of Conservation and Natural
9 Resources, Carson City, Nevada, dated October, 1971.

10 MR. MORROS: All right. We'll have that marked as
11 exhibit next in order, which is No. 3.

12 (Document, "Water for Nevada, Nevada's Water
13 Resources" was then received and marked for the record as
14 Exxon Exhibit No. 3.)

15 MR. MORROS: I might point out, Mr. Downs, the
16 State Engineer has taken administrative notice of all of the
17 records in the office of the State Engineer as they might
18 relate to the issue before this hearing today.

19 MR. CHARLES E. DOWNS: Thank you, sir.

20 The second report I would ask be entered is
21 entitled "Ground Water Resources, Reconnaissance Report No. 6,
22 Ground Water Appraisal of Diamond Valley, Eureka and Elko
23 Counties, Nevada, by Thomas E. Eakin," prepared cooperatively
24 by the Nevada Department of Conservation and Natural Resources
25 and the U. S. Geological Survey, February, 1962.

26 MR. MORROS: All right. That will be marked as

1 Exxon next exhibit in order, which I believe is No. 4, and
2 received into the record.

3 (Document, Ground Water Resources, Reconnaissance
4 Report No. 6" was then received and marked Exxon Exhibit No.
5 4.)

6 MR. CHARLES E. DOWNS: In addition, at the opening
7 of this hearing, Mr. Morros, you entered Item No. 3, which was
8 the Groundwater Resources, Reconnaissance Series Report No. 30,
9 Groundwater Appraisal of Monitor, Antelope and Kobeh Valleys,
10 Nevada, and I would be referring to that document.

11 In addition is your entry No. 4, which you entered,
12 Hydrologic Response to Irrigation Pumping in Diamond Valley,
13 Eureka and Elko Counties, Water Resources Bulletin No. 35.
14 I will also make reference to your entry there.

15 These reports conclude that Kobeh Valley is
16 essentially a closed alluvial filled basin; that inter-basin
17 flow from Kobeh Valley to Diamond Valley is minor or negli-
18 gible; Kobeh Valley is essentially in hydrologic equilibrium
19 with groundwater recharge balanced by evapo-transpiration
20 discharge.

21 In addressing the hydrographic basin characteris-
22 tics, the Kobeh Valley Basin designated as Hydrographic Area
23 No. 139 by the State Engineer of Nevada. Groundwater outflow
24 from the basin is negligible or minor as concluded by both
25 the USGS and the State of Nevada in references 1 to 4 cited
26 earlier. Surface water outflow occurs intermittently and only

1 in response to intense rainfall events in Kobeh Valley which
2 generate streamflow through Devils's Gate, which connects
3 Kobeh Valley to Diamond Valley at the surface.

4 In addressing the boundary conditions affecting
5 hydrologic flow processes, the Kobeh Valley is separated
6 from the Diamond Valley to the east by the Sulphur Springs
7 Range. The Sulphur Springs Range is a barrier to groundwater
8 flow between the basins as is shown on the geologic map of
9 Eureka County, Nevada. The title of that report is "Geology
10 and Mineral Resources of Eureka County, Nevada; Bulletin 64,
11 by R. J. Roberts, K. M. Montgomery and R. E. Lehner, prepared
12 cooperatively by the U. S. Geological Survey and the Mackay
13 School of Mines, University of Nevada. I would respectfully
14 ask that this item is perhaps covered in your office reports?

15 MR. MORROS: We will take administrative notice of
16 the report.

17 MR. CHARLES E. DOWNS: Thank you.

18 The Sulphur Springs Range is composed of tertiary
19 volcanics and intrusives, such as Whistler Mountain, and
20 older Western Assemblage rocks, comprised of shale, chert,
21 quartzite and andesitic volcanics, all of which are relative-
22 ly impermeable to groundwater flow.

23 The lack of hydraulic communication between the Kobeh
24 and Diamond basins. While there exist heavy groundwater
25 withdrawals for agricultural activities in Diamond Valley,
26 the effects of this groundwater pumping have not influenced

1 the water levels in Kobeh Valley. In essence, the Kobeh
2 Valley bowl is full of groundwater and is in hydrologic bal-
3 ance between recharge and evapo-transpiration discharge.
4 Conversely, Diamond Valley groundwater levels are steeply
5 dipping toward the center of the basin in response to pumping
6 discharge. This distinction between hydrologic conditions in
7 the two basins is schematically illustrated in Figure 1.

8 May I use the blackboard?

9 MR. MORROS: Certainly.

10 MR. CHARLES E. DOWNS: If I may?

11 MR. MORROS: Just go off the record here for a
12 minute.

13 Everybody see that all right?

14 MR. CHARLES E. DOWNS: Ladies and gentlemen, please
15 bear with me.

16 MR. MORROS: Just a moment. Let's get back on the
17 record first.

18 Okay. We'll be back on the record.

19 MR. CHARLES E. DOWNS: I'm not an artist, so please
20 bear with me.

21 The schematic diagram, the general illustration of
22 the general relationship between the basins, and I'll try to
23 draw it large enough so you can see it, this is the Figure 1
24 I refer to in my written statement, written presentation.

25 MR. MORROS: I don't know that everybody can see
26 this or not, but this is the Figure 1 in the report.

1 While Mr. Downs is drawing that on the blackboard,
2 we have passed around a tablet, and I would like everybody
3 here to just enter their name and address on that. We would
4 appreciate it.

5 MR. CHARLES E. DOWNS: What I have diagrammed here
6 in the schematic illustration is the alluvial fill, Kobeh
7 Basin, and what you see is approximately 17,000 acre feet per
8 year of recharge to the basin from precipitation and ground-
9 water inflow from the south and southwest, and approximately
10 15,000 acre feet per year of evapo-transpiration losses,
11 which are losses to beneficial use, and these losses in fact
12 are non-beneficial uses of this resource. Our preliminary
13 survey in the area of water levels indicate there is a
14 general gradient in Kobeh Valley and the grade of the ground-
15 water basin is approximately five to ten feet per mile and
16 across Devil's Gate there is a gradient of approximately 30
17 to 40 feet from the Gate area.

18 Speaking to the water budget, given the total amount
19 of recharge to and discharge from Kobeh Valley, an estimate
20 can be made of perennial yield for the system. Perennial
21 yield, as defined by Rush and Everett in Exhibit No. 3, page
22 26, is the maximum amount of water that can be withdrawn from
23 a groundwater reservoir and used economically each year for
24 an indefinite period of time. The perennial yield for Kobeh
25 Valley is taken as the average of total recharge and discharge,
26 or approximately 16,000 acre feet per year, which is referen-
ced in the State of Nevada's Report No. 3, Table 1, page 22,

1 and also in Reference 2, the Eakin report.

2 The area of alluvial fill in Kobeh Valley is about
3 270,000 acres. Assuming a specific yield value of about 10
4 percent, 27,000 acre feet of groundwater are in storage per
5 foot of the alluvial aquifer. This is from Reference 3,
6 which was the Rush and Everett report, which was entered on
7 page 29. Exxon proposes to withdraw approximately 8700 acre
8 feet per year from the aquifer for mining and milling
9 processes. This would result in a total withdrawal of
10 174,000 acre feet over a 20-year period and in an average
11 lowering of the water table by about 6.5 feet over the entire
12 Kobeh Valley basin. These figures involve only groundwater in
13 near surface storage and do not consider that recharge to the
14 basin will continue to occur and that non-beneficial evapo-
15 transpiration losses will be reduced.

16 The State of Nevada has given appropriations for
17 about 13,000 acre feet per year of Kobeh Valley groundwater
18 to date. Exxon's request to appropriate 8700 acre feet per
19 year for mining and milling purposes would appear to overdraft
20 the perennial yield of the basin. However, the safe yield of
21 Kobeh Valley will not be adversely impacted, in view of four
22 items: No. 1: the large volume of groundwater in storage;
23 No. 2: the minimization of pumping impacts offset by recharge
24 and the salvage of non-beneficial evapo-transpiration losses;
25 No. 3: the under utilization of currently appropriated water
26 rights; and No. 4: the temporary nature of Exxon's use.

1 In summary, Exxon's water supply would come from a
2 combination of natural recharge, transitional storage reserve
3 as groundwater levels are lowered to salvage non-beneficial
4 evapo-transpiration losses, and from the salvaged groundwater.

5 In conclusion, we feel that there is adequate
6 groundwater in Kobeh Valley to satisfy Exxon's mining and
7 milling water requirements without adversely impacting other
8 users. We feel that Kobeh Valley is essentially a closed
9 alluvial basin in hydrologic equilibrium.

10 Thirdly, that interbasin groundwater flow from
11 Kobeh Valley to Diamond Valley is minimal or negligible.

12 Fourthly, the Nevada State Engineer should continue
13 to administer water rights in Kobeh Valley separate and apart
14 from Diamond Valley.

15 And fifthly, the State Engineer should grant
16 Exxon's water appropriation applications in Kobeh Valley.

17 That is the end of the prepared statement.

18 MR. MORROS: Okay, Mr. Downs. I just have a couple
19 of questions. I want to refer you to State's Exhibit 3,
20 which is the Groundwater Resources Reconnaissance Report 30.
21 Page 1 of that Report and page 16 of that Report. Page 1 of
22 the Report, and this is a report prepared by Eugene Rush and
23 Dean Everett, in the summary there is a statement made that
24 "Underflow to Diamond Valley through Devil's Gate is considered
25 very small. Leakage of groundwater through bedrock from the
26 report has not been identified."

Ruling
Page 20

presented as to most of its protest claims, therefore, those claims are subject to being overruled.

IV.

The State Engineer concludes that in light of State Engineer's Interim Ruling No. 4662 protestant Nevada Agency for Nuclear Projects focused its entire case on its claims that the appropriation threatens to prove detrimental to the public interest and did not provide any evidence or testimony to support its protest claim that the proposed use conflicts with existing water rights, therefore, that claim is subject to being overruled.

V.

Nevada Revised Statute § 533.370 provides that the State Engineer shall deny a permit where the proposed use threatens to prove detrimental to the public interest. The protestant alleges that the proposed use threatens to prove detrimental to the public interest because to the extent it facilitates the storage of high-level radioactive waste it is prohibited by NRS § 459.910.⁴¹

To date, the only decision of the Nevada Supreme Court that addresses the provision of NRS § 533.370 as to the meaning of "threatens to prove detrimental to the public interest" is a case commonly known as the "Honey Lake Case."⁴² In the "Honey Lake Case" one of the appellant's contentions was that the applicant's proposal was not economically feasible or desirable in light of certain other factors. After the hearings, the State Engineer issued a ruling and on appeal the district court concluded that the State Engineer did not specifically determine whether the applications were detrimental to the public interest and remanded the matter to the State Engineer for further consideration of that criterion. Upon remand, the State Engineer identified 13 policy

⁴¹ NRS § 459.910(1) provides that it is unlawful for any person or governmental entity to store high-level radioactive waste in Nevada.

⁴² Pyramid Lake Paiute Tribe of Indians v. Washoe County, 112 Nev. 743, 918 P.2d 697 (1996).

Ruling
Page 21

considerations contained in Nevada water statutes to help define the public interest.

On further appeal, the Nevada Supreme Court specifically addressed whether the State Engineer had properly defined the meaning of the "public interest" and found that he had done so.⁴³ The State Engineer rejects any idea or perception that "public interest" means how the public views a project in a public opinion poll.

It became clear to the State Engineer during the administrative hearing process that this facility is not like any other industrial complex for which an appropriation of water is requested. This facility, if approved, is for the operation of a complex facility, which will ultimately result in the storage of high-level nuclear waste at Yucca Mountain, but other processes are involved before the waste is actually stored. There are processes for shipment of nuclear materials into the facility, for the transfer of those materials from its transporters to begin the "storage" process, for the transfer of nuclear materials from various containers to storage containers, and these operations take place prior to emplacement of casks underground. Most of these processes will require some use of water for decontamination or transfer of materials.

Going back to the "Honey Lake Case", while the Nevada Supreme Court held that in that case the State Engineer had properly defined the meaning of the public interest, it also held that the "Legislature has the power to decide what the policy of law shall be, and if it has intimated its will, however indirectly, that will should be recognized and obeyed."⁴⁴ The State Engineer places great deference in pronouncements made by the Nevada Legislature. The legislature is presumed to be the voice of the

⁴³ Pyramid Lake Paiute Tribe of Indians v. Washoe County, 112 Nev. 743, 918 P.2d 697 (1996).

⁴⁴ Pyramid Lake Paiute Tribe of Indians v. Washoe County, 112 Nev. 743, 918 P.2d 697 (1996).

Ruling
Page 22

people through the democratic process of government, and if it has spoken to a certain area relative to a water right application indicating the public interest, the State Engineer will and must take that pronouncement into consideration.

In this case, the Nevada Legislature has determined what the public interest is through its determination of the policy of law, and it has intimated that will through the enactment of NRS § 459.910, which provides that it is unlawful for any person or governmental entity to store high-level radioactive waste in Nevada. Therefore, the Nevada Legislature has already determined that the use applied for (the construction and operation of a high-level nuclear waste repository) threatens to prove detrimental to the public interest. The State Engineer concludes he is not required by statute to conduct the political and economic decision-making as to whether a repository should be located in Nevada and he does not have the duty or authority to independently review the decision of the Nevada Legislature that high-level nuclear waste is not to be stored in Nevada. Therefore, the State Engineer further concludes that since NRS § 459.910 prohibits the operation of a high-level nuclear waste repository to be sited in Nevada, the use of water in conjunction with said facility threatens to prove detrimental to the public interest.

VI.

The use of the area for the storage of high-level nuclear waste was previously challenged by the State of Nevada as to the Department of Energy's activities related to site characterization at Yucca Mountain. In 1990, the Ninth Circuit Court of Appeals decided the case of State of Nevada v. Watkins⁴⁵ pursuant to which the State of Nevada challenged the Secretary of Energy's decision under the Nuclear Waste Policy Act ("NWPA") to continue investigation of Yucca Mountain, Nevada, as a potential site for

⁴⁵ 914 F.2d 1545 (9th Cir. 1990).

Ruling
Page 23

the location of a national high-level radioactive waste repository. Nevada asserted that pursuant to NRS § 459.910 it had affected a valid legislative veto of the selection of Yucca Mountain. The Secretary of Energy maintained that the NWPA preempts NRS § 459.910 to the extent it is inconsistent with the NWPA.

The focus of the Watkins case was site characterization, and the Court noted that neither party had contended that Congress had expressly preempted the field of nuclear waste disposal. In Watkins, the Ninth Circuit Court of Appeals held that under the Supreme Court's preemption analysis, when Congress does not define explicitly the extent to which its enactments preempt state law that:

[S]tate law can be pre-empted in either of two general ways. If Congress evidences an intent to occupy a given field, any state law falling within that field is pre-empted.... If Congress has not entirely displaced state regulation over the matter in question, state law is still pre-empted to the extent it actually conflicts with federal law, that is, when it is impossible to comply with both state and federal law...or where the state law stands as an obstacle to the accomplishment of the full purposes and objectives of Congress.⁴⁶

The Ninth Circuit Court of Appeals held that Nevada's attempted legislative veto of the Secretary's site characterization activities was preempted by the NWPA, but the Court did not determine whether Nevada's legislative veto of the storage of high-level radioactive waste was preempted. Therefore, whether Nevada's legislative veto extends past site characterization to nuclear waste disposal has not been ruled upon by a court of law. While neither the Secretary of Energy nor the President of the United States has actually recommended the site to Congress, it was very clear from the administrative proceeding that water was being applied for use at the Yucca Mountain site in the operation of a high-level nuclear waste repository. The State Engineer

⁴⁶ Id. at 1560-1561.

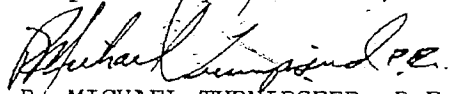
Ruling
Page 24

concludes that Nevada's legislative veto of the use of water for the purposes applied for under these applications is not preempted by the NWPAA.

RULING

The State Engineer finds the protests of Citizens Alert and the Nevada Agency for Nuclear Projects to Applications 63263, 63264, 63265, 63266 and 63267 are hereby upheld on the grounds that the requested use threatens to prove detrimental to the public interest. No ruling is made as to the merits of the other protest claims.

Respectfully submitted,


R. MICHAEL TURNIPSEED, P.E.
State Engineer

RMT/SJT/cl

Dated this 2nd day of
February, 2000.

002986

JA4398

DOC# 0214360
12/15/2009 09:13AM

Official Record

Recording Requested By
FIRST AMERICAN TITLE RENO
Eureka County - NV
Mike Rebaleati - Recorder
Fee: \$15.00 Page: 001 of 002
RPTT: \$674.70 Recorded By FS
Book- 0496 Page- 0215



0214360

APN#: 007-140-01

Recording Requested by:

First American Title Insurance Company
5310 Kietzke Lane, Suite 100
Reno, NV 89511-2043

When Recorded Mail to:

Michael K. Branstetter
Hull & Branstetter Chartered
P.O. Box 709
Wallace, ID 83873

Mail Tax Statement to:

General Moly, Inc.
1726 Cole Boulevard, Suite 115
Lakewood, CO 80401

AFFIRMATION

Pursuant to NRS 239B.030, the undersigned hereby affirms that
this document submitted for recording DOES NOT contain a Social Security number.

Signature: [Signature]

Print Name: H. D. BERNARD

2388110 W08

GRANT, BARGAIN AND SALE DEED

THIS GRANT, BARGAIN AND SALE DEED is made and entered into this 15TH
day of December, 2009, between Barbara J. Heard, a widow ("Grantor") and General Moly,
Inc., a Delaware corporation ("Grantee").

WITNESSETH:

That the said Grantor, for and in consideration of the sum of One and No/100 Dollars
(\$1.00), lawful money of the United States of America, and other good and valuable
consideration, the receipt and sufficiency whereof is hereby acknowledged, does hereby grant,
bargain, sell and convey unto Grantee and to its heirs, successors and assigns forever, all of
the following real property, located in Eureka County, Nevada, to-wit:

Lots 3, 4, 5 and 6, Section 6, Township 22 North, Range 54
East, M.D. B&M, Eureka County, Nevada.

TOGETHER WITH, all and singular, the tenements, hereditaments and appurtenances thereunto belonging or in anywise appertaining, including water rights, irrigation system, wells, pumps, motors, together with all and any other appurtenances necessary to operate the above described real property and the reversion and reversions, remainder and remainders, rents, issues and profits thereof.

IN WITNESS WHEREOF, the said Grantor has hereunto executed this Grant, Bargain and Sale Deed the day and year first above written.

GRANTOR

By: Barbara J. Heard

Print Name: Barbara J. Heard

STATE OF NEVADA)
COUNTY OF Clark) ss.

This instrument was acknowledged before me on 12/19, 2009 by **BARBARA J. HEARD**.



Kathleen Samora
Print Name: Kathleen Samora
Notary Public, State of Nevada
Appt#: 94-2068-1, Clark County
Commission expires: 9/29/01



0214360

Book: 496 12/15/2009
Page: 216 Page: 2 of 2

**STATE OF NEVADA
DECLARATION OF VALUE**

1. Assessor Parcel Number(s)

a) 007-140-01
b) _____
c) _____
d) _____

2. Type of Property

a) ☒ Vacant Land b) ☐ Single Fam. Res.
c) ☐ Condo/Twnhse d) ☐ 2-4 Plex
e) ☐ Apt. Bldg. f) ☐ Comm'l/Ind'l
g) ☐ Agricultural h) ☐ Mobile Home
i) ☐ Other _____

FOR RECORDERS OPTIONAL USE

Book _____ Page: _____
Date of Recording: _____
Notes: _____

3. a) Total Value/Sales Price of Property: \$173,000.00
b) Deed in Lieu of Foreclosure Only (value of (\$))
c) Transfer Tax Value: \$173,000.00
d) Real Property Transfer Tax Due \$ 674.70

4. If Exemption Claimed:

a. Transfer Tax Exemption, per 375.090, Section: _____
b. Explain reason for exemption: _____

5. Partial Interest: Percentage being transferred: _____ %

The undersigned declares and acknowledges, under penalty of perjury, pursuant to NRS 375.060 and NRS 375.110, that the information provided is correct to the best of their information and belief, and can be supported by documentation if called upon to substantiate the information provided herein. Furthermore, the parties agree that disallowance of any claimed exemption, or other determination of additional tax due, may result in a penalty of 10% of the tax due plus interest at 1% per month. Pursuant to NRS 375.030, the Buyer and Seller shall be jointly and severally liable for any additional amount owed.

Signature: Barbara J. Heard Capacity: SELLER
Signature: _____ Capacity: _____

SELLER (GRANTOR) INFORMATION
(REQUIRED)

Print Name: Barbara J. Heard
Address: 8035 W. Craig Road
City: Las Vegas
State: NV Zip: 89129

BUYER (GRANTEE) INFORMATION
(REQUIRED)

Print Name: General Moly Inc.
Address: 1726 Cole Boulevard, Suite
City: Lakewood
State: CO Zip: 80401

COMPANY/PERSON REQUESTING RECORDING (required if not seller or buyer)

First American Title Insurance
Print Name: Company File Number: 121-2388110 WDB/WDB
Address: 5310 Kietzke Lane, Suite 100
City: Reno State: NV Zip: 89511-2043

(AS A PUBLIC RECORD THIS FORM MAY BE RECORDED/MICROFILMED)



DV-0214360

Book: 496 12/15/2009
Page: 21 Page: 1 of 2

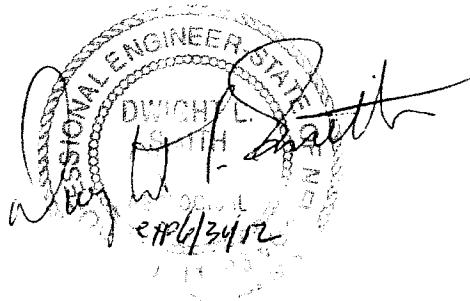
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JA4401

Modeling of Pumping from Permits Granted Under Ruling 5966, Kobeh Valley, Eureka County, Nevada – Mt Hope Project

Prepared by:

Dwight L. Smith, PE, PG
Principal Hydrogeologist
Interflow Hydrology, Inc



November 18, 2010

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Modeling of Pumping from Permits Granted Under Ruling 5966, Kobeh Valley, Eureka County, Nevada – Mt Hope Project

State Engineer Ruling 5966 granted to Kobeh Valley Ranch, LLC numerous change applications and new appropriations for groundwater in Kobeh Valley. These water rights are for mining and milling water use associated with the Mt Hope Project being developed by Eureka Moly, LLC (EMLLC). The total combined duty of the applications granted by Ruling 5966 in Kobeh Valley is 11,300 af/yr.

Ruling 5966 has been remanded to the State Engineer. Numeric flow model modifications and refinements have been made since the October 2008 water right hearing, in response to both EIS peer review and additional hydrogeologic data collected by EMLLC in the proposed Kobeh Valley well field area and at Mt Hope.

Using the current version of the regional flow model (July 2010), Interflow Hydrology ran a pumping simulation based on the proposed points of diversion for applications granted under Ruling 5966. This simulation demonstrates that these points of diversion produce reasonable model results.

Table 1 summarizes the water right change applications and new appropriations granted under Ruling 5966. Table 2 summarizes a pumping distribution from nineteen simulated points of diversion, together generating a combined total of 11,300 af/yr. During the first 32 years of mine operations, approximately 100 to 740 af/yr will be produced by pit dewatering and will augment the Kobeh Valley well field supply. During this time period, the combined total of mine dewatering and Kobeh Valley well field production equals 11,300 af/yr. For the remaining years to Mine Year 44 (last year of proposed mining) the entire 11,300 af/yr of mining water demand is supplied from the Kobeh Valley well field.

Figure 1 shows the locations the proposed points of diversion of the applications granted under Ruling 5966. For comparison, Figure 1 also shows the proposed points of diversion presented in the July 2010 model version. The July 2010 well distribution correlates to pending water right change applications 79911 to 79942 filed on June 15, 2010.

Figure 2 shows the simulated water table drawdown at the end of Mine Year 44 for the proposed points of diversion and is contrasted with the 2010 proposed pumping distribution (Figure 4.4-13 in the July 2010 hydrogeology and modeling report). These figures are contrasted with Figure 13.2 in the June 2008 hydrogeology and regional modeling report (Exhibit 116 in the October 2008 hearing).

Table 3 summarizes the water balance impacts resulting from simulated pumping at the 2008 proposed points of diversion, and compares the water budget values with those

produced in the July 2010 modeling report and representing pending applications 79911 to 79942.

The water right applications subject to Ruling 5966 did not benefit from data generated in several phases of exploration drilling and aquifer testing conducted subsequent to the filings. The current proposed points of diversion (June 2010) reflect a shift of pumping distribution to the south and west with groundwater derived predominantly (90%) from the alluvial aquifer and to a lesser degree (10%) from carbonate rock aquifers. The pumping scenario based on the 2008 proposed points of diversion has approximately 43% of the pumping from the carbonate rocks at the southern base of the Roberts Mountains (well sites 206 and 207). Minor pumping (4%) is distributed at well sites located in clastic sedimentary rocks (Vinini Formation) and volcanic rocks (sites 203, 204, 208, and 209), which have been determined as part of exploration drilling to be in hydraulically tight rocks that are not capable of yielding large quantities of water. The remaining pumping (53%) is derived from the alluvial aquifer at the points of diversion for new appropriations (72695-72698, 73545-73552, and 74587) labeled as Well-1 to Well-13 (Figure 1). Within this group of simulated alluvial wells, the largest pumping quantities are simulated at Well-10 and Well-12.

The 2008 pumping distribution places a greater pumping stress on the carbonate rock aquifers and shifts the well field pumping distribution eastward toward the Whistler Mountain range and also northward to the base of the Roberts Mountains, as contrasted with the 2010 proposed points of diversion. Resulting drawdown from the 2008 pumping distribution is predicted to be more extensive to the north of the well field in the Roberts Mountains, and less extensive to the southwest in central Kobeh Valley. Capture of interbasin groundwater flow from Kobeh Valley to Diamond Valley is greater in the 2008 simulation than the July 2010 modeled pumping distribution, with 185 af/yr greater groundwater outflow capture at the end of proposed mining (Table 3). This is due to greater levels of drawdown near Devils Gate and adjacent to the Whistler Mountain range, through which interbasin flows are simulated to occur. This degree of simulated interbasin flow capture is still mild, at approximately only 7% of the total simulated interbasin flow.

At the end of mining (Mine Year 44), capture of ET discharge of groundwater in Kobeh Valley is predicted to be approximately 400 af/yr less under the 2008 points of diversion simulation versus the July 2010 modeled pumping distribution (Table 3).

The proposed points of diversion defined by the June 2010 pending applications 79911 to 79942 are a more desirable pumping distribution than those originally filed for the Mt Hope Project in 2008 and prior, for several reasons.

1. The June 2010 proposed points of diversion take into account currently available exploration drilling and aquifer testing data in the proposed well field area, including several phases of drilling and aquifer testing conducted after the October 2008 water rights hearing.
2. The shift of pumping distribution geographically to the south in Kobeh Valley, and into the alluvial aquifer system rather than the carbonate rock aquifers at the

base of the Roberts Mountains, results in less projected drawdown in the Roberts Mountains.

3. The shift of the pumping to the west in Kobreh Valley helps minimize capture of potential interbasin groundwater flow to Diamond Valley.

Table 1 – Summary of Water Rights granted under Ruling 5966

Base Right	EMLLC Well Location (proposed point of diversion)
72695-72698	Wells 1 - 4
73545-73552	Wells 5 - 12
76004	208
76003	204
75997	203
75988	203
75996	204
75999	204
75989	206
76989	206
75995	209
76000	206
76002	208
75992	209
75993	209
75994	209
75998	203
76745	206
76990	206
75990	207
75991	207
74587	Well 13
76746	206
76001	208

Table 2 – Summary of Simulated Pumping Distribution Based on Proposed Points of Diversion of Applications Granted by Ruling 5966

GMI Well Location*	Simulated Annual Diversion (af/yr)	Diversion (ft³/day)	Percent total Diversion
203	280	33,414	2.48
204	20	2,387	0.18
206	4,000	477,339	35.40
207	896.6	106,996	7.93
208	50	5,967	0.44
209	100	11,933	0.88
Well-1 thru Well-9 and Well-11	51.4 each (514.3 total)	6,137 each	0.46 each (4.55 total)
Well-10	2,669.5	318,564	23.62
Well-12	2,669.5	318,564	23.62
Well-13	100	11,933	0.88

* see Figure 1 for well locations; Well-1 to Well-4 correspond to pending applications 72695 to 72698, Well-5 to Well-12 correspond to pending applications 73545 to 73552, and Well-13 corresponds to pending application 74587

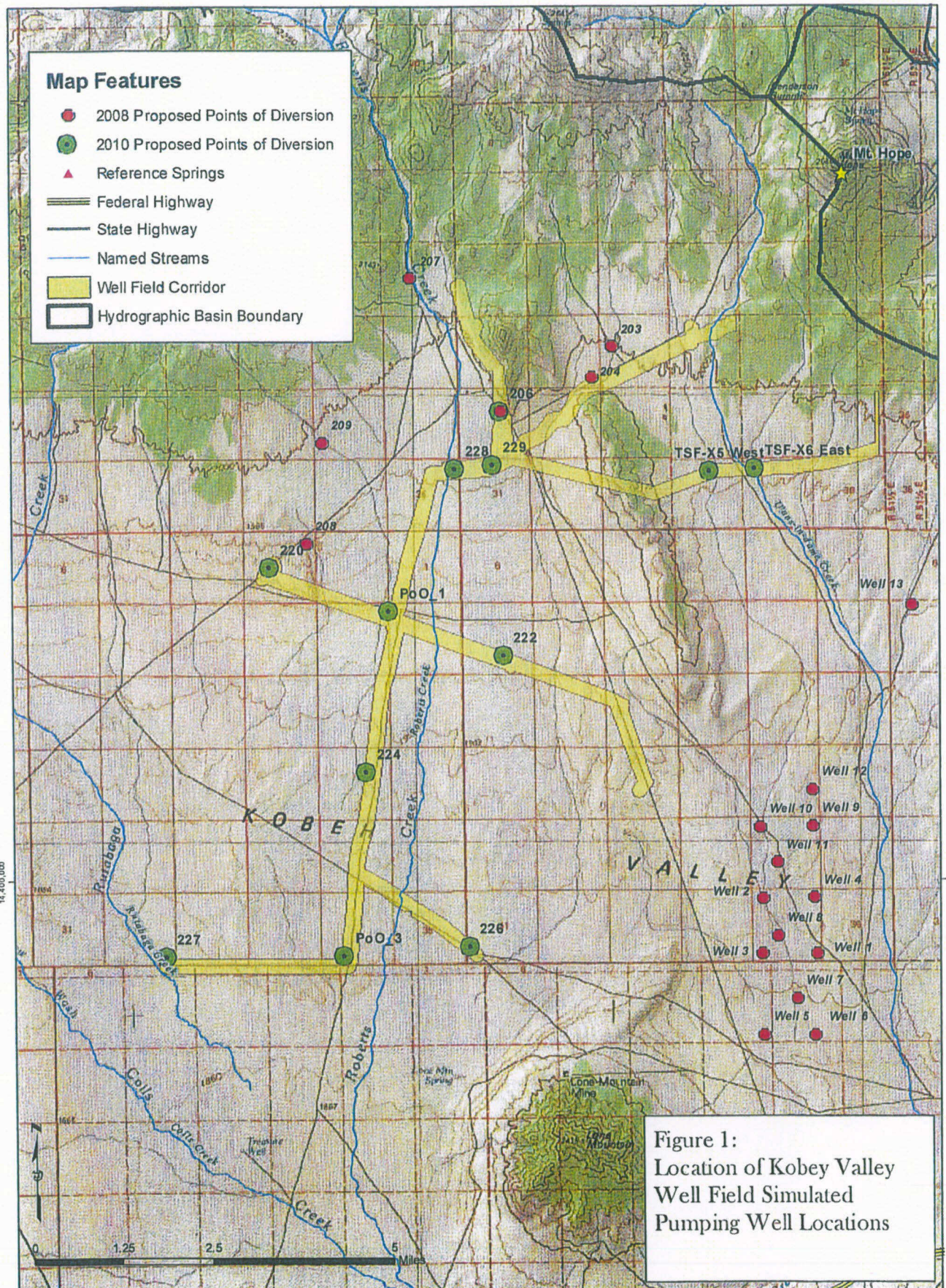
**Table 3 – Summary of Pumping Impacts to Major Water Balance Components
based on the Ruling 5966 Proposed Points of Diversion Pumping Distribution**

(1) Parameter	(2) Simulated Steady-State Flow (Predevelopment Conditions) (af/yr)	(3) Simulated Current Conditions (2009) (af/yr)	(4) Simulated July 2010 EIS Base Case Pumping Scenario at Mine Year 44 (2055) (af/y)	(5) Simulated Ruling 5966 Pumping Scenario at Mine Year 44 (2055) (af/yr)	(6) Difference between Ruling 5966 and July 2010 EIS Pumping Simulations (af/yr)
Kobeh ET	16,150	15,912	11,016	11,402	+386
Kobeh Outflow to S. Diamond	1,583	2,001	2,380	2,195	-185
Kobeh Inflow from N. Monitor	1,368	1,586	1,875	1,874	-1
Kobeh Inflow from Antelope	2,655	2,658	2,709	2,693	-16
South Diamond Valley ET	2,994	345	0	0	0
North Diamond Valley ET	24,578	14,379	9,071	9,069	-2
Antelope Valley ET	1,439	1,439	1,416	1,424	+8
Garden Valley ET	307	300	272	271	-1
Garden Valley Outflow to Diamond	5,724	5,816	5,994	5,997	+3
Garden Valley Outflow to Pine	4,415	4,407	4,341	4,275	-66
Garden Valley Outflow to Kobeh	232	251	350	434	+84
Pine Valley ET	16,824	16,812	16,795	16,793	-2
Pine Valley Outflow to N. Pine	11,324	11,333	11,331	11,331	0
Pine Outflow to Kobeh	272	275	364	563	+199

Notes:

Columns (1) – (4) from Tables 4.4-5 and 4.4-6 in July 2010 *Hydrogeology and Numeric Flow Modeling*,
Mt. Hope Project, Eureka County, Nevada

Column (6) = Column (5) minus Column (4)



IN THE SUPREME COURT OF THE STATE OF NEVADA

EUREKA COUNTY, A POLITICAL
SUBDIVISION OF THE STATE OF
NEVADA; KENNETH F. BENSON,
INDIVIDUALLY; DIAMOND CATTLE
COMPANY, LLC, A NEVADA LIMITED
LIABILITY COMPANY; AND MICHEL
AND MARGARET ANN ETCHEVERRY
FAMILY, LP, A NEVADA REGISTERED
FOREIGN LIMITED PARTNERSHIP,

Case No. 61324

District Court Case Nos.
CV 1108-15; CV 1108-156;
CV 1108-157; CV 1112-164;
CV 1112-165; CV 1202-170

Electronically Filed
Dec 27 2012 10:13 a.m.
Tracie K. Lindeman
Clerk of Supreme Court

Appellants,

vs.

THE STATE OF NEVADA STATE
ENGINEER; THE STATE OF NEVADA
DIVISION OF WATER RESOURCES;
AND KOBEH VALLEY RANCH, LLC, A
NEVADA LIMITED LIABILITY
COMPANY,

Respondents.

JOINT APPENDIX
Volume 23

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**CHRONOLOGICAL APPENDIX TO
APPEAL FROM JUDGMENT**

<u>DOCUMENT</u>	<u>DATE</u>	<u>VOL</u>	<u>JA NO.</u>
Petition for Judicial Review	08/08/2011	1	01-06
Notice of Verified Petition for Writ of Prohibition, Complaint and Petition for Judicial Review	08/10/2011	1	07- 08
Verified Petition for Writ of Prohibition, Complaint and Petition for Judicial Review	08/10/2011	1	09-59
Summons and Proof of Service, Kobeh Valley Ranch, LLC	08/11/2011	1	60-62
Summons and Proof of Service, Jason King	08/11/2011	1	63-65
Affidavit of Service by Certified Mail	08/11/2011	1	66-68
Notice of Petition for Judicial Review	08/11/2011	1	69-117
Summons and Proof of Service, Kobeh Valley Ranch, LLC	08/15/2011	1	118-120
Summons and Proof of Service, Jason King	08/15/2011	1	121-123
Summons and Proof of Service, The State of Nevada	08/17/2011	1	124-128
First Additional Summons and Proof of Service, State Engineer, Division of Water Resources	08/17/2011	1	129-133
Order Allowing Intervention of Kobeh Valley Ranch, LLC, to Intervene as a Respondent	09/14/2011	1	134-135

<u>DOCUMENT</u>	<u>DATE</u>	<u>VOL</u>	<u>JA NO.</u>
Partial Motion to Dismiss, Notice of Intent to Defend	09/14/2011	1	136-140
Order Allowing Intervention of Kobeh Valley Ranch, LLC, as a Party Respondent	09/26/2011	1	141-142
Answer to Verified Petition for Writ of Prohibition, Complaint and Petition for Judicial Review by Kobeh Valley Ranch, LLC	09/28/2011	1	143-149
Answer to Petition for Judicial Review by Kobeh Valley Ranch, LLC	09/29/2011	1	150-154
Answer to Petition for Judicial Review by Kobeh Valley Ranch, LLC	09/29/2011	1	155-160
Order Directing the Consolidation of Action CV1108-156 and Action No. CV1108-157 with Action CV1108-155	10/26/2011	1	161-162
Summary of Record on Appeal	10/27/2011	2-26	163-5026
Request for and Points and Authorities in Support of Issuance of Writ of Prohibition and in Opposition to Motion to Dismiss	11/10/2011	27	5027-5052
Order Setting Briefing Schedule	12/02/2011	27	5053-5055
Reply in Support of Partial Motion to Dismiss and Opposition to Request for Writ of Prohibition	12/15/2011	27	5056-5061

<u>DOCUMENT</u>	<u>DATE</u>	<u>VOL</u>	<u>JA NO.</u>
Kobeh Valley Ranch's Reply to Conley/Morrison's Request for and Points and Authorities in Support of Issuance of Writ of Prohibition and in Opposition to Motion to Dismiss	12/15/2011	27	5062-5083
Kobeh Valley Ranch's Joinder in the State of Nevada and Jason King's Partial Motion to Dismiss	12/15/2011	27	5084-5086
Petition for Judicial Review	12/29/2011	27	5087-5091
Petition for Judicial Review	12/30/2011	27	5092-5097
Summons and Proof of Service, The State of Nevada	01/11/2012	27	5098-5100
First Additional Summons and Proof of Service, State Engineer, Division of Water Resources	01/11/2012	27	5101-5103
First Amended Petition for Judicial Review	01/12/2012	27	5104-5111
Opening Brief of Conley Land & Livestock, LLC and Lloyd Morrison	01/13/2012	27	5112-5133
Petitioners Kenneth F. Benson, Diamond Cattle Company, LLC, and Michel and Margaret Ann Etcheverry Family LP's Opening Brief	01/13/2012	27	5134-5177
Eureka County's Opening Brief	01/13/2012	27	5178-5243
Eureka County's Summary of Record on Appeal - CV1112-0164	01/13/2012	28	5244-5420
Eureka County's Supplemental Summary of Record on Appeal - CV1108-155	01/13/2012	29-30	5421-5701

<u>DOCUMENT</u>	<u>DATE</u>	<u>VOL</u>	<u>JA NO.</u>
Order Granting Extension	01/26/2012	31	5702-5703
Answer to Petition for Judicial Review	01/30/2012	31	5704-5710
Answer to First Amended Petition for Judicial Review	01/30/2012	31	5711-5717
Supplemental Petition for Judicial Review	01/31/2012	31	5718-5720
Petition for Judicial Review	02/01/2012	31	5721-5727
Summary of Record on Appeal	02/03/2012	31	5728-5733
Record on Appeal, Vol. I, Bates Stamped Pages 1-216	02/03/2012	31	5734-5950
Record on Appeal, Vol. II, Bates Stamped Pages 217-421	02/03/2012	32	5951-6156
Record on Appeal, Vol. III, Bates Stamped Pages 422-661	02/03/2012	33	6157-6397
Answer to Petition to Judicial Review	02/23/2012	34	6398-6403
Answering Brief	02/24/2012	34	6404-6447
Respondent Kobeh Valley Ranch, LLC's Answering Brief	02/24/2012	34	6448-6518
Reply Brief of Conley Land & Livestock, LLC and Lloyd Morrison	03/28/2012	34	6519-6541
Petitioners Kenneth F. Benson, Diamond Cattle Company, LLC, and Michel and Margaret Ann Etcheverry Family LP's Reply Brief	03/28/2012	34	6542-6565
Eureka County's Reply Brief	03/28/2012	34	6566-6638

<u>DOCUMENT</u>	<u>DATE</u>	<u>VOL</u>	<u>JA NO.</u>
Transcript for Petition for Judicial Review	04/03/2012	35	6639-6779
Corrected Answering Brief	04/05/2012	35	6780-6822
Findings of Fact, Conclusions of Law, and Order Denying Petitions for Judicial Review	06/13/2012	36	6823-6881
Notice of Entry of Findings of Fact, Conclusions of Law, and Order Denying Petitions for Judicial Review	06/18/2012	36	6882-6944
Notice of Appeal	07/10/2012	36	6945-6949
Petitioners Benson, Diamond Cattle Co., and Etcheverry Family LP's Notice of Appeal	07/12/2012	36	6950-6951
Excerpts from Transcript of Proceedings	10/13/2008	36	6952-6964

**ALPHABETICAL APPENDIX TO
APPEAL FROM JUDGMENT**

<u>DOCUMENT</u>	<u>DATE</u>	<u>VOL</u>	<u>JA NO.</u>
Affidavit of Service by Certified Mail	08/11/2011	1	66-68
Answer to Verified Petition for Writ of Prohibition, Complaint and Petition for Judicial Review by Kobeh Valley Ranch, LLC	09/28/2011	1	143-149
Answer to Petition for Judicial Review by Kobeh Valley Ranch, LLC	09/29/2011	1	150-154
Answer to Petition for Judicial Review by Kobeh Valley Ranch, LLC	09/29/2011	1	155-160
Answer to Petition for Judicial Review	01/30/2012	31	5704-5710
Answer to First Amended Petition for Judicial Review	01/30/2012	31	5711-5717
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Corrected Answering Brief	04/05/2012	35	6780-6822
Eureka County's Supplemental Summary of Record on Appeal - CV1108-155	01/13/2012	29-30	5421-5701
Eureka County's Summary of Record on Appeal - CV1112-0164	01/13/2012	28	5244-5420
Eureka County's Opening Brief	01/13/2012	27	5178-5243
Eureka County's Reply Brief	03/28/2012	34	6566-6638
Excerpts from Transcript of Proceedings	10/13/2008	36	6952-6964

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First Additional Summons and Proof of Service, State Engineer, Division of Water Resources	08/17/2011	1	129-133
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Notice of Petition for Judicial Review	08/11/2011	1	69-117
Notice of Entry of Findings of Fact, Conclusions of Law, and Order Denying Petitions for Judicial Review	06/18/2012	36	6882-6944
Notice of Appeal	07/10/2012	36	6945-6949
Opening Brief of Conley Land & Livestock, LLC and Lloyd Morrison	01/13/2012	27	5112-5133

<u>DOCUMENT</u>	<u>DATE</u>	<u>VOL</u>	<u>JA NO.</u>
Order Allowing Intervention of Kobeh Valley Ranch, LLC, to Intervene as a Respondent	09/14/2011	1	134-135
Order Allowing Intervention of Kobeh Valley Ranch, LLC, as a Party Respondent	09/26/2011	1	141-142
Order Directing the Consolidation of Action CV1108-156 and Action No. CV1108-157 with Action CV1108-155	10/26/2011	1	161-162
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Petition for Judicial Review	08/08/2011	1	01-06
Petition for Judicial Review	12/29/2011	27	5087-5091
Petition for Judicial Review	12/30/2011	27	5092-5097
Petition for Judicial Review	02/01/2012	31	5721-5727
Petitioners Kenneth F. Benson, Diamond Cattle Company, LLC, and Michel and Margaret Ann Etcheverry Family LP's Opening Brief	01/13/2012	27	5134-5177
Petitioners Kenneth F. Benson, Diamond Cattle Company, LLC, and Michel and Margaret Ann Etcheverry Family LP's Reply Brief	03/28/2012	34	6542-6565
Petitioners Benson, Diamond Cattle Co., and Etcheverry Family LP's Notice of Appeal	07/12/2012	36	6950-6951

<u>DOCUMENT</u>	<u>DATE</u>	<u>VOL</u>	<u>JA NO.</u>
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Summons and Proof of Service, Jason King	08/15/2011	1	121-123
Summons and Proof of Service, Kobeh Valley Ranch, LLC	08/15/2011	1	118-120

<u>DOCUMENT</u>	<u>DATE</u>	<u>VOL</u>	<u>JA NO.</u>
Summons and Proof of Service, The State of Nevada	08/17/2011	1	124-128
Summons and Proof of Service, The State of Nevada	01/11/2012	27	5098-5100
Supplemental Petition for Judicial Review	01/31/2012	31	5718-5720
Transcript for Petition for Judicial Review	04/03/2012	35	6639-6779
Verified Petition for Writ of Prohibition, Complaint and Petition for Judicial Review	08/10/2011	1	09-59

CERTIFICATE OF APPENDIX (NRAP 30(g)(1))

In compliance with NRAP 30(g)(1) I hereby certify that this Appendix consists of true and correct copies of the papers in the District Court file.

DATED: December 21, 2012.

/s/ KAREN A. PETERSON

KAREN A. PETERSON, NSB #366
ALLISON, MacKENZIE, PAVLAKIS,
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P.O. Box 646
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Attorneys for Appellant,
EUREKA COUNTY

IN THE MATTER OF APPLICATIONS 43136,)
43137, 43138, 43835, 44460, 44461, 44462,)
44463, 44464, 44465, 44466, 44467,)
44468, and 44469; FILED TO CHANGE THE)
WATERS OF AN UNDERGROUND SOURCE IN)
DIAMOND VALLEY, EUREKA COUNTY, NEVADA)

R U L I N G

GENERAL

Application 43136 was filed on January 26, 1981, by Orrian C. and Lucille Tallcott to change the place of use of 0.60 c.f.s., a portion of water from an underground source appropriated under Permit 18802, Certificate 6024. Water would be diverted at a point located in the SE $\frac{1}{4}$ NE $\frac{1}{4}$ Section 8, T. 22 N., R. 54 E., M.D.B.&M. The proposed place of use of Application 43136 was 80 acres in the N $\frac{1}{2}$ NW $\frac{1}{4}$ Section 8, T. 22 N., R. 54 E., M.D.B.&M.

Application 43137 was filed on January 26, 1981, by Orrian C. and Lucille E. Tallcott to change the place of use of 0.18 c.f.s., a portion of water from an underground source appropriated under Permit 28751. Water would be diverted at a point located in the SE $\frac{1}{4}$ SW $\frac{1}{4}$ Section 8, T. 22 N., R. 54 E., M.D.B.&M. The proposed place of use was 80 acres in the N $\frac{1}{2}$ NW $\frac{1}{4}$ Section 8, T. 22 N., R. 54 E., M.D.B.&M.

Application 43138 was filed on January 26, 1981, by Orrian C. and Lucille E. Tallcott to change the place of use of 0.67 c.f.s., a portion of water from an underground source appropriated under Permit 16468, Certificate 5785. Water would be diverted at a point located in the SE $\frac{1}{4}$ SE $\frac{1}{4}$ Section 8, T. 22 N., R. 54 E., M.D.B.&M. The proposed place of use was 2.44 acres in the W $\frac{1}{2}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ Section 8, and 80 acres in the N $\frac{1}{2}$ NW $\frac{1}{4}$ Section 8, all in T. 22 N., R. 54 E., M.D.B.&M.

Application 43835 was filed on June 4, 1981, by Fred J. Stenton, et al., to change the place of use of 0.75 c.f.s., a portion of water from an underground source appropriated under Permit 32890. Water would be diverted at a point located in the NW $\frac{1}{4}$ NE $\frac{1}{4}$ Section 18, T. 22 N., R. 54 E., M.D.B.&M. The proposed place of use was 43.51 acres in Lots 3 and 4 of Section 7, and Lots 14, SE $\frac{1}{4}$ SW $\frac{1}{4}$, and SW $\frac{1}{4}$ SE $\frac{1}{4}$ Section 18, T. 22 N., R. 54 E., M.D.B.&M.

Application 44460 was filed on September 22, 1981, by Nevada Ringsby Farms, Inc. to change the point of diversion and place of use of 0.54 c.f.s., a portion of water from an underground source appropriated under Permit 20487, Certificate 7352. Water would be diverted at a point located in the SE $\frac{1}{4}$ SW $\frac{1}{4}$ Section 5, T. 21 N., R. 53 E., M.D.B.&M. The proposed place of use was 32.5 acres in Section 5, T. 21 N., R. 53 E., M.D.B.&M.

Application 44461 was filed on September 22, 1981, by Dongary Investments, Ltd. to change the point of diversion and place of use of 1.79 c.f.s., a portion of water from an underground source under Permit 22566, Certificate 6561. Water would be diverted at a point located in the SE $\frac{1}{4}$ SE $\frac{1}{4}$ Section 5, T. 21 N., R. 53 E., M.D.B.&M. The proposed place of use was 71.2 acres in Section 5, T. 21 N., R. 53 E., M.D.B.&M.

RULING
PAGE TWO

Application 44462 was filed on September 22, 1981, by Dongary Investments, Ltd., to change the point of diversion and place of use of 1.22 c.f.s., a portion of water from an underground source under Permit 22567, Certificate 6562. Water would be diverted at a point located in the SE $\frac{1}{4}$ SE $\frac{1}{4}$ Section 5, T. 21 N., R. 53 E., M.D.B.&M. The proposed place of use was 43 acres in Section 5, T. 21 N., R. 53 E., M.D.B.&M.

Application 44463 was filed on September 22, 1981, by Dongary Investments, Ltd., to change the point of diversion and place of use of 0.66 c.f.s., a portion of water from an underground source under Permit 24262, Certificate 6959. Water would be diverted at a point located in the SW $\frac{1}{4}$ NE $\frac{1}{4}$ Section 5, T. 21 N., R. 53 E., M.D.B.&M. The proposed place of use was 154 acres in Section 5, T. 21 N., R. 53 E., M.D.B.&M.

Application 44464 was filed on September 22, 1981, by Dongary Investments, Ltd., to change the point of diversion and place of use of 0.66 c.f.s., a portion of water from an underground source under Permit 24263, Certificate 6960. Water would be diverted at a point located in the SW $\frac{1}{4}$ NE $\frac{1}{4}$ Section 5, T. 21 N., R. 53 E., M.D.B.&M. The proposed place of use was 154 acres in Section 5, T. 21 N., R. 53 E., M.D.B.&M.

Application 44465 was filed on September 22, 1981, by Dongary Investments, Ltd., to change the point of diversion and place of use of 1.02 c.f.s., a portion of water from an underground source under Permit 24264, Certificate 6961. Water would be diverted at a point located in the SW $\frac{1}{4}$ NE $\frac{1}{4}$ Section 5, T. 21 N., R. 53 E., M.D.B.&M. The proposed place of use was 154 acres in Section 5, T. 21 N., R. 53 E., M.D.B.&M.

Application 44466 was filed on September 22, 1981, by Dongary Investments, Ltd., to change the point of diversion and place of use of 0.87 c.f.s., a portion of water from an underground source under Permit 24265, Certificate 6962. Water would be diverted at a point located in the SW $\frac{1}{4}$ NE $\frac{1}{4}$ Section 5, T. 21 N., R. 53 E., M.D.B.&M. The proposed place of use was 82 acres in Section 5, T. 21 N., R. 53 E., M.D.B.&M.

Application 44467 was filed on September 22, 1981, by Nevada Ringsby Land Co. to change the point of diversion and place of use of 0.54 c.f.s., a portion of water from an underground source under Permit 33817. Water would be diverted at a point located in the SE $\frac{1}{4}$ SW $\frac{1}{4}$ Section 5, T. 21 N., R. 53 E., M.D.B.&M. The proposed place of use was 32.1 acres in Section 5, T. 21 N., R. 53 E., M.D.B.&M.

Application 44468 was filed on September 22, 1981, by Nevada Ringsby Land Co. to change the point of diversion and place of use of 0.88 c.f.s., a portion of water from an underground source under Permit 33818. Water would be diverted at a point located in the SE $\frac{1}{4}$ SW $\frac{1}{4}$ Section 5, T. 21 N., R. 53 E., M.D.B.&M. The proposed place of use was 40.4 acres in Section 5, T. 21 N., R. 53 E., M.D.B.&M.

Application 44469 was filed on September 22, 1981, by Nevada Ringsby Farms, Inc., to change the point of diversion and place of use of 0.54 c.f.s., a portion of water from an underground source appropriated under Permit 35012. Water would be diverted at a point located in the SE $\frac{1}{4}$ SW $\frac{1}{4}$ Section 5, T. 21 N., R. 53 E., M.D.B.&M. The proposed place of use was 32.1 acres in Section 5, T. 21 N., R. 53 E., M.D.B.&M.

RULING
PAGE THREE

FINDINGS OF FACT

I

The Diamond Valley groundwater basin was designated by Order of the State Engineer on August 5, 1964. 1/

II

A notice of curtailment of water appropriation within the Diamond Valley groundwater basin was issued by the State Engineer on December 22, 1975. 2/

III

A notice of further curtailment of water appropriation within the Diamond Valley groundwater basin was issued by the State Engineer on July 10, 1978, because of continued depletion of the ground water supply. 3/

IV

The proposed place of use of Applications 43136 and 43137 is on lands under the control of the Bureau of Land Management. 4/

V

The proposed place of use of Application 43138 is on 80 acres of land under the control of the Bureau of Land Management, which parcel is the same proposed place of use as Applications 43136 and 43137, and 2.44 acres of land in private ownership. 5/

VI

The proposed place of use of Application 43835 is on lands under the control of the Bureau of Land Management. 6/

VII

The acreage of private land irrigated by wells within the Diamond Valley groundwater basin has increased yearly since 1975. In 1975, approximately 17,796 acres of land were irrigated compared to 25,279 acres in 1981. 7/

VIII

In public hearings held in Eureka, Nevada, on May 24, 1982 and August 9, 1982, the State Engineer received evidence and testimony on possible curtailment of pumping from underground sources in the Diamond Valley Designated Groundwater Basin. Static groundwater levels are declining on a yearly basis due to over-appropriation. The State Engineer has found that the groundwater is being depleted in portions of the basin, particularly in the agricultural areas. 8/

RULING
PAGE FOUR

IX

The perennial yield of the basin is estimated to be 30,000 acre-feet and the estimated water consumption in 1981 was approximately 71,744 acre-feet. The perennial yield is the maximum amount of water of useable chemical quality that can be withdrawn and consumed economically each year for an indefinite period of time. 9/

If over-appropriation continues in the concentrated areas, the static water levels eventually will reach a depth below ground surface where it will become uneconomical to pump waters for irrigation. This condition will be contrary to the economic welfare of the area. 10/

X

The State Engineer has ordered the installation of totalizing meters in order to more accurately determine the amount of water placed to beneficial use. 11/

XI

The State Engineer is authorized to designate preferred uses in designated groundwater basins. 12/

XII

In acting upon applications to appropriate underground water for irrigation purposes in a given basin, the State Engineer is directed to give the first priority to an "owner of/and for use on that land." 13/

CONCLUSIONS

The State Engineer has jurisdiction of the parties and subject matter of this action. 14/

The State Engineer has the authority to conduct investigations in any basin or portion thereof where it appears that the average annual replenishment to the ground water supply may not be adequate for the needs of all permittees and all vested right claimants, and if his findings so indicate the State Engineer may order that withdrawals be restricted to conform to priority rights. 15/

The present status quo of the amount of water withdrawn for irrigation of existing private lands has the potential of being detrimental to the economic welfare of the area. If Applications 43136, 43137, 43138, 43835, 44460, 44461, 44462, 44463, 44464, 44465, 44466, 44467, 44468, and 44469 were approved, the withdrawal of water for use on Desert Land Entry ground would place additional lands in private ownership and have the effect of placing additional lands under cultivation. This would change the present status quo of water use on private lands by existing methods of cultivation and thus create additional demands on the underground water source not presently utilized on private lands covered by existing water rights.

RULING
PAGE FIVE

The State Engineer has determined that it would not be in the public welfare and interest to approve applications to irrigate lands other than those that are in private ownership at this time.

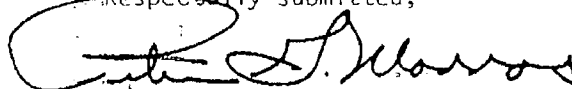
RULING

Applications 43136, 43137, 43835, 44460, 44461, 44462, 44463, 44464, 44465, 44466, 44467, 44468, and 44469, are herewith denied on the grounds that approval would adversely affect existing rights, that the proposed use is not a preferred use within the Diamond Valley Designated Ground Water Basin, and would tend to impair the value of existing rights.

Application 43138 is approved in part for 0.046 c.f.s. for the irrigation of 2.44 acres within the SE $\frac{1}{4}$ SE $\frac{1}{4}$ Section 8, T. 22 N., R. 54 E., M.D.B.&M. The remainder of Application 43138 is denied on the grounds that approval would adversely affect existing rights, that the proposed use is not a preferred use within the Diamond Valley Designated Ground Water Basin, and would tend to impair the value of existing rights.

These applications are also denied on the grounds that the economic welfare of the Diamond Valley area would be adversely affected if approval is given.

Respectfully submitted,



PETER G. MORRÓS
State Engineer

PGM/GB/KN/br

Dated this 31st day of
January, 1983

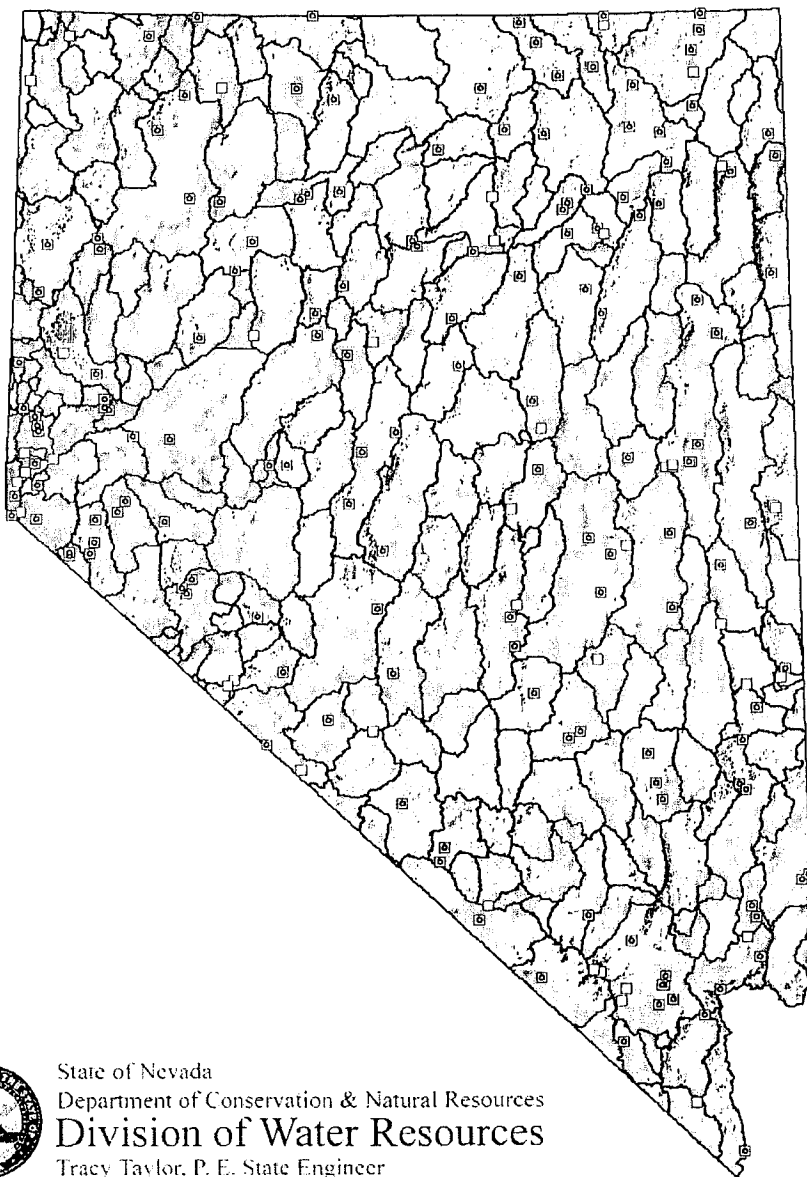
002922

JA4334

FOOTNOTES

1. State Engineer's Order No. 277 and 280.
2. State Engineer's Order No. 541.
3. State Engineer's Order No. 717.
4. Correspondence from Bureau of Land Management and BLM's 30 minute planning quad sheet, "Newark, Nevada".
5. Correspondence from Bureau of Land Management and BLM's 30 minute planning quad sheet, "Newark, Nevada".
6. Correspondence from Bureau of Land Management and BLM's 30 minute planning quad sheet, "Newark, Nevada".
7. Public Records in the Office of the State Engineer.
8. Public Records in the Office of the State Engineer.
9. Water Resources Bulletin No. 35, page 56.
10. NRS 534.110 Subsection 4.
11. State Engineer's Order No. 809.
12. NRS 534.120 Subsection 2.
13. NRS 533.357.
14. NRS 533.025 and 534.020.
15. NRS 534.110, Section 6.

Evapotranspiration and Net Irrigation Water Requirements for Nevada



State of Nevada
Department of Conservation & Natural Resources
Division of Water Resources
Tracy Taylor, P. E. State Engineer

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All compiled evapotranspiration data files are available via internet download from the following NDWR website:

<http://water.nv.gov/NVET>

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Evapotranspiration and Net Irrigation Water Requirements for Nevada

By

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EXECUTIVE SUMMARY

Accurate estimates of evapotranspiration (ET) are becoming more important as increasing demands are placed on finite water supplies in Nevada and across the western U.S. Local, state, and federal water resource agencies require accurate crop ET (ET_{act}) and net irrigation water requirement (NIWR) estimates for evaluating irrigation development, transfers of irrigation water for municipal use, and litigation of water right applications and protests. The ET_{act} was calculated via a crop coefficient approach, where ET_{act} is equal to the reference ET multiplied by a crop coefficient. The NIWR is equal to the annual ET_{act} less the effective precipitation entering the root zone that is available for evaporation or transpiration. The major objective of this study was to update estimates of the ET_{act} and NIWR for Nevada. The methods for estimating the reference ET follow the new ASCE-EWRI Standardized Penman-Monteith (ASCE-PM) approach, while the ET_{act} and NIWR were estimated using a dual crop coefficient and daily soil water balance. Estimates of the ET_{act} and NIWR for major crops grown in Nevada were made for daily, monthly, and annual time steps at 190 locations using National Weather Service weather stations located throughout the state for available periods of record.

Assessing the error in estimated ASCE-PM reference ET using estimates of the 'secondary' weather parameters solar radiation, dewpoint, and wind speed, versus using measured data is of significant concern because estimation of these weather variables provides the ability to use NWS stations, which allows for sufficient spatial coverage and statewide application. To address this issue, a comparison was made between estimated reference ET at NWS stations, and calculated reference ET at nearby stations located in irrigated areas that measure the full suite of weather variables. Results of the comparison indicate that the ratios of annual reference ET based on estimated secondary weather parameters, to reference ET based on measured secondary weather parameters, range from 1.01 to 1.06 with an average of 1.03. These results are acceptable considering the overall error or uncertainty inherent to reference ET and crop coefficient calculations, which have been suggested to be about 10%.

To explore the accuracy of estimated alfalfa ET_{act} , a comparison was made to measured ET_{act} of alfalfa using results from previous studies for respective Hydrographic Areas (HAs) and time periods. The average ratio of estimated ET_{act} to the average of the reported ET_{act} is 1.04. Results generally agree well, however there are significant differences in some instances where published measurements of ET_{act} were likely being impacted by water limiting conditions or instrumentation biases.

For purposes of estimating the mean annual ET_{act} and NIWR for each HA, the analysis was limited to weather stations on valley floor areas representative of potential agricultural areas. Mean annual values of the ET_{act} and NIWR were assigned to the HA if a single station was available, or if multiple stations were available, a period of record

weighted average of the ET_{act} and NIWR was assigned to HAs. Of the 256 HAs in the state, 160 are absent of weather stations from which to estimate the ET_{act} and NIWR; therefore, spatial interpolation of weather station estimates of the mean annual ET_{act} and NIWR was performed for alfalfa, grass hay, pasture grass, turf grass, and small shallow open water bodies. Results of the NIWR per HA (Appendix 15 and Plate 1) indicate that in central and northern parts of Nevada, the NIWR for alfalfa is less than the typical permitted irrigation water right of 4 ac-ft/ac. However, in southern Nevada the NIWR may exceed the typical irrigation water right of 5 ac-ft/ac. These results represent the NIWR for pristine crop conditions under full water supply and should be considered the maximum.

CONTENTS

Executive Summary	ii
Introduction.....	1
Evapotranspiration Calculation Approach	3
Methods.....	4
Weather Station Data Assembly	4
Standardized Penman-Monteith Equation	5
Calculation of the Standardized Penman-Monteith Reference ET	6
Psychrometric and Atmospheric Variables.....	6
Net Radiation	15
Net Long Wave Radiation	15
Incoming Solar Radiation	16
Estimated vs. Measured Incoming Solar Radiation	19
Wind speed.....	22
Crop Evapotranspiration	27
Crop Coefficient Approach.....	27
Infiltration Characteristics and Water Holding Properties.....	29
Root Growth.....	34
Runoff from Precipitation	35
Simulated Irrigations.....	38
Deep Percolation.....	38
Crop Coefficient Curves	38
Crop Specific K_{cb} Curves.....	44
Alfalfa	44
Grass Hay.....	50
Winter and Spring Grain.....	50
Potatoes	52
Corn.....	53
Beans.....	53
Sugar Beets	53
Peas	55
Onions and Garlic	55
Wine Grapes.....	57
Melons.....	58
Hops	58
Orchards	58
Canola and Sunflower/Safflower	60
Turf Grass	60

CONTENTS cont.

Pasture Grass.....	61
Alfalfa Seed	61
Termination and Killing Frosts.....	63
Aridity Rating	63
Non-growing Season Evapotranspiration	64
Evaporation from Small Open Water Bodies	66
Results.....	68
Reference ET, Actual Crop ET, and Net Irrigation Water Requirements	68
Estimated vs. Calculated Reference ET.....	76
Estimated vs. Previously Reported Actual ET.....	82
Summary and Conclusions	86
References.....	90

FIGURES

Figure 1. Weather stations used for calculating crop ET and net irrigation water requirements.....	2
Figure 2. Weather stations located in irrigated areas measuring relative humidity representative of reference conditions, which are used for estimating the dewpoint at stations not measuring relative humidity	10
Figure 3a. Measured mean monthly dewpoint depression for southern latitude weather stations	11
Figure 3b. Measured mean monthly dewpoint depression for central latitude weather stations	11
Figure 3c. Measured mean monthly dewpoint depression for northern latitude weather stations	12
Figure 4. Spatially interpolated mean annual reference condition dewpoint depression ...	13
Figure 5. Basin average PRISM precipitation	13

Figure 6. Comparison of dewpoint depression between the Fallon AGRIMET and Fairview Valley DRI stations.....	14
Figure 7. Locations of weather stations used for comparing measured to estimated daily solar radiation.....	20
Figure 8. Baker Flat RAWs measured solar radiation and theoretical clear sky solar radiation	21
Figure 9. Fallon AGRIMET measured solar radiation and theoretical clear sky solar radiation	21
Figure 10. Fallon AGRIMET daily measured and estimated solar radiation	23
Figure 11. AGRIMET mean monthly measured and estimated solar radiation	23
Figure 12. Daily measured wind speed at the Caliente CEMP weather station	26
Figure 13. Mean monthly 2 meter height equivalent wind speed for selected stations across the state	26
Figure 14. Spatially distributed mean monthly wind speed derived from multiple weather station networks located on valley floor areas.....	28
Figure 15. State Soil Geographic Database (STATSGO) used for estimating soil properties at weather stations for soil water balance simulations.....	31
Figure 16. Close up view of the STATSGO soils database illustrating contiguous soil units that surround irrigated areas.....	32
Figure 17. Conceptual model of the FAO-56 root zone water balance	33
Figure 18. . Root growth function.....	34
Figure 19. Schematic showing the typical shape of the FAO-56 Kcb curve with four different crop stages dependent on development of vegetation.....	39
Figure 20. Documented and typical greenup dates compared to simulated greenup dates for alfalfa using a calibrated CGDD value of 300 °C-days from January 1	48

Figure 21. Documented and typical cutting dates compared to simulated cutting dates for alfalfa using a calibrated CGDD value of 880 °C-days from greenup to the first cutting, and 740 °C-days for later cuttings.....	48
Figure 22. Alfalfa K_{cb} curve for the first, intermediate, and last growth cycles.....	49
Figure 23. Grass hay K_{cb} curve which assumes one large cutting, and later smaller cuttings or grazing.....	51
Figure 24. Winter wheat K_{cb} curve	51
Figure 25. Spring grain K_{cb} curve.....	52
Figure 26. Potato K_{cb} curves for two different classes representing baking (long season) and processing (short season) potatoes	53
Figure 27. Corn K_{cb} curves for three different classes representing field, sweet, and silage corn	54
Figure 28. Bean K_{cb} curves representing dry and fresh snap beans, which are harvested earlier than dry beans	54
Figure 29. Sugar beet K_{cb} curve.....	55
Figure 30. Pea K_{cb} curves for dry peas (for seed) and fresh peas	56
Figure 31. Onion and garlic K_{cb} curves modified from AGRIMET	56
Figure 32. Wine grape K_{cb} curve modified from AGRIMET	57
Figure 33. Melon K_{cb} curve modified from AGRIMET	58
Figure 34. Hops K_{cb} curve modified from AGRIMET	59
Figure 35. Orchard K_{cb} curves modified from FAO-56 and AGRIMET	59
Figure 36. Canola and Sunflower/Safflower K_{cb} curves modified from AGRIMET	60
Figure 37. Turf grass K_{cb} curve modified from AGRIMET	61

Figure 38. Pasture grass K_{cb} curves representing two classes of highly managed rotated grazing with significant re-growth height, and low management pasture grass with sustained lower grazing height.....	62
Figure 39. Alfalfa seed K_{cb} curve	62
Figure 40. Lake Bowen ratio energy balance estimated evaporation vs calculated ET_{os} using Bowen ratio weather data	67
Figure 41a. Simulated alfalfa ET_{act} using the NWS Fallon weather station.....	71
Figure 41b. Simulated onion ET_{act} using the NWS Yerington weather station.....	72
Figure 41c. Simulated pasture grass ET_{act} using the NWS Minden weather station	73
Figure 42. Spatially distributed mean annual alfalfa net irrigation water requirements.....	74
Figure 43. Spatially distributed mean annual ET_{os}	75
Figure 44a. Alfalfa simulated growing season lengths and ET_{pot} for Lahontan Dam and Fallon NWS weather stations.....	77
Figure 44b. Alfalfa simulated growing season lengths and ET_{pot} for Yerington and Reno AP NWS weather stations.....	78
Figure 44c. Alfalfa simulated growing season lengths and ET_{pot} for Golconda and Austin NWS weather stations.....	79
Figure 44d Alfalfa simulated growing season lengths and ET_{pot} for Minden and Carson City NWS weather stations.....	80
Figure 44e Alfalfa simulated growing season lengths and ET_{pot} for Pahrnagat WR and Amargosa Farms NWS weather stations	81

TABLES

Table 1 Estimated solar radiation at NWS stations vs. measured solar radiation at weather stations nearby NWS stations.....	24
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Table 2. Typical antecedent soil water conditions (AWC) II curve numbers (CN's) for general crops and hydrologic group classes.....	36
Table 3. Basal crop coefficient type, normalizing basis, and source	41
Table 4. Documented/typical greenup and harvest dates vs. simulated greenup and harvest dates.....	45
Table 5. Aridity adjustments to the average temperature for stations having aridity ratings of 100%	63
Table 6. Estimated ET_{os} vs. 'full suite' computed ET_{os} at NWS and nearby irrigated area weather stations.....	76
Table 7. Previously reported alfalfa and pasture ET_{act} based from measurement techniques vs. alfalfa and pasture ET_{act} estimated in this study.	85

APPENDIXES

Appendix 1a. Weather stations used for estimating ET and net irrigation water requirements (sorted by station name).....	97
Appendix 1b. Weather stations used for estimating ET and net irrigation water requirements (sorted by basin name)	104
Appendix 2. Details of supplementary Washoe County weather data and modifications made to two NWS weather station data sets due to poor station siting	111
Appendix 3a. Mean monthly dew point depression ($^{\circ}C$) for stations used in spatial interpolation and assignment to NWS weather stations	120
Appendix 3b. Spatially interpolated or assigned basin average mean monthly dew point depression ($^{\circ}C$) used for assignment to respective weather stations.....	121
Appendix 4a. Mean monthly 2 meter equivalent wind speed (m/s) for stations used in spatial interpolation and assignment to weather NWS weather stations	125

Appendix 4b. Spatially interpolated or assigned basin average mean monthly wind speed (m/s) used for assignment to respective NWS weather stations	128
Appendix 5. Crop parameter table listing all parameters used in estimating crop ET, planting or greenup, harvest, killing frost, and runoff	133
Appendix 6. Basal crop coefficient (K_{cb}) curve values for crop types simulated	138
Appendix 7. Description of greenup and harvest information used in calibrating the cumulative growing degree day and T30 parameters controlling simulated greenup and harvest dates	142
Appendix 8. Weather station aridity ratings	144
Appendix 9. Descriptions of daily, monthly, annual, and statistical summaries of ET, NIWR	150
Appendix 10. Crop or land cover class simulated for each station	160
Appendix 11a. Mean annual ET_{os} and ET_{act} for each NWS weather station, alphabetized by weather station	177
Appendix 11b. Mean annual ET_{os} and ET_{act} for each NWS weather station, alphabetized by hydrographic area name	190
Appendix 12a. Mean annual NIWR for each NWS weather station, alphabetized by weather station	203
Appendix 12b. Mean annual NIWR for each NWS weather station, alphabetized by hydrographic area name	216
Appendix 13. Example of assignment and weighting of the mean annual NIWR of alfalfa for respective HAS	228
Appendix 14. Mean annual ET_{os} and ET_{act} for all HAS	238
Appendix 15. Mean annual NIWR for all HAS	249
Appendix 16. Mean annual NIWR for HAS with secondary crops	260

ANNEX

Annex 1. Allen et al., 2005 paper outlining soil and root zone water balance methods used in this report..... xx

PLATES

Plate 1. Mean annual net irrigation water requirements for each IIA and major crops where NWS weather stations are present.....xx

ACRONYMS

α	= albedo
AGRIMET	= U.S. Bureau of Reclamation Agricultural Weather Network
ASC	= Antecedent Soil Condition
ASCE-EWRI	= American Society of Civil Engineers - Environmental Water Resources Institute
ASCE-PM	= American Society of Civil Engineers Standardized Penman Monteith equation
AWC	= Available Water Holding Capacity
AZMET	= Arizona Meteorological Network
β	= angle of the sun above the horizon
B	= empirical solar radiation fitting coefficient
C_d	= ASCE-PM equation constant dependent on reference type
CEMP	= Community Environmental Monitoring Program
CGDD	= Cumulative Growing Degree Day
CIMIS	= California Irrigation Management Information System
CN	= Runoff Curve Number
C_n	= ASCE-PM equation constant dependent on reference type
CN_I	= Runoff Curve Number associated with dry antecedent soil conditions
CN_{III}	= Runoff Curve Number associated with wet antecedent soil conditions
Δ	= slope of the saturation vapor pressure-temperature curve
δ	= solar declination
d	= zero plane displacement height for the weather site vegetation
D_e	= Depletion of evaporative layer
d_r	= squared inverse relative distance factor for the earth-sun
DRI	= Desert Research Institute
e_a	= mean actual vapor pressure
$e^o(T)$	= saturation vapor pressure at a specified temperature T
$e^o(T_{dew})$	= actual vapor pressure at daily dewpoint temperature
e_s	= saturation vapor pressure
ET	= Evapotranspiration

ET_{act}	= Actual Evapotranspiration
ET_o	= Reference Evapotranspiration
ET_{os}	= Standardized Grass Reference Evapotranspiration
ET_{sz}	= Standardized Reference Evapotranspiration
f_{cd}	= cloudiness function
$F_{tuneroot}$	= fraction of time from the start of root growth until the time of maximum root depth
γ	= psychrometric constant
G	= soil heat flux
GDD	= Growing Degree Day
h	= vegetation height
HA	= Hydrographic Area
ϕ	= latitude
J	= Julian day (1-365 or 366 for leap years)
K_b	= index of atmospheric clearness
K_c	= crop coefficient
K_{cb}	= basal crop coefficient
K_{cmean}	= mean crop coefficient curve (i.e. lumps evaporation, transpiration, and cutting effects)
K_d	= diffuse radiation index
K_e	= soil evaporation coefficient
K_o	= dew point depression (i.e. $T_{min} - T_{dew}$)
K_s	= stress coefficient
K_T	= atmospheric transmissivity
K_{tb}	= atmospheric turbidity coefficient
λ	= latent heat of vaporization
LCRAS	= Lower Colorado River Accounting System
MAD	= Maximum allowable Depletion
NCGDD	= Normalized Cumulative Growing Degree Day
NIWR	= Net Irrigation Water Requirement
NRCS	= Natural Resource Conservation Service
NWS	= National Weather Service
P	= mean atmospheric pressure
P_{inf}	= depth of infiltrated precipitation
PPT	= precipitation
R_a	= exoatmospheric radiation
RAW	= Readily Available water in the root zone
RAWS	= Remote Automated Weather Station
REW	= Readily Evaporable Water
RH	= Relative Humidity
RMSE	= Root Mean Squared Error
R_n	= net radiation
R_{nl}	= net long wave radiation
R_{ns}	= net short wave radiation
RO	= surface runoff
R_s	= incoming short wave solar radiation

R_s/R_{s0}	= relative solar radiation
R_{s0}	= calculated clear sky radiation
S	= maximum depth of water that can be retained as infiltration and canopy interception during a single precipitation event
σ	= Stefan-Boltzmann constant
STATSGO	= State Soil Geographic database
T	= mean daily air temperature
TAW	= Total Available Water in the root zone
T_{base}	= base temperature used in the growing degree method
T_{dew}	= dewpoint temperature
TEW	= Total Evaporable Water
T_{Kmax}	= maximum daily Kelvin temperature
T_{Kmin}	= minimum daily Kelvin temperature
T_{max}	= maximum daily air temperature
T_{min}	= minimum daily air temperature
U_2	= mean daily wind speed at 2m height
USBR	= U.S. Bureau of Reclamation
USDA	= U.S. Department of Agriculture
USGS	= U.S. Geological Survey
u_z	= measured wind speed at z_w m above ground surface
VPD	= Vapor Pressure Deficit (i.e. $e_s - e_a$)
W	= precipitable water in the atmosphere
ω_s	= sunset hour angle
z	= weather station site elevation above mean sea level
Z_{max}	= maximum effective root depth
Z_{min}	= initial root depth at planting or greenup
Z_{om}	= aerodynamic roughness length for the weather site vegetation
Z_i	= effective root depth
z_w	= height of measurement above ground surface

Appendix 1a cont. Weather stations used for estimating ET and net irrigation water requirements (sorted by station name). * indicates station was used for basin average.

STATION NAME	STATION NUMBER	LAT (NAD83)	LONG (NAD83)	ELEVATION (feet)	DATA FILE START YEAR	DATA FILE END YEAR	NUMBER OF YEARS WITH INSIGNIFICANT MISSING DATA	BASIN NAME	BASIN NUMBER
CORTEZ GOLD MINE*	261975	40.18	-116.63	4905	1968	1979	10	Crescent Valley	54
CURRENT*	262078	38.75	-115.47	5184	1941	1949	4	Railroad Valley	173B
CURRENT HWY STN	262091	38.80	-115.35	6243	1963	1977	7	Railroad Valley	173B
CURRIE HWY STN*	262096	40.27	-114.75	5820	1961	1991	10	Steptoe Valley	179
DAGGET PASS	262119	38.98	-119.88	7334	1988	2007	5	Lake Tahoe Basin	90
DENIO*	262229	41.98	-118.63	4190	1951	2006	39	Pueblo Valley	1
DESERT NWR*	262243	36.43	-115.37	2920	1940	2007	60	Las Vegas Valley	212
DIABLO*	262276	37.92	-116.05	5105	1959	1978	10	Railroad Valley	173A
DIAMOND VALLEY USDA*	262296	39.68333	-116.0333	5970	1979	2007	19	Diamond Valley	153
DUCKWATER*	262390	38.85	-115.63	5550	1966	2003	19	Railroad Valley	173B
DUFURRENA*	262394	41.87	-119.02	4800	1959	2005	30	Virgin Valley	4
DYER*	262431	37.62	-118.02	4900	1903	2007	55	Fish Lake Valley	117
EASTGATE*	262477	39.30	-117.88	5023	1956	1964	4	Eastgate Valley Area	127
ECHO BAY*	262497	36.32	-114.43	1250	1989	2007	10	Black Mountains Area	215
ELGIN*	262557	37.35	-114.55	3420	1985	2007	20	Lower Meadow Valley Wash	205
ELGIN 3 SE*	262562	37.32	-114.50	3301	1965	1985	15	Lower Meadow Valley Wash	205
ELKO*	262570	40.87	-115.75	5235	1999	2007	6	Elko Segment	49
ELKO RGNL AP*	262573	40.83	-115.78	5050	1888	2007	94	Elko Segment	49
ELY 6 NE	262626	39.30	-114.83	6263	1999	2005	5	Steptoe Valley	179
ELY YELLAND FLD AP*	262631	39.30	-114.85	6262	1893	2005	68	Steptoe Valley	179
EMIGRANT PASS HWY STN	262656	40.65	-116.30	5760	1963	2001	27	Boulder Flat	61
EMPIRE*	262662	40.58	-119.35	3953	1951	1976	6	San Emidio Desert	22
EUREKA	262708	39.52	-115.97	6540	1888	2007	67	Diamond Valley	153
FALLON EXP STN*	262780	39.45	-118.78	3965	1903	2007	96	Carson Desert	101
FERGUSON SPRINGS HMS*	262820	40.42	-114.18	5840	1972	1982	7	Great Salt Lake Desert	192
FERNLEY*	262840	39.62	-119.25	4163	1907	1974	21	Fernley Area	76
FISH CREEK RCH*	262860	39.27	-116.00	6053	1943	1964	14	Little Smoky Valley	155A
GERLACH*	263090	40.65	-119.37	3950	1948	2007	27	San Emidio Desert	22
GEYSER RCH*	263101	38.67	-114.63	6020	1904	2002	19	Lake Valley	183

Appendix 1b cont. Weather stations used for estimating ET and net irrigation water requirements (sorted by basin name). * indicates station was used for basin average.

STATION NAME	STATION NUMBER	LAT (NAD83)	LONG (NAD83)	ELEVATION (feet)	DATA FILE START YEAR	DATA FILE END YEAR	NUMBER OF YEARS WITH INSIGNIFICANT MISSING DATA	BASIN NAME	BASIN NUMBER
MIDDLEGATE-LOWERY*	265132	39.30	-118.02	4600	1988	2007	15	Cowkick Valley	126
BEOVAWE*	260795	40.58	-116.47	4700	1908	2007	60	Crescent Valley	54
CORTEZ GOLD MINE*	261975	40.18	-116.63	4905	1968	1979	10	Crescent Valley	54
VIRGINIA CITY	268761	39.32	-119.65	6340	1887	2007	41	Dayton Valley	103
JUNGO MEYER RCH*	264108	40.88	-118.43	4200	1968	1986	7	Desert Valley	31
DIAMOND VALLEY USDA*	262296	39.683	-116.03	5970	1979	2007	19	Diamond Valley	153
EUREKA	262708	39.52	-115.97	6540	1888	2007	67	Diamond Valley	153
SOUTH FORK SP*	267690	40.68	-115.75	5270	1993	2007	8	Dixie Creek Tenmile	48
BRINKERHOFF RCH*	261160	40.08	-117.67	3661	1966	1981	7	Dixie Valley	128
WADSWORTH 4 N*	268838	39.68	-119.28	4200	1974	2007	21	Dodge Flat	82
CARSON CITY*	261485	39.15	-119.77	4651	1893	2007	90	Eagle Valley	104
URSINE	268538	37.98	-114.22	5833	1964	1972	4	Eagle Valley	200
EASTGATE*	262477	39.30	-117.88	5023	1956	1964	4	Eastgate Valley Area	127
BOULDER CITY*	261071	35.98	-114.85	2500	1931	2004	64	Eldorado Valley	167
ELKO*	262570	40.87	-115.75	5235	1999	2007	6	Elko Segment	49
ELKO RGNL AP*	262573	40.83	-115.78	5050	1888	2007	94	Elko Segment	49
FERNLEY*	262840	39.62	-119.25	4163	1907	1974	21	Fernley Area	76
DYER*	262431	37.67	-118.07	4900	1903	2007	55	Fish Lake Valley	117
PALMETTO	265931	37.47	-117.77	5906	1890	1911	14	Fish Lake Valley	117
LATHROP WELLS	264457	36.65	-116.40	2671	1942	1963	8	Fortymile Canyon	227A
ADAVEN	260046	38.12	-115.58	6250	1914	1981	53	Garden Valley	172
OASIS*	265722	41.03	-114.47	5830	1987	2007	17	Goshute Valley	187
PEQUOP	266148	41.07	-114.53	6033	1959	1985	23	Goshute Valley	187
BEOVAWE U OF N RCH*	260800	39.90	-116.58	5740	1972	2007	28	Grass Valley	138
WINNEMUCCA #2*	269168	40.93	-117.75	4300	1999	2007	6	Grass Valley	71
FERGUSON SPRINGS HMS*	262820	40.42	-114.18	5840	1972	1982	7	Great Salt Lake Desert	192
SHELDON	267443	41.85	-119.63	6506	1933	1972	35	Guano Valley	6
BLUE JAY HWY STN*	260961	38.38	-116.22	5322	1963	1984	7	Hot Creek	156
RATTLESNAKE	266630	38.45	-116.17	5915	1948	1966	13	Hot Creek	156
TWIN SPRING FALLINI*	268443	38.20	-116.18	5300	1985	2005	10	Hot Creek	156
JIGGS 8 SSE ZAGA*	264095	40.35	-115.62	5800	1978	2007	19	Huntington Valley	47
IMLAY*	263957	40.65	-118.17	4260	1914	2007	56	Imlay Area	72

Appendix 3b. Interpolated or assigned basin average mean monthly dew point depression K_o ($^{\circ}\text{C}$) used for assignment to respective weather stations. Symbol * next to the basin name indicates the basins that were assigned the measured mean monthly dew point depression.

BASIN NUMBER	BASIN NAME	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN ANNUAL
142	Alkali Spring Valley	-0.2	0.9	2.9	3.8	3.8	4.8	4.6	3.8	3.1	2.1	0.9	0.1	2.5
111B	Alkali Valley	-0.7	1.1	3.0	3.5	3.3	4.2	4.3	3.4	2.7	1.8	0.4	0.1	2.3
230	Amargosa Desert	-0.5	0.8	2.7	3.9	4.3	5.7	5.1	4.1	3.8	2.4	1.2	0.0	2.8
57	Antelope Valley	-1.6	-0.3	2.0	2.7	3.0	4.7	4.9	4.0	2.9	1.7	-0.4	-1.2	1.9
106	Antelope Valley	-0.4	1.3	2.5	2.9	2.3	3.1	3.4	2.5	2.4	1.5	-0.1	-0.4	1.7
186B	Antelope Valley	-2.3	-1.4	0.4	1.9	2.4	3.6	3.8	3.4	2.4	1.3	-0.3	-2.3	1.1
137A	Big Smoky Valley	-0.6	0.7	2.8	3.6	3.6	4.9	4.7	3.8	3.0	2.0	0.6	-0.2	2.4
137B	Big Smoky Valley	-1.8	-0.5	1.9	2.7	3.0	4.8	4.9	4.0	3.0	1.8	-0.1	-1.4	1.9
215	Black Moutains Area	-0.6	0.8	2.4	4.1	5.0	6.9	5.9	4.7	4.9	2.8	1.7	0.0	3.2
28	Black Rock Desert	-1.3	0.3	1.3	2.0	2.2	3.4	3.9	3.4	2.3	1.0	-0.9	-1.3	1.3
61	Boulder Flat	-2.1	-1.3	0.9	1.8	2.2	3.4	4.0	3.6	2.4	1.3	-0.8	-1.9	1.1
38	Bruneau River Area	-1.8	-1.4	0.3	1.6	2.0	2.5	3.2	3.1	1.9	0.9	-0.9	-1.9	0.8
129	Buena Vista Valley	-1.7	0.0	2.7	2.9	3.7	4.8	4.9	3.9	2.9	1.6	-0.5	-1.0	2.0
131	Buffalo Valley	-1.7	-0.6	1.5	2.3	2.6	4.0	4.4	3.7	2.6	1.4	-0.7	-1.4	1.5
101	Carson Desert*	-1.0	1.0	4.6	5.6	6.7	9.6	8.3	5.9	4.9	3.7	0.3	-0.4	4.1
105	Carson Valley*	-0.1	2.0	2.3	3.0	1.4	2.2	2.4	1.6	3.0	3.0	0.2	-0.3	1.7
102	Churchill Valley	-0.6	0.9	2.9	3.7	2.9	4.2	4.7	3.3	2.5	1.5	-0.3	-0.5	2.1
143	Clayton Valley	0.3	1.3	3.4	4.1	4.0	4.7	4.4	3.7	3.0	2.2	1.2	0.7	2.7
177	Clover Valley	-2.2	-1.5	0.4	1.8	2.2	3.2	3.6	3.3	2.2	1.2	-0.6	-2.1	1.0
204	Clover Valley	-2.7	-0.9	1.0	2.8	3.6	6.1	4.9	3.5	3.6	1.6	0.9	-1.8	1.9
64	Clovers Area	-1.9	-1.0	1.0	1.8	2.2	3.4	4.0	3.5	2.3	1.2	-0.9	-1.7	1.2
213	Colorado Valley	1.8	2.7	3.8	5.7	7.2	8.5	7.5	6.2	6.9	4.6	2.7	2.4	5.0
118	Columbus Salt Marsh Valley	0.1	1.2	3.2	3.9	3.8	4.6	4.4	3.7	2.9	2.1	0.9	0.4	2.6
126	Cowkick Valley	-1.0	0.6	3.1	3.8	4.1	6.0	5.8	4.3	3.4	2.1	-0.1	-0.5	2.6
54	Crescent Valley	-2.4	-1.4	1.0	1.8	2.3	4.0	4.4	3.9	2.7	1.5	-0.7	-2.0	1.3
103	Dayton Valley	-0.4	1.3	2.5	2.9	2.3	3.2	3.6	2.6	2.4	1.5	-0.2	-0.5	1.8
31	Desert Valley	-1.4	-0.5	1.3	2.0	2.2	3.4	3.9	3.4	2.3	1.0	-0.9	-1.4	1.3
153	Diamond Valley*	-3.6	-2.6	0.3	1.1	1.8	4.1	4.8	4.4	2.8	1.7	-0.9	-2.9	0.9
48	Dixie Creek-Tenmile Creek Area	-2.4	-1.6	0.6	1.7	2.2	3.6	4.0	3.7	2.4	1.3	-0.7	-2.2	1.0
128	Dixie Valley	-1.1	0.3	2.8	3.5	3.9	5.7	5.6	4.2	3.3	2.0	-0.2	-0.7	2.4
82	Dodge Flat	-0.8	0.8	2.9	3.5	3.6	5.2	5.2	3.9	3.1	1.9	-0.3	-0.5	2.4
104	Eagle Valley	-0.2	1.8	2.3	2.9	2.0	2.6	2.7	2.0	2.5	1.8	0.1	-0.3	1.7
200	Eagle Valley	-2.7	-1.0	0.9	2.8	3.6	6.1	4.8	3.4	3.5	1.5	0.8	-1.9	1.8

Appendix 4a cont. Mean monthly 2 meter equivalent wind speed (m/s) for stations used in spatial interpolation and assignment to weather stations used for computing ET and net irrigation water requirements.

STATION NAME	LAT	LONG	ELEVATION (FT)	STATE	NETWORK	BASIN NUMBER	BASIN NAME	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN ANNUAL
DYER - WALLACE FARMS	37.61	-117.99	4882	NV	DRI	117	Fish Lake Valley	3.2	3.8	3.8	4.1	3.2	3.2	2.9	2.8	2.8	3.1	3.1	3.3	3.3
EDWARDS CREEK VALLEY	39.53	-117.75	5194	NV	DRI	133	Edwards Creek Valley	1.7	1.9	2.1	2.4	2.4	2.4	2.4	2.3	2.1	1.9	1.8	1.8	2.1
ELKO WB AIRPORT	40.83	-115.78	5050	NV	AIRPORT	49	Elko Segment	1.6	1.8	2.1	2.3	2.2	2.2	2.1	1.9	1.8	1.6	1.7	1.6	1.9
ELY WBO	39.30	-114.85	6262	NV	AIRPORT	179	Stephens Valley	3.0	3.1	3.3	3.4	3.4	3.4	3.3	3.3	3.2	3.1	3.0	3.1	3.2
EUREKA	39.69	-115.98	5896	NV	AGRI-MET	153	Diamond Valley	1.7	1.9	2.6	3.0	2.3	2.2	1.9	1.8	1.8	1.8	1.9	2.0	2.1
FAIRVIEW VALLEY	39.32	-118.22	4236	NV	DRI	124	Fairview Valley	1.7	2.1	2.3	2.7	2.8	2.6	2.6	2.3	2.1	1.9	1.9	1.7	2.2
FALLON	39.46	-118.78	3967	NV	AGRI-MET	101	Carson Desert	1.3	1.7	2.0	2.2	1.8	1.8	1.4	1.3	1.3	1.1	1.3	1.5	1.6
GARDEN VALLEY	38.03	-115.44	5167	NV	CEMP	172	Garden Valley	1.1	1.3	1.6	1.9	1.8	1.8	1.7	1.6	1.5	1.2	1.1	1.1	1.5
GARDNERVILLE	38.89	-119.72	4797	NV	NVDOT	105	Carson Valley	1.5	1.5	2.2	2.4	2.2	1.9	1.7	1.8	1.6	1.5	1.5	1.7	1.8
GOLDFIELD	37.71	-117.24	5627	NV	CEMP	142	Alkali Spring Valley	2.8	3.1	3.3	3.5	3.1	3.1	2.8	2.8	2.7	2.6	2.7	2.7	2.9
IMMIGRATION WASH	37.92	-114.17	6230	NV	RAWS	198	Dry Valley	2.2	2.4	2.8	3.1	3.2	3.3	2.9	2.8	2.8	2.6	2.3	2.2	2.7
LAS VEGAS WSO AIRPORT	36.23	-115.03	1883	NV	AIRPORT	212	Las Vegas Valley	2.4	2.8	3.3	3.6	3.7	3.6	3.3	3.1	2.9	2.6	2.5	2.4	3.0
LOVELOCK FAA AIRPORT	40.07	-118.57	3902	NV	AIRPORT	73	Lovelock Valley	1.8	2.2	2.5	2.9	3.0	2.9	2.6	2.4	2.2	2.0	1.8	1.7	2.3
LOWER BIG SMOKEY VALLEY	38.37	-117.47	5036	NV	DRI	137A	Big Smoky Valley	3.2	3.5	3.9	4.3	4.1	4.2	3.5	3.4	3.5	3.6	3.4	3.0	3.6
MEDLINS RANCH	37.40	-115.54	4475	NV	CEMP	169A	Tikapoo Valley	2.5	2.5	2.8	3.2	3.1	3.0	2.7	2.6	2.7	2.5	2.3	2.3	2.7
MESQUITE	36.81	-114.05	1768	NV	CEMP	222	Virgin River Valley	1.4	1.4	1.5	1.7	1.7	1.6	1.7	1.5	1.6	1.3	1.2	1.2	1.5
MOHAVE	34.97	-114.61	479	AZ	AZMET	NA	NA	2.6	2.7	2.7	2.8	2.6	2.2	1.8	1.7	1.6	1.9	2.3	2.9	2.3
MOREY CREEK	41.45	-117.62	5499	NV	RAWS	69	Paradise	2.1	2.3	3.0	3.0	2.9	2.9	2.9	2.8	2.6	2.5	2.3	2.1	2.6
NYALA	38.25	-115.73	4826	NV	CEMP	173B	Railroad Valley	1.3	1.5	1.9	2.4	2.3	2.4	2.3	2.2	1.9	1.6	1.4	1.2	1.9
ORIENTAL WASH	37.24	-117.50	4101	NV	RAWS	232	Oriental W.	3.1	3.2	3.4	3.6	3.6	3.6	3.4	3.4	3.4	3.5	3.2	3.1	3.4

Appendix 4b. Interpolated or assigned basin average mean monthly wind speed (m/s) used for assignment to respective NWS weather stations. Symbol * next to the basin name indicates that the basins was assigned the measured mean monthly wind speed.

BASIN NUMBER	BASIN NAME	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN ANNUAL
142	Alkali Spring Valley*	2.8	3.1	3.3	3.5	3.1	3.1	2.8	2.8	2.7	2.6	2.7	2.7	2.9
111B	Alkali Valley	2.0	2.3	2.7	2.9	2.6	2.5	2.2	2.2	2.1	2.0	2.1	2.2	2.3
230	Amargosa Desert*	1.8	2.2	2.3	3.0	2.7	2.9	2.9	2.8	2.3	2.0	1.7	1.7	2.4
57	Antelope Valley*	1.6	2.0	2.2	2.5	2.6	2.5	2.2	2.1	2.0	1.8	1.7	1.7	2.1
106	Antelope Valley	1.9	2.1	2.6	2.9	2.8	2.7	2.5	2.4	2.4	1.9	2.0	2.3	2.4
186B	Antelope Valley	2.4	2.4	2.7	3.0	2.8	2.9	2.6	2.6	2.4	2.4	2.3	2.3	2.6
137A	Big Smoky Valley*	3.2	3.5	3.9	4.3	4.1	4.2	3.5	3.4	3.5	3.6	3.4	3.0	3.6
137B	Big Smoky Valley*	2.0	2.4	2.9	3.3	3.0	3.2	2.9	2.7	2.5	2.4	2.4	2.3	2.7
215	Black Moutains Area	1.8	2.0	2.3	2.6	2.5	2.5	2.2	2.2	2.1	1.9	1.8	1.7	2.1
28	Black Rock Desert	2.0	2.2	2.6	2.8	2.7	2.6	2.5	2.4	2.3	2.2	2.1	2.1	2.4
61	Boulder Flat	1.7	2.0	2.3	2.5	2.4	2.4	2.3	2.2	2.0	1.8	1.8	1.8	2.1
38	Bruneau River Area	2.4	2.5	2.9	2.9	2.8	2.8	2.7	2.6	2.4	2.4	2.6	2.5	2.6
129	Buena Vista Valley	1.8	2.1	2.4	2.6	2.6	2.6	2.4	2.3	2.1	2.0	1.9	1.9	2.2
131	Buffalo Valley	1.8	2.0	2.3	2.5	2.5	2.5	2.3	2.3	2.1	1.9	1.9	1.8	2.2
101	Carson Desert*	1.3	1.7	2.0	2.2	1.8	1.8	1.4	1.3	1.3	1.1	1.3	1.5	1.6
105	Carson Valley*	1.6	1.6	2.4	2.5	2.3	2.0	1.8	1.7	1.7	1.6	1.6	1.8	1.9
102	Churchill Valley	1.6	2.0	2.3	2.6	2.3	2.1	1.9	1.8	1.8	1.6	1.8	1.8	2.0
143	Clayton Valley	2.8	3.2	3.4	3.6	3.2	3.2	2.9	2.8	2.8	2.8	2.8	2.8	3.0
177	Clover Valley	2.3	2.3	2.7	2.9	2.8	2.8	2.6	2.5	2.3	2.3	2.3	2.3	2.5
204	Clover Valley	1.9	2.0	2.3	2.7	2.6	2.7	2.5	2.4	2.4	2.1	1.9	1.8	2.3
64	Clovers Area	1.9	2.1	2.5	2.6	2.6	2.5	2.4	2.3	2.2	2.0	2.0	1.9	2.2
213	Colorado Valley	2.6	2.7	2.7	2.8	2.6	2.7	1.8	1.7	1.6	1.9	2.3	2.9	2.3
118	Columbus Salt Marsh Valley	2.6	3.0	3.2	3.5	3.1	3.0	2.7	2.6	2.6	2.7	2.7	2.6	2.8
126	Cowkick Valley	1.8	2.1	2.3	2.6	2.6	2.5	2.5	2.3	2.1	1.9	1.9	1.9	2.2
54	Crescent Valley	1.6	1.9	2.3	2.4	2.4	2.4	2.2	2.1	2.0	1.8	1.7	1.7	2.1
103	Dayton Valley	1.8	2.0	2.6	2.9	2.6	2.3	2.2	2.0	2.0	1.8	2.0	2.1	2.2
31	Desert Valley	2.2	2.4	2.7	2.8	2.8	2.8	2.6	2.5	2.4	2.3	2.3	2.2	2.5
153	Diamond Valley*	1.7	1.9	2.6	3.0	2.3	2.2	1.9	1.8	1.8	1.8	1.9	2.0	2.1
48	Dixie Creek-Tenmile Creek Area	1.8	2.0	2.3	2.5	2.4	2.4	2.2	2.1	2.0	1.9	1.9	1.9	2.1
128	Dixie Valley	1.7	2.0	2.3	2.6	2.6	2.5	2.4	2.2	2.1	1.9	1.9	1.8	2.1

Appendix 8 cont. Weather station aridity ratings following Allen and Brockway (1983), estimated from station photos, and high resolution image analysis (0= irrigated area, 100=completely arid).

Station Name	NOAA #	Station Aridity	Area Aridity	Regional Aridity	Cumulative Aridity
DAGGET PASS	262119	70	60	60	64
DENIO	262229	70	60	80	66
DESERT NWR	262243	80	90	100	87
DIABLO	262276	100	100	100	100
DIAMOND VALLEY USDA	262296	70	20	40	42
DUCKWATER	262390	60	60	80	62
DUFURRENA	262394	80	60	90	71
DYER	262431	90	90	90	90
EASTGATE	262477	90	90	100	91
ECHO BAY	262497	100	80	70	87
ELGIN	262557	60	90	90	78
ELGIN 3 SE	262562	60	90	90	78
ELKO	262570	70	70	90	72
ELKO RGNL AP	262573	100	70	80	83
ELY 6 NE	262626	90	90	90	90
FLY YELLAND FLD AP	262631	100	100	90	99
EMIGRANT PASS HWY STN	262656	90	90	100	91
EMPIRE	262662	70	90	100	83
EUREKA	262708	90	90	100	91
FALLON EXP STN	262780	50	70	50	60
FERGUSON SPRINGS HMS	262820	90	90	90	90
FERNLEY	262840	100	100	100	100
FISH CREEK RCH	262860	20	40	80	36
GERLACH	263090	100	90	100	95
GEYSER RCH	263101	60	70	90	68
GIBBS RCH	263114	50	50	70	52
GLENBROOK	263205	50	70	70	62
GOLCONDA	263245	100	100	100	100
GOLDFIELD	263285	100	100	100	100
GOODSPRINGS	263316	80	100	100	92
GREAT BASIN NP	263340	70	80	100	78
HAWTHORNE	263512	90	100	100	96
HAWTHORNE AP	263515	80	90	100	87
HIKO	263671	50	50	70	52
HUMBOLDT FLD	263853	90	100	100	96
I-L RCH	263940	80	80	90	81
IMLAY	263957	90	90	100	91
INDIAN SPRINGS	263980	100	100	100	100
JACKPOT	264016	70	90	100	83

Appendix 10. Crop or land cover class simulated for each station (1 = yes, 0 = no).

Station Name	Station Number	Alfalfa Hay	Grass Hay	Snap and Dry Beans - fresh	Snap and Dry Beans - seed	Field Corn	Silage Corn	Sweet Corn--early	Sweet Corn--late	Spring Grain - irrigated	Winter Grain - irrigated
ADAVEN	260046	1	1								
ALAMO	260099	1	1			1	1	1	1	1	1
AMARGOSA FARMS-GAREY	260150	1	1			1	1	1	1	1	1
ANTELOPE VALLEY FARR	260282	1	1								
ARTHUR 4 NW	260438	1	1			1	1	1	1	1	1
AUSTIN #2	260507	1	1								
BASALT	260668	1	1								
BATTLE MTN	260688	1	1			1	1	1	1	1	1
BATTLE MTN AP	260691	1	1			1	1	1	1	1	1
BEATTY	260715	1	1			1	1	1	1	1	1
BEATTY 8 N	260718	1	1			1	1	1	1	1	1
BEOWAWE	260795	1	1								
BEOWAWE U OF N RCH	260800	1	1								
BLUE EAGLE RCH HANKS	260955	1	1								
BLUE JAY HWY STN	260961	1	1								
BOULDER CITY	261071	1	1			1	1	1	1	1	1
BRINKERHOFF RCH	261160	1	1								
BUFFALO RCH	261311	1	1								
BUNKERVILLE	261327	1	1			1	1	1	1	1	1
CALIENTE	261358	1	1			1	1	1	1	1	1
CALLVILLE BAY	261371	1	1								
CARLIN NEWMONT MINE	261415	1	1								
CARSON CITY	261485	1	1								
CATHEDRAL GORGE SP	261590	1	1			1	1	1	1	1	1
CENTRAL NEVADA FLD LAB	261630	1	1			1	1	1	1	1	1
CHARLESTON	261660	1	1								
CLOVER VALLEY	261740	1	1			1	1	1	1	1	1
COALDALE JUNCTION	261755	1	1								
CONTACT	261905	1	1								
CORTEZ GOLD MINE	261975	1	1								
CURRENT	262078	1	1			1	1	1	1	1	1
CURRENT HWY STN	262091	1	1								
CURRIE HWY STN	262096	1	1								
DAGGET PASS	262119	1	1								
DENIO	262229	1	1			1	1	1	1	1	1
DESERT NWR	262243	1	1								
DIABLO	262276	1	1								
DIAMOND VALLEY USDA	262296	1	1			1	1	1	1	1	1
DUCKWATER	262390	1	1			1	1	1	1	1	1
DUFURRENA	262394	1	1								
DYER	262431	1	1			1	1	1	1	1	1
EASTGATE	262477	1	1								
ECHO BAY	262497	1	1								
ELGIN	262557	1	1			1	1	1	1	1	1
ELGIN 3 SE	262562	1	1			1	1	1	1	1	1

Appendix 10 cont. Crop or land cover class simulated for each station (1 = yes, 0 = no).

Station Name	Station Number	Grass Pasture - high management	Grass Pasture - low management	Grass - Turf	Orchards - Apples and Cherries w/ground cover	Orchards - Apples and Cherries w/no ground cover	Garden Vegetables - general	Onions	Melons
ADAVEN	260046	1	1	1					
ALAMO	260099	1	1	1	1	1	1	1	
AMARGOSA FARMS-GAREY	260150	1	1	1	1	1	1	1	
ANTELOPE VALLEY FARR	260282	1	1	1					
ARTHUR 4 NW	260438	1	1	1	1	1			
AUSTIN #2	260507	1	1	1					
BASALT	260668	1	1	1					
BATTLE MTN	260688	1	1	1	1	1	1	1	
BATTLE MTN AP	260691	1	1	1	1	1	1	1	
BEATTY	260715	1	1	1	1	1	1	1	
BEATTY 8 N	260718	1	1	1	1	1	1	1	
BEOWAVE	260795	1	1	1					
BEOWAVE U OF N RCH	260800	1	1	1					
BLUE EAGLE RCH HANKS	260955	1	1	1					
BLUE JAY HWY STN	260961	1	1	1					
BOULDER CITY	261071	1	1	1	1	1	1		
BRINKERHOFF RCH	261160	1	1	1					
BUFFALO RCH	261311	1	1	1					
BUNKERVILLE	261327	1	1	1	1	1	1	1	
CALIENTE	261358	1	1	1	1	1	1	1	
CALLVILLE BAY	261371	1	1	1					
CARLIN NEWMONT MINE	261415	1	1	1					
CARSON CITY	261485	1	1	1					
CATHEDRAL GORGE SP	261590	1	1	1	1	1	1	1	
CENTRAL NEVADA FLD LAB	261630	1	1	1	1	1	1		
CHARLESTON	261660	1	1	1					
CLOVER VALLEY	261740	1	1	1	1	1	1		
COALDALE JUNCTION	261755	1	1	1					
CONTACT	261905	1	1	1					
CORTEZ GOLD MINE	261975	1	1	1					
CURRANT	262078	1	1	1	1	1	1	1	
CURRANT HWY STN	262091	1	1	1					
CURRIE HWY STN	262096	1	1	1					
DAGGET PASS	262119	1	1	1					
DENIO	262229	1	1	1	1	1	1	1	
DESERT NWR	262243	1	1	1					
DIABLO	262276	1	1	1					
DIAMOND VALLEY USDA	262296	1	1	1	1	1	1		
DUCKWATER	262390	1	1	1	1	1	1	1	
DUFURRENA	262394	1	1	1					
DYER	262431	1	1	1	1	1	1	1	
EASTGATE	262477	1	1	1					
ECHO BAY	262497	1	1	1					
ELGIN	262557	1	1	1	1	1	1	1	
ELGIN 3 SE	262562	1	1	1	1	1	1	1	
ELKO	262570	1	1	1	1	1	1		

Appendix 10 cont. Crop or land cover class simulated for each station (1 = yes, 0 = no).

Station Name	Station Number	Grapes- -wine	Alfalfa Seed	Peas- - fresh	Peas- - seed	Potatoes-- processing (early harvest)	Potatoes- -cold pack (late harvest)	Sugar beets	Hops
ADAVEN	260046								
ALAMO	260099		1			1	1	1	
AMARGOSA FARMS- GAREY	260150		1			1	1	1	
ANTELOPE VALLEY FARR	260282								
ARTHUR 4 NW	260438		1						
AUSTIN #2	260507								
BASALT	260668								
BATTLE MTN	260688		1			1	1		
BATTLE MTN AP	260691		1			1	1		
BEATTY	260715		1			1	1	1	
BEATTY 8 N	260718		1			1	1	1	
BEOWAWE	260795								
BEOWAWE U OF N RCH	260800								
BLUE EAGLE RCH HANKS	260955								
BLUE JAY HWY STN	260961								
BOULDER CITY	261071		1						
BRINKERHOFF RCH	261160								
BUFFALO RCH	261311								
BUNKERVILLE	261327		1			1	1	1	
CALIENTE	261358		1			1	1	1	
CALLVILLE BAY	261371								
CARLIN NEWMONT MINE	261415								
CARSON CITY	261485								
CATHEDRAL GORGE SP	261590		1			1	1	1	
CENTRAL NEVADA FLD LAB	261630		1						
CHARLESTON	261660								
CLOVER VALLEY	261740		1						
COALDALE JUNCTION	261755								
CONTACT	261905								
CORTEZ GOLD MINE	261975								
CURRENT	262078		1			1	1	1	
CURRENT HWY STN	262091								
CURRIE HWY STN	262096								
DAGGET PASS	262119								
DENIO	262229		1			1	1	1	
DESERT NWR	262243								
DIABLO	262276								
DIAMOND VALLEY USDA	262296		1						
DUCKWATER	262390		1			1	1	1	
DUFURRENA	262394								
DYER	262431		1			1	1	1	
EASTGATE	262477								
ECHO BAY	262497								
ELGIN	262557		1			1	1	1	
ELGIN 3 SE	262562		1			1	1	1	

Appendix 10 cont. Crop or land cover class simulated for each station (1 = yes, 0 = no).

Station Name	Station Number	Sunflower -irrigated	Safflower -irrigated	Canola	Garlic	Bare soil	Mulched soil, including wheat stubble	Dormant turf (winter time)	Open water - shallow systems/ponds
ADAVEN	260046					1	1	1	1
ALAMO	260099	1	1	1	1	1	1	1	1
AMARGOSA FARMS- GAREY	260150	1	1	1		1	1	1	1
ANTELOPE VALLEY FARR	260282					1	1	1	1
ARTHUR 4 NW	260438					1	1	1	1
AUSTIN #2	260507					1	1	1	1
BASALT	260668					1	1	1	1
BATTLE MTN	260688					1	1	1	1
BATTLE MTN AP	260691					1	1	1	1
BEATTY	260715	1	1	1	1	1	1	1	1
BEATTY 8 N	260718	1	1	1	1	1	1	1	1
BEOVAWE	260795					1	1	1	1
BEOVAWE U OF N RCH	260800					1	1	1	1
BLUE EAGLE RCH HANKS	260955					1	1	1	1
BLUE JAY HWY STN	260961					1	1	1	1
BOULDER CITY	261071	1	1	1		1	1	1	1
BRINKERHOFF RCH	261160					1	1	1	1
BUFFALO RCH	261311					1	1	1	1
BUNKERVILLE	261327	1	1	1	1	1	1	1	1
CALIENTE	261358	1	1	1	1	1	1	1	1
CALLVILLE BAY	261371					1	1	1	1
CARLIN NEWMONT MINE	261415					1	1	1	1
CARSON CITY	261485					1	1	1	1
CATHEDRAL GORGE SP	261590	1	1	1		1	1	1	1
CENTRAL NEVADA FLD LAB	261630					1	1	1	1
CHARLESTON	261660					1	1	1	1
CLOVER VALLEY	261740					1	1	1	1
COALDALE JUNCTION	261755					1	1	1	1
CONTACT	261905					1	1	1	1
CORTEZ GOLD MINE	261975					1	1	1	1
CURRENT	262078	1	1	1		1	1	1	1
CURRENT HWY STN	262091					1	1	1	1
CURRIE HWY STN	262096					1	1	1	1
DAGGET PASS	262119					1	1	1	1
DENIO	262229	1	1	1	1	1	1	1	1
DESERT NWR	262243					1	1	1	1
DIABLO	262276					1	1	1	1
DIAMOND VALLEY USDA	262296					1	1	1	1
DUCKWATER	262390	1	1	1	1	1	1	1	1
DUFURRENA	262394					1	1	1	1
DYER	262431	1	1	1	1	1	1	1	1
EASTGATE	262477					1	1	1	1
ECHO BAY	262497					1	1	1	1
ELGIN	262557	1	1	1	1	1	1	1	1

Appendix 11a cont.

STATION NUMBER	STATION NAME	BASIN NAME	BASIN NUMBER	NUMBER OF YEARS USED FOR AVERAGE	START YEAR	END YEAR	REFERENCE ET _{ref} (ft)	ALFALFA ET _{ref} (ft)	HIGHLY MANAGED PASTURE GRASS ET _{ref} (ft)	LOW MANAGED PASTURE GRASS ET _{ref} (ft)	GRASS HAY ET _{ref} (ft)	TURF GRASS ET _{ref} (ft)	SHALLOW OPEN WATER ET _{ref} (ft)
261905	CONTACT*	Salmon Falls Creek Area	40	30	1958	1998	4.2	3.4	3.2	2.7	3.0	3.0	4.4
261975	CORTEZ GOLD MINE*	Crescent Valley	54	10	1969	1979	4.1	3.6	3.5	2.9	3.4	3.3	4.3
262091	CURRENT HWY STN	Railroad Valley	173B	7	1964	1977	4.3	3.0	3.0	2.4	2.7	2.7	4.5
262078	CURRENT*	Railroad Valley	173B	4	1942	1946	4.4	3.8	3.8	3.1	3.7	3.6	4.6
262096	CURRIE HWY STN*	Steptoe Valley	179	10	1962	1989	4.7	3.2	3.1	2.5	2.9	2.8	4.9
262119	DAGGET PASS	Lake Tahoe Basin	90	5	1989	2005	3.3	2.3	2.2	1.7	2.0	2.0	3.4
262229	DENIO*	Pueblo Valley	1	30	1970	2005	4.3	3.7	3.6	3.0	3.5	3.5	4.5
262243	DESERT NWR*	Las Vegas Valley	212	30	1976	2007	6.2	5.9	5.1	4.1	4.2	5.7	6.5
262276	DIABLO*	Railroad Valley	173A	10	1960	1978	4.8	4.2	4.1	3.4	4.0	4.1	5.0
262296	DIAMOND VALLEY USDA*	Diamond Valley	153	19	1980	2006	4.1	3.2	3.1	2.5	3.0	2.9	4.3
262390	DUCKWATER*	Railroad Valley	173B	19	1967	1998	4.5	3.9	3.8	3.1	3.7	3.6	4.7
262394	DUFURENA*	Virgin Valley	4	30	1967	2004	4.4	3.3	3.1	2.6	3.0	2.9	4.6
262431	DYER*	Fish Lake Valley	117	30	1974	2007	5.5	4.6	4.4	3.6	4.3	4.3	5.8
262477	EASTGATE*	Eastgate Valley Area	127	4	1957	1963	4.5	3.9	3.9	3.2	3.9	3.8	4.8
262497	ECHO BAY*	Black Mountains Area	215	10	1990	2003	5.3	5.0	4.2	3.4	2.8	4.9	5.6

Appendix 11a cont.

STATION NUMBER	STATION NAME	BASIN NAME	BASIN NUMBER	NUMBER OF YEARS USED FOR AVERAGE	START YEAR	END YEAR	REFERENCE ET _{ref} (ft)	ALFALFA ET _{ref} (ft)	HIGHLY MANAGED PASTURE GRASS ET _{ref} (ft)	LOW MANAGED PASTURE GRASS ET _{ref} (ft)	GRASS HAY ET _{ref} (ft)	TURF GRASS ET _{ref} (ft)	SHALLOW OPEN WATER ET _{ref} (ft)
262562	ELGIN 3 SE*	Lower Meadow Valley Wash	205	15	1966	1985	4.9	4.6	3.9	3.2	3.5	4.5	5.1
262557	ELGIN*	Lower Meadow Valley Wash	205	20	1986	2006	4.9	4.6	4.1	3.3	3.8	4.5	5.2
262573	ELKO RGNL AP*	Elko Segment	49	30	1978	2007	4.0	3.3	3.2	2.7	3.1	3.0	4.2
262570	ELKO*	Elko Segment	49	6	2000	2007	3.9	3.3	3.3	2.7	3.2	3.1	4.1
262626	ELY 6 NE	Steptoe Valley	179	5	2000	2005	4.8	4.0	3.9	3.3	3.7	3.7	5.1
262631	ELY YELLAND FLD AP*	Steptoe Valley	179	30	1976	2005	4.5	3.5	3.3	2.7	3.2	3.0	4.7
262656	EMIGRANT PASS HWY STN	Boulder Flat	61	27	1964	1999	3.8	3.2	3.2	2.6	3.0	3.0	4.0
262662	EMPIRE*	San Emidio Desert	22	6	1951	1976	4.4	3.9	3.9	3.2	3.8	3.9	4.6
262708	EUREKA	Diamond Valley	153	30	1975	2007	3.6	2.9	2.8	2.2	2.6	2.5	3.8
262780	FALLON EXP STN*	Carson Desert	101	30	1973	2005	4.1	3.6	3.5	2.9	3.5	3.5	4.3
262820	FERGUSON SPRINGS HMS*	Great Salt Lake Desert	192	7	1973	1982	3.6	2.9	2.9	2.3	2.7	2.7	3.7
262840	FERNLEY*	Fernley Area	76	21	1908	1974	4.6	3.9	3.8	3.1	3.6	3.7	4.8
262860	FISH CREEK RCH*	Little Smoky Valley	155A	14	1944	1964	4.5	3.1	3.1	2.5	2.9	2.9	4.8
263090	GERLACH*	San Emidio Desert	22	27	1953	2006	4.2	3.8	3.7	3.0	3.6	3.7	4.4
263101	GEYSER RCH*	Lake Valley	183	19	1972	2002	4.5	3.6	3.4	2.8	3.3	3.2	4.7

Appendix 11b cont.

STATION NUMBER	STATION NAME	BASIN NAME	BASIN NUMBER	NUMBER OF YEARS USED FOR AVERAGE	START YEAR	END YEAR	REFERENCE ET ₀ (ft)	ALFALFA ET _{act} (ft)	HIGHLY MANAGED PASTURE GRASS ET _{act} (ft)	LOW MANAGED PASTURE GRASS ET _{act} (ft)	GRASS HAY ET _{act} (ft)	TURF GRASS ET _{act} (ft)	SHALLOW OPEN WATER ET _{act} (ft)
261755	COALDALE JUNCTION*	Columbus Salt Marsh Valley	118	6	1942	1958	5.5	4.7	4.4	3.6	4.3	4.3	5.8
265132	MIDDLEGATE- LOWERY*	Cowick Valley	126	15	1989	2007	4.8	3.8	3.5	2.9	3.4	3.3	5.0
260795	BEOVAWE*	Crescent Valley	54	30	1976	2006	4.3	3.6	3.6	3.0	3.5	3.5	4.5
261975	CORTEZ GOLD MINE*	Crescent Valley	54	10	1969	1979	4.1	3.6	3.5	2.9	3.4	3.3	4.3
268761	VIRGINIA CITY	Dayton Valley	103	30	1975	2007	3.5	2.9	2.8	2.3	2.7	2.7	3.7
264108	JUNGO MEYER RCH*	Desert Valley	31	7	1969	1985	4.3	3.8	3.7	3.0	3.5	3.6	4.5
262296	DIAMOND VALLEY USDA*	Diamond Valley	153	19	1980	2006	4.1	3.2	3.1	2.5	3.0	2.9	4.3
262708	EUREKA	Diamond Valley	153	30	1975	2007	3.6	2.9	2.8	2.2	2.6	2.5	3.8
267690	SOUTH FORK SP*	Dixie Creek - Tennille	48	8	1994	2007	4.3	3.4	3.3	2.7	3.0	3.1	4.5
261160	BRINKERHOFF RCH*	Dixie Valley	128	7	1967	1979	4.7	4.2	4.1	3.4	4.0	4.1	4.9
268838	WADSWORTH 4 N*	Dodge Flat	82	21	1975	2002	4.6	3.9	3.8	3.1	3.7	3.7	4.8
261485	CARSON CITY*	Eagle Valley	104	30	1974	2007	4.3	3.8	3.6	3.0	3.5	3.6	4.6
268538	URSINE	Eagle Valley	200	4	1965	1972	4.8	4.3	4.2	3.5	4.1	4.1	5.1
262477	EASTGATE*	Eastgate Valley Area	127	4	1957	1963	4.5	3.9	3.9	3.2	3.9	3.8	4.8
261071	BOULDER CITY*	Eldorado Valley	167	30	1969	2004	5.4	5.1	4.3	3.5	3.1	5.0	5.7
262573	ELKO RGNL AP*	Elko Segment	49	30	1978	2007	4.0	3.3	3.2	2.7	3.1	3.0	4.2

Appendix 12a cont.

STATION NUMBER	STATION NAME	BASIN NAME	BASIN NUMBER	NUMBER OF YEARS USED FOR AVERAGE	START YEAR	END YEAR	ALFALFA NIWR (ft)	HIGHLY MANAGED PASTURE GRASS NIWR (ft)	LOW MANAGED PASTURE GRASS NIWR (ft)	GRASS HAY NIWR (ft)	TURF GRASS NIWR (ft)	SHALLOW OPEN WATER NIWR (ft)
261905	CONTACT*	Salmon Falls Creek Area	40	30	1956	1998	2.6	2.4	1.9	2.3	2.3	3.5
261975	CORTEZ GOLD MINE*	Crescent Valley	54	10	1969	1979	2.9	2.9	2.3	2.8	2.8	3.5
262091	CURRENT HWY STN	Railroad Valley	1738	7	1964	1977	2.5	2.5	2.0	2.3	2.3	3.8
262078	CURRENT*	Railroad Valley	1738	4	1942	1946	3.3	3.4	2.6	3.2	3.2	4.1
262096	CURRIE HWY STN*	Steptoe Valley	179	10	1962	1989	2.8	2.7	2.1	2.5	2.5	4.3
262119	DAGGET PASS	Lake Tahoe Basin	90	5	1989	2005	1.9	1.9	1.4	1.7	1.7	1.3
262229	DENIO*	Pueblo Valley	1	30	1969	2005	3.1	3.1	2.5	3.0	3.0	3.7
262243	DESERT NWR*	Las Vegas Valley	212	30	1974	2007	5.5	4.7	3.7	4.0	5.4	6.1
262276	DIABLO*	Railroad Valley	173A	10	1960	1978	3.7	3.7	3.0	3.5	3.7	4.5
262296	DIAMOND VALLEY USDA*	Diamond Valley	153	19	1980	2006	2.5	2.5	2.0	2.4	2.4	3.5
262390	DUCKWATER*	Railroad Valley	173B	19	1967	1998	3.3	3.3	2.6	3.2	3.1	4.1
262394	DUFURRENA*	Virgin Valley	4	30	1965	2004	2.8	2.7	2.1	2.6	2.5	4.0
262431	DYER*	Fish Lake Valley	117	30	1974	2007	4.2	4.1	3.2	4.1	4.0	5.4
262477	EASTGATE*	Eastgate Valley Area	127	4	1957	1963	3.4	3.4	2.7	3.4	3.4	4.2
262497	ECHO BAY*	Black Mountains Area	215	10	1990	2003	4.5	3.8	3.0	2.6	4.6	5.1
262562	ELGIN 3 SE*	Lower Meadow Valley Wash	205	15	1966	1985	3.8	3.2	2.5	2.9	3.8	3.9

Appendix 12a cont.

STATION NUMBER	STATION NAME	BASIN NAME	BASIN NUMBER	NUMBER OF YEARS USED FOR AVERAGE	START YEAR	END YEAR	ALFALFA NIWR (ft)	HIGHLY MANAGED PASTURE GRASS NIWR (ft)	LOW MANAGED PASTURE GRASS NIWR (ft)	GRASS HAY NIWR (ft)	TURF GRASS NIWR (ft)	SHALLOW OPEN WATER NIWR (ft)
262557	ELGIN*	Lower Meadow Valley Wash	205	20	1986	2006	3.9	3.4	2.7	3.3	3.9	4.2
262573	ELKO RGNL AP*	Elko Segment	49	30	1978	2007	2.6	2.6	2.1	2.5	2.5	3.3
262570	ELKO*	Elko Segment	49	6	2000	2007	2.6	2.7	2.1	2.6	2.5	3.2
262626	ELY 6 NE	Steptoe Valley	179	5	2000	2005	3.4	3.4	2.7	3.1	3.2	4.4
262631	ELY YELLAND FLD AP*	Steptoe Valley	179	30	1976	2005	2.8	2.7	2.1	2.6	2.5	3.9
262656	EMIGRANT PASS HWY STN	Boulder Flat	61	27	1964	1999	2.4	2.5	2.0	2.4	2.4	2.9
262662	EMPIRE*	San Emidio Desert	22	6	1951	1976	3.5	3.5	2.8	3.4	3.5	4.1
262708	EUREKA	Diamond Valley	153	30	1975	2007	2.3	2.3	1.7	2.2	2.1	2.8
262780	FALLON EXP STN*	Carson Desert	101	30	1973	2005	3.2	3.2	2.5	3.1	3.2	3.9
262820	FERGUSON SPRINGS HWS*	Great Salt Lake Desert	192	7	1973	1982	2.3	2.4	1.9	2.3	2.2	3.1
262840	FERNLEY*	Fernley Area	76	21	1908	1974	3.5	3.4	2.7	3.3	3.3	4.3
262860	FISH CREEK RCH*	Little Smoky Valley	155A	14	1944	1964	2.8	2.8	2.2	2.6	2.6	4.4
263090	GERLACH*	San Emidio Desert	22	27	1963	2006	3.1	3.2	2.5	3.1	3.2	3.7
263101	GEYSER RCH*	Lake Valley	183	19	1905	2002	3.0	2.9	2.3	2.7	2.7	4.0
263114	GIBBS RCH*	Marys River Area	42	30	1972	2006	2.3	2.3	1.8	2.2	2.1	3.2
263205	GLENBROOK*	Lake Tahoe Basin	90	30	1969	2007	2.3	2.2	1.7	2.1	2.1	2.2
263245	GOLCONDA*	Winnemucca Segment	70	30	1970	2005	3.4	3.4	2.7	3.3	3.4	4.2

Appendix 12b cont.

STATION NUMBER	STATION NAME	BASIN NAME	BASIN NUMBER	NUMBER OF YEARS USED FOR AVERAGE	START YEAR	END YEAR	ALFALFA NIWR (ft)	HIGHLY MANAGED PASTURE GRASS NIWR (ft)	LOW MANAGED PASTURE GRASS NIWR (ft)	GRASS HAY NIWR (ft)	TURF GRASS NIWR (ft)	SHALLOW OPEN WATER NIWR (ft)
265132	MIDDLEGATE-LOWERY*	Cowick Valley	126	15	1989	2007	3.4	3.2	2.5	3.1	3.0	4.5
260795	BEOWAWE*	Crescent Valley	54	30	1976	2006	2.9	3.0	2.4	2.9	2.9	3.7
261975	CORTEZ GOLD MINE*	Crescent Valley	54	10	1969	1979	2.9	2.9	2.3	2.8	2.8	3.5
268761	VIRGINIA CITY	Dayton Valley	103	30	1974	2007	2.4	2.4	1.8	2.3	2.3	2.6
264108	JUNGO MEYER RCH*	Desert Valley	31	7	1969	1985	3.1	3.2	2.5	3.1	3.1	3.8
262296	DIAMOND VALLEY USDA*	Diamond Valley	153	19	1980	2006	2.5	2.5	2.0	2.4	2.4	3.5
262708	EUREKA	Diamond Valley	153	30	1975	2007	2.3	2.3	1.7	2.2	2.1	2.8
267690	SOUTH FORK SP*	Dixie Creek - Tennile	48	8	1994	2007	2.8	2.7	2.1	2.4	2.6	3.7
261160	BRINKERHOFF RCH*	Dixie Valley	128	7	1967	1979	3.6	3.5	2.8	3.4	3.6	4.3
268838	WADSWORTH 4 N*	Dodge Flat	82	21	1975	2002	3.5	3.4	2.7	3.3	3.3	4.3
261485	CARSON CITY*	Eagle Valley	104	30	1973	2007	3.2	3.1	2.5	3.0	3.1	3.7
268538	URSINE	Eagle Valley	200	4	1965	1972	3.4	3.6	2.8	3.4	3.5	4.0
262477	EASTGATE*	Eastgate Valley Area	127	4	1957	1963	3.4	3.4	2.7	3.4	3.4	4.2
261071	BOULDER CITY*	Eldorado Valley	167	30	1968	2004	4.6	3.9	3.1	2.9	4.6	5.1
262573	ELKO RGNL AP*	Elko Segment	49	30	1978	2007	2.6	2.6	2.1	2.5	2.5	3.3
262570	ELKO*	Elko Segment	49	6	2000	2007	2.6	2.7	2.1	2.6	2.5	3.2
262840	FERNLEY*	Fernley Area	76	21	1908	1974	3.5	3.4	2.7	3.3	3.3	4.3
262431	DYER*	Fish Lake Valley	117	30	1974	2007	4.2	4.1	3.2	4.1	4.0	5.4

Appendix 13 cont.

STATION NUMBER	STATION NAME	BASIN NAME	BASIN NUMBER	ALFALFA NIWR (ft)	START YEAR	END YEAR	NUMBER OF YEARS IN AVERAGE	WEIGHT BASED ON NUMBER OF YEARS USED IN AVERAGE	WEIGHT x ALFALFA NIWR (ft)	WEIGHTED AVERAGE ALFALFA NIWR (ft)
262296	DIAMOND VALLEY USDA*	Diamond Valley	153	2.5	1980	2006	19	1.00	2.5	2.5
267690	SOUTH FORK SP*	Dixie Creek - Tenmile	48	2.8	1994	2007	8	1.00	2.8	2.8
261160	BRINKERHOFF RCH*	Dixie Valley	128	3.6	1967	1979	7	1.00	3.6	3.6
262840	FERNLEY*	Fernley Area	76	3.5	1908	1974	21	0.44	1.5	
268834	WADSWORTH*	Tracy Segment	83	3.6	1902	1947	6	0.13	0.5	
268838	WADSWORTH 4 N*	Dodge Flat	82	3.5	1975	2002	21	0.44	1.5	3.5
261485	CARSON CITY*	Eagle Valley	104	3.2	1973	2007	30	1.00	3.2	3.2
262477	EASTGATE*	Eastgate Valley Area	127	3.4	1957	1963	4	1.00	3.4	3.4
261071	BOULDER CITY*	Eldorado Valley	167	4.6	1968	2004	30	1.00	4.6	4.6
262570	ELKO*	Elko Segment	49	2.6	2000	2007	6	0.17	0.4	
262573	ELKO RGNL AP*	Elko Segment	49	2.6	1978	2007	30	0.83	2.2	2.6
268838	WADSWORTH 4 N*	Dodge Flat	82	3.5	1975	2002	21	0.44	1.5	
268834	WADSWORTH*	Tracy Segment	83	3.6	1902	1947	6	0.13	0.5	
262840	FERNLEY*	Fernley Area	76	3.5	1908	1974	21	0.44	1.5	3.5
262431	DYER*	Fish Lake Valley	117	4.2	1974	2007	30	1.00	4.2	4.2
265722	OASIS*	Goshute Valley	187	2.8	1988	2006	17	1.00	2.8	2.8
269171	WINNEMUCCA MUNI AP*	Winnemucca Segment	70	3.4	1978	2007	30	0.83	2.8	
269168	WINNEMUCCA #2*	Grass Valley	71	3.3	2000	2007	6	0.17	0.5	3.3

Table 1. Estimated solar radiation at NWS stations vs. measured solar radiation at weather stations nearby NWS stations.

Name of NWS Station for Rs Estimation	NWS Station Latitude	NWS Station Longitude	Basin of NWS Station Location	Name of Rs Measurement Station	R _s Station Latitude	R _s Station Longitude	Basin of R _s Station Location	Type of R _s Measurement Station	Period of Record for Comparison	Ratio of Estimated R _s to Measured R _s	RMSE for Daily Estimated R _s , MJ m ⁻² d ⁻¹
Battle MTN AP	40.62	-116.90	Lower Reese River Valley	Beacon Light	40.56	-116.76	Lower Reese River Valley	RAWS	1/98 - 5/04	1.08	3.62
Smokey Valley	38.78	-117.17	Big Smokey Valley	Lower Big Smokey Valley	38.37	-117.47	Big Smokey Valley	DRI	12/03 - 6/07	1.01	3.77
Diamond Valley USDA	39.72	-116.05	Diamond Valley	Eureka	39.69	-115.98	Diamond Valley	AGRIMET	8/01 - 6/06	1.09	3.51
Dyer	37.62	-118.02	Fish Lake Valley	Dyer Wallace Farms	37.61	-117.99	Fish Lake Valley	DRI	4/03 - 7/06	1.01	3.65
Fallon EXP STN	39.45	-118.78	Carson Desert	Fallon	39.46	-118.78	Carson Desert	AGRIMET	3/01 - 12/04	1.01	3.00
Lages	40.07	-114.62	Steptoe Valley	Spruce Mountain	40.44	-114.81	Goshute Valley	RAWS	8/98 - 5/04	1.05	3.91
Lund	38.87	-115.02	White River Valley	Current Creek	38.76	-115.41	Railroad Valley - Northern Part	RAWS	1/99 - 12/04	1.00	3.53
Middlegate - Lowery	39.30	-118.02	Cowick Valley	Desatoya Mountain	39.30	-117.58	Smith Creek Valley	RAWS	1/99 - 5/05	1.09	3.77
Overton	36.55	-114.45	Lower Moapa Valley	Overton	36.55	-114.45	Lower Moapa Valley	CEMP	1/04 - 5/07	1.03	3.21
Reno INT AP	39.48	-119.77	Truckee Meadows	Reno Wolf Run Golf Course	39.42	-119.80	Truckee Meadows	DRI	4/00 - 3/06	0.99	3.67
Shoshone 5N	38.92	-114.40	Spring Valley	Current Creek	38.76	-115.41	Railroad Valley - Northern Part	RAWS	1/99 - 12/04	1.00	4.04
Smoke Creek Espil	40.60	-119.75	Smoke Creek Valley	Buffalo Creek	40.58	-119.79	Smoke Creek Valley	RAWS	9/98 - 12/04	0.90	3.33
Stead	39.62	-119.88	Lemmon Valley	Stead Golf Course	39.63	-119.89	Lemmon Valley	DRI	7/01 - 9/04	0.99	5.55
Twin Springs Fallini	38.20	-116.18	Hot Creek	Pancake	38.30	-116.19	Hot Creek	RAWS	1/98 - 4/04	1.02	3.88
Average of Ratios and RMSE										1.02	3.75
Std. Dev. of Ratios and RMSE										0.05	0.59

Comparison of Estimated ET_{os} vs. Calculated ET_{os}

Assessing the error in estimated ET_{os} using estimates of R_s , T_{dew} , and U_2 , verses using measured data is of significant interest because estimation of these variables provides the ability to use NWS stations allowing for sufficient spatial coverage and statewide application. To address the accuracy of estimating these secondary parameters, a comparison was made between estimated ET_{os} at NWS stations and calculated ET_{os} at nearby stations located in irrigated areas that measure the full suite of weather variables. Results of the comparison indicate that the ratios of annual estimated ET_{os} to calculated ET_{os} range from 1.01 to 1.06, with an average of 1.03, and an average RMSE for daily estimated ET_{os} of 0.036 in/d (0.91 mm/d) (Table 6). These results are acceptable considering the overall uncertainty in the $K_c \times ET_{os}$ estimation procedures. The estimated ET_{os} was dependent on spatially interpolated K_o , U_2 , and estimated R_s using T_{max} and T_{min} . Unfortunately very few weather stations exist that measure R_s , RH, and U_2 and are located in reference settings to compare estimated ET_{os} . As more weather stations become available that are located in agricultural areas the uncertainty in estimated ET_{os} can be better quantified.

Table 6. ET_{os} from NWS stations where solar radiation, wind speed and dewpoint were estimated vs. ET_{os} at nearby irrigated area weather stations that measure the full suite of weather variables to calculate the 'full-suite' ET_{os} .

Name of NWS Station for ET_{os} Estimation	Basin of NWS Station Location	Name of ET_{os} full-suite Station	Basin of ET_{os} full-suite Station Location	Type of ET_{os} full-suite Station	Period of Record Used for Comparison	Ratio of Estimated Annual ET_{os} for NWS stations to Full-Suite Annual ET_{os}	RMSE for Daily Estimated ET_{os} (in/d)	Mean Annual ET_{os} (in) for full-suite station	Estimated Mean Annual ET_{os} (in)
Diamond Valley USDA	Diamond Valley	Eureka AGRIMET	Diamond Valley	AGRIMET	8/01 - 6/06	1.06	0.03	47.6	50.4
Fallon EXP STN	Carson Desert	Fallon AGRIMET	Carson Desert	AGRIMET	3/01 - 12/05	1.02	0.03	50.1	50.8
Laughlin	Colorado Valley	Mohave	Mohave Valley, AZ	AZMET	1/03 - 5/07	1.01	0.06	76.3	77.1
Yerington	Mason Valley	B11	Mason Valley	USGS Bowen Ratio	3/05 - 3/07	1.04	0.03	47.1	48.9
Minden	Carson Valley	ET-2	Carson Valley	USGS Bowen Ratio	4/03 - 11/04	1.05	0.03	50.2	52.4

Average of Ratios and RMSE	1.03	0.04
Std. Dev. of Ratios and RMSE	0.02	0.01

Appendix 14 cont.

BASIN NAME	BASIN NUMBER	BASIN REGION	REFERENCE ET _{ref} (ft)	ALFALFA ET _{act} (ft)	HIGHLY MANAGED PASTURE GRASS ET _{act} (ft)	LOW MANAGED PASTURE GRASS ET _{act} (ft)	GRASS HAY ET _{act} (ft)	TURF GRASS ET _{act} (ft)	SHALLOW OPEN WATER E _{art} (ft)
Crater Flat*	229	Death Valley Basin	5.6	5.2	4.6	3.7	4.0	5.1	5.9
Crescent Valley	54	Humboldt River Basin	4.2	3.6	3.6	3.0	3.4	3.4	4.4
Dayton Valley*	103	Carson River Basin	4.4	3.8	3.7	3.0	3.5	3.6	4.6
Deep Creek Valley*	193	Great Salt Lake Basin	4.2	3.3	3.2	2.6	3.1	3.0	4.4
Delamar Valley*	182	Central Region	5.1	4.6	4.2	3.4	3.9	4.4	5.4
Desert Valley	31	Black Rock Desert Region	4.3	3.8	3.7	3.0	3.5	3.6	4.5
Diamond Valley	153	Central Region	4.1	3.2	3.1	2.5	3.0	2.9	4.3
Dixie Creek-Tennile Creek Area	48	Humboldt River Basin	4.3	3.4	3.3	2.7	3.0	3.1	4.5
Dixie Valley	128	Central Region	4.7	4.2	4.1	3.4	4.0	4.1	4.9
Dodge Flat	82	Truckee River Basin	4.6	3.9	3.8	3.1	3.7	3.7	4.8
Dry Lake Valley*	181	Central Region	4.9	4.3	4.1	3.3	3.8	4.0	5.1
Dry Valley*	19	Black Rock Desert Region	4.5	4.0	3.9	3.2	3.8	3.9	4.7
Dry Valley*	95	Western Region	4.1	3.4	3.2	2.6	3.2	3.1	4.3
Dry Valley*	198	Colorado River Basin	4.9	4.2	4.0	3.3	3.8	3.9	5.2
Duck Lake Valley*	16	Northwest Region	4.4	3.9	3.8	3.1	3.7	3.7	4.6
Eagle Valley	104	Carson River Basin	4.3	3.8	3.6	3.0	3.5	3.6	4.6
Eagle Valley*	200	Colorado River Basin	4.9	3.8	3.6	2.9	3.4	3.3	5.1
East Walker Area*	109	Walker River Basin	4.6	3.9	3.8	3.1	3.6	3.8	4.8
Eastgate Valley Area	127	Central Region	4.5	3.9	3.9	3.2	3.9	3.8	4.8
Edwards Creek Valley*	133	Central Region	4.5	3.7	3.6	2.9	3.5	3.4	4.7
Eldorado Valley	167	Central Region	5.4	5.1	4.3	3.5	3.1	5.0	5.7
Elko Segment	49	Humboldt River Basin	4.0	3.3	3.2	2.7	3.1	3.0	4.2
Emigrant Valley*	158A	Central Region	5.3	4.7	4.4	3.6	4.1	4.5	5.5
Emigrant Valley*	158B	Central Region	5.5	5.0	4.5	3.7	4.1	4.8	5.8
Escalante Desert*	197	Escalante Desert	4.9	4.3	4.0	3.3	3.8	4.0	5.2

Appendix 15 cont.

BASIN NAME	BASIN NUMBER	BASIN REGION	ALFALFA NIWR (ft)	HIGHLY MANAGED PASTURE GRASS NIWR (ft)	LOW MANAGED PASTURE GRASS NIWR (ft)	GRASS HAY NIWR (ft)	TURF GRASS NIWR (ft)	SHALLOW OPEN WATER NIWR (ft)
Crater Flat*	229	Death Valley Basin	4.8	4.2	3.4	3.8	4.8	5.4
Crescent Valley	54	Humboldt River Basin	2.9	3.0	2.4	2.9	2.9	3.7
Dayton Valley*	103	Carson River Basin	3.3	3.2	2.6	3.1	3.2	3.9
Deep Creek Valley*	193	Great Salt Lake Basin	2.7	2.7	2.1	2.6	2.5	3.6
Delamar Valley*	182	Central Region	4.1	3.7	2.9	3.4	3.9	4.6
Desert Valley	31	Black Rock Desert Region	3.1	3.2	2.5	3.1	3.1	3.8
Diamond Valley	153	Central Region	2.5	2.5	2.0	2.4	2.4	3.5
Dixie Creek-Tennille Creek Area	48	Humboldt River Basin	2.8	2.7	2.1	2.4	2.6	3.7
Dixie Valley	128	Central Region	3.6	3.5	2.8	3.4	3.6	4.3
Dodge Flat	82	Truckee River Basin	3.5	3.4	2.7	3.3	3.3	4.3
Dry Lake Valley*	181	Central Region	3.7	3.5	2.7	3.3	3.5	4.3
Dry Valley*	19	Black Rock Desert Region	3.5	3.5	2.8	3.4	3.5	4.1
Dry Valley*	95	Western Region	2.9	2.9	2.3	2.7	2.7	3.6
Dry Valley*	198	Colorado River Basin	3.5	3.3	2.6	3.2	3.2	4.2
Duck Lake Valley*	16	Northwest Region	3.3	3.3	2.6	3.2	3.3	4.0
Eagle Valley	104	Carson River Basin	3.2	3.1	2.5	3.0	3.1	3.7
Eagle Valley*	200	Colorado River Basin	3.1	3.0	2.4	2.9	2.8	4.1
East Walker Area*	109	Walker River Basin	3.5	3.4	2.7	3.3	3.4	4.3
Eastgate Valley Area	127	Central Region	3.4	3.4	2.7	3.4	3.4	4.2
Edwards Creek Valley*	133	Central Region	3.2	3.1	2.4	3.0	3.0	4.0
Eldorado Valley	167	Central Region	4.6	3.9	3.1	2.9	4.6	5.1
Elko Segment	49	Humboldt River Basin	2.6	2.6	2.1	2.5	2.5	3.3
Emigrant Valley*	158A	Central Region	4.2	4.0	3.2	3.7	4.1	5.0
Emigrant Valley*	158B	Central Region	4.6	4.2	3.3	3.8	4.5	5.3
Escalante Desert*	197	Escalante Desert	3.6	3.4	2.7	3.2	3.4	4.3

Appendix 16. Mean annual Net Irrigation Water Requirement (NIWR) for selected HAs and crops. Values of the NIWR were either assigned or averaged for HAs with multiple stations according to the number of valid years used in computing the station annual average NIWR. The NIWR for corn is the average of silage, field, and sweet corn crops. For other areas and crops of interest, see electronic statistical summaries. Descriptions of the electronic statistical summaries are given in Appendix 9.

Basin Name	Basin Number	Garden Vegetables (general) NIWR (ft)	Corn NIWR(ft)	Spring Wheat NIWR (ft)	Winter Wheat NIWR (ft)	Garlic NIWR (ft)	Onion NIWR (ft)	Potatoes (baking-late harvest) NIWR (ft)	Potatoes (processing-early harvest) NIWR (ft)	Grapes NIWR (ft)	Melons NIWR (ft)
Carson Desert	101	2.8	2.6	2.0	2.1					2.4	1.7
Carson Valley	105	2.7	2.5	1.9	2.2						
Diamond Valley	153	2.2	2.2	2.0	2.1						
Lovelock Valley	73	3.4	3.1	2.3	2.5			2.9	2.5		
Mason Valley	108	2.7	2.4	1.9	2.0	2.3	2.4				
Paradise Valley	69	2.6	2.8	2.3	2.5	2.5	2.6	2.7	2.4		
Smith Valley	107	2.6	2.5	2.0	2.2	2.4	2.5				
Lake Valley	183	2.3	2.4	2.2	2.5	2.5	2.5	2.6	2.4		

Appendix 14 cont.

BASIN NAME	BASIN NUMBER	BASIN REGION	REFERENCE ET _{ref} (ft)	ALFALFA ET _{ref} (ft)	HIGHLY MANAGED PASTURE GRASS ET _{ref} (ft)	LOW MANAGED PASTURE GRASS ET _{ref} (ft)	GRASS HAY ET _{ref} (ft)	TURF GRASS ET _{ref} (ft)	SHALLOW OPEN WATER ET _{ref} (ft)
Kings River Valley*	308	Black Rock Desert Region	4.4	3.8	3.7	3.0	3.5	3.6	4.6
Kobeh Valley*	139	Central Region	4.2	3.4	3.3	2.7	3.1	3.1	4.2
Kumiva Valley*	79	West Central Region	4.4	3.9	3.9	3.2	3.7	3.8	4.7
Lake Tahoe Basin	90	Truckee River Basin	3.6	2.9	2.7	2.2	2.6	2.6	3.7
Lake Valley	183	Central Region	4.5	3.6	3.4	2.8	3.3	3.2	4.7
Lamoille Valley	45	Humboldt River Basin	3.9	3.0	2.8	2.3	2.7	2.6	4.1
Las Vegas Valley	212	Colorado River Basin	6.2	6.0	5.2	4.2	3.9	6.0	6.5
Lemmon Valley	928	Western Region	4.2	3.7	3.6	3.0	3.5	3.6	4.4
Lemmon Valley*	92A	Western Region	4.2	3.7	3.6	3.0	3.5	3.6	4.4
Lida Valley*	144	Central Region	5.3	4.6	4.4	3.5	4.1	4.4	5.6
Little Fish Lake Valley*	150	Central Region	4.6	3.7	3.7	3.0	3.5	3.5	4.8
Little Humboldt Valley*	67	Humboldt River Basin	4.4	3.5	3.4	2.8	3.2	3.2	4.6
Little Owyhee River Area*	34	SNAKE River Basin	4.2	3.3	3.1	2.6	3.0	2.9	4.4
Little Smoky Valley	155A	Central Region	4.5	3.1	3.1	2.5	2.9	2.9	4.8
Little Smoky Valley*	155C	Central Region	4.6	3.9	3.8	3.1	3.7	3.7	4.9
Little Smoky Valley*	155B	Central Region	4.6	3.8	3.7	3.0	3.6	3.5	4.8
Long Valley*	9	Northwest Region	4.3	3.7	3.6	3.0	3.5	3.5	4.5
Long Valley*	175	Central Region	4.3	3.4	3.2	2.7	3.1	3.0	4.5
Lovelock Valley	73	Humboldt River Basin	4.7	4.1	4.1	3.4	4.0	4.0	4.9
Lovelock Valley*	73A	Humboldt River Basin	4.7	4.2	4.0	3.3	3.9	3.9	4.9
Lower Meadow Valley Wash	205	Colorado River Basin	5.0	4.7	4.2	3.4	3.4	4.8	5.3
Lower Moapa Valley	220	Colorado River Basin	5.1	4.9	4.3	3.5	3.2	5.0	5.4
Lower Reese River Valley	59	Humboldt River Basin	4.4	3.8	3.8	3.1	3.6	3.7	4.7
Macy Flat*	10	Northwest Region	4.3	3.6	3.5	2.9	3.4	3.4	4.5
Maggie Creek Area*	51	Humboldt River Basin	4.0	3.2	3.0	2.5	2.9	2.8	4.2

Appendix 15 cont.

BASIN NAME	BASIN NUMBER	BASIN REGION	ALFALFA NIWR (ft)	HIGHLY MANAGED PASTURE GRASS NIWR (ft)	LOW MANAGED PASTURE GRASS NIWR (ft)	GRASS HAY NIWR (ft)	TURF GRASS NIWR (ft)	SHALLOW OPEN WATER NIWR (ft)
Kings River Valley*	30B	Black Rock Desert Region	3.1	3.1	2.5	3.0	3.0	3.8
Little Snake Valley*	139B	Central Region	2.7	2.7	2.1	2.6	2.6	3.6
Kumiva Valley*	79	West Central Region	3.4	3.4	2.7	3.3	3.4	4.1
Lake Tahoe Basin	90	Truckee River Basin	2.3	2.3	1.8	2.1	2.2	2.4
Lake Valley	183	Central Region	3.0	2.9	2.3	2.7	2.7	4.0
Lamollie Valley	45	Humboldt River Basin	2.3	2.3	1.8	2.2	2.1	2.9
Las Vegas Valley	212	Colorado River Basin	5.6	4.8	3.9	3.7	5.7	6.1
Lemmon Valley	92B	Western Region	3.1	3.1	2.5	3.0	3.1	3.4
Lemmon Valley*	92A	Western Region	3.1	3.1	2.5	3.0	3.1	3.6
Lida Valley*	144	Central Region	4.3	4.1	3.3	3.8	4.2	5.2
Little Fish Lake Valley*	150	Central Region	3.2	3.2	2.5	3.1	3.1	4.2
Little Humboldt Valley*	67	Humboldt River Basin	2.8	2.8	2.2	2.6	2.6	3.7
Little Owyhee River Area*	34	Snake River Basin	2.5	2.5	2.0	2.4	2.4	3.5
Little Smoky Valley	155A	Central Region	2.8	2.8	2.2	2.6	2.6	4.4
Little Smoky Valley*	155C	Central Region	3.3	3.3	2.6	3.2	3.2	4.2
Little Smoky Valley*	155B	Central Region	3.2	3.2	2.5	3.1	3.1	4.2
Long Valley*	9	Northwest Region	3.2	3.2	2.5	3.1	3.1	3.9
Long Valley*	175	Central Region	2.7	2.7	2.1	2.6	2.5	3.7
Lovelock Valley	73	Humboldt River Basin	3.7	3.7	3.0	3.6	3.6	4.5
Lovelock Valley*	73A	Humboldt River Basin	3.5	3.4	2.8	3.3	3.4	4.2
Lower Meadow Valley Wash	205	Colorado River Basin	4.2	3.7	2.9	3.0	4.3	4.6
Lower Moapa Valley	220	Colorado River Basin	4.5	1.8	1.5	1.4	2.2	2.4
Lower Reese River Valley	59	Humboldt River Basin	3.2	3.2	2.6	3.1	3.1	4.0
Macy Flat*	10	Northwest Region	3.1	3.1	2.4	3.0	2.9	3.9
Maggie Creek Area*	51	Humboldt River Basin	2.4	2.4	1.9	2.3	2.3	3.3

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

IN THE MATTER OF APPLICATIONS 63263,)
63264, 63265, 63266 AND 63267 FILED)
TO APPROPRIATE THE PUBLIC WATERS FROM)
AN UNDERGROUND SOURCE WITHIN THE)
FORTY MILE CANYON - JACKASS FLAT)
GROUNDWATER BASIN (227A), NYE COUNTY,)
NEVADA.)

RULING

4848

GENERAL

I.

Application 63263 was filed on July 22, 1997, by the United States Department of Energy - Yucca Mountain Site Characterization Project Office ("DOE") to appropriate 1.0 cubic foot per second (cfs), not to exceed 430 acre-feet annually (afa), from the underground waters of the Fortymile Canyon - Jackass Flat Groundwater Basin, Nye County, Nevada, for industrial purposes within portions of Sections 31 through 36, inclusive, T.11S., R.49E., Sections 31 through 36, inclusive, T.11S., R.50E., all of T.12S., R.49E., all of T.12S., R.50E., Sections 10 through 15, inclusive, Sections 22 through 27, inclusive, Sections 34 through 36 inclusive, all in T.13S., R.48E., all of T.13S., R.49E., Sections 7 through 10, inclusive, Sections 15 through 22, inclusive, Sections 27 through 34 inclusive, all in T.13S., R.50E., Sections 1 through 3, inclusive, Sections 10 through 15, inclusive, Sections 22 through 27, inclusive, Section 35, and portions of Sections 34 and 36, all in T.14S., R.48E., all of T.14S., R.49E., Sections 3 through 10, inclusive, Sections 15 through 22, inclusive, Sections 27 through 34, inclusive, all in T.14S., R.50E., portions of Sections 1, 2 and 3, in T.15S., R.48E., Sections 1 through 6, inclusive, portions of Sections 7 through 10, inclusive, Sections 11 and 12, all in T.15S., R.49E., and Sections 3 through 10, inclusive, in T.15S., R.50E., M.D.B.&M.¹ The proposed point of diversion is described as being

¹ File No. 63263, official records in the office of the State Engineer.

Ruling
Page 2

located within the NE¼ SW¼ of Section 19, T.13S., R.50E.,
M.D.B.&M.

II.

Application 63264 was filed on July 22, 1997, by the United States Department of Energy - Yucca Mountain Site Characterization Project Office to appropriate 1.0 cfs, not to exceed 430 afa, from the underground waters of the Fortymile Canyon - Jackass Flat Groundwater Basin, Nye County, Nevada, for industrial purposes within the same places of use identified under Application 63263. The proposed point of diversion is described as being located within the SW¼ NE¼ of Section 6, T.14S., R.50E., M.D.B.&M.²

III.

Application 63265 was filed on July 22, 1997, by the United States Department of Energy - Yucca Mountain Site Characterization Project Office to appropriate 0.9 cfs, not to exceed 430 afa, from the underground waters of the Fortymile Canyon - Jackass Flat Groundwater Basin, Nye County, Nevada, for industrial purposes within the same places of use identified under Applications 63263 and 63264. The proposed point of diversion is described as being located within the NW¼ NE¼ of Section 14, T.13S., R.49E., M.D.B.&M.³

IV.

Application 63266 was filed on July 22, 1997, by the United States Department of Energy - Yucca Mountain Site Characterization Project Office to appropriate 0.9 cfs, not to exceed 430 afa, from the underground waters of the Fortymile Canyon - Jackass Flat Groundwater Basin, Nye County, Nevada, for industrial purposes within the same places of use identified under Applications 63263, 63264 and 63265. The proposed point of diversion is described as

² File No. 63264, official records in the office of the State Engineer.

³ File No. 63265, official records in the office of the State Engineer.

Ruling

Page 3

being located within the NW¼ NE¼ of Section 14, T.13S., R.49E., M.D.B.&M.⁴

V.

Application 63267 was filed on July 22, 1997, by the United States Department of Energy - Yucca Mountain Site Characterization Project Office to appropriate 0.9 cfs, not to exceed 430 afa, from the underground waters of the Fortymile Canyon - Jackass Flat Groundwater Basin, Nye County, Nevada, for industrial purposes within the same places of use identified under Applications 63263, 63264, 63265 and 63266. The proposed point of diversion is described as being located within the NW¼ NE¼ of Section 14, T.13S., R.49E., M.D.B.&M.⁵

VI.

The remarks under Item 12 of the applications indicate the following:

This application to appropriate the waters of the State of Nevada is being filed by the Department of Energy in order to provide water for meeting the Department of Energy's responsibilities under the Nuclear Waste Policy Act. Said uses will include, but are not limited to, road construction, facility construction, drilling, dust suppression, tunnel and pad construction, testing, culinary, domestic and other related site uses.

Existing Permits 57373, 57374, 57375, 57376, 58827, 58828 and 58829 were issued for site characterization and aquifer characteristic studies as part of the overall site characterization for the Yucca Mountain Project. These permits (with the exception of Permit 57375) had a limited life and are scheduled to expire within a few years. Although no final determination has been made on whether or not the Repository will be located at Yucca Mountain, these applications are being filed in order to ensure priority of filing and establishment of a claim for the use of the water. Accordingly, under the provisions of NRS 533.370(2)(a),

⁴ File No. 63266, official records in the office of the State Engineer.

⁵ File No. 63267, official records in the office of the State Engineer.

Ruling

Page 4

it is requested that, after this application becomes ready for action, that the State Engineer withhold final approval until the Department of Energy provides notification to proceed.

The total combined duty of this application to appropriate and its four companion applications to appropriate, along with Permit 57375, is not to exceed 430.00 acre-feet annually from any and all sources.¹⁻⁵

VII.

Applications 63263, 63264, 63265, 63266 and 63267 were protested by: Robert Loux, Executive Director of the Nevada Agency for Nuclear Projects; Ralph McCracken, farmer and Vice-President of the Southern Nye County Conservation District; Richard Nielsen, Executive Director of Citizen Alert; and Michael DeLee, farmer and Chairman of the Amargosa Water Committee.

The Nevada Agency for Nuclear Projects protested the applications on the following grounds:

1. There is no unappropriated water in the source of supply.
2. The proposed use conflicts with existing rights, particularly water rights owned and controlled by the State of Nevada for purposes of mitigating adverse impacts to threatened and endangered species in the Ash Meadows area.
3. The proposed industrial use threatens to prove detrimental to the public interest for the following reasons:
 - a. The proposed use, to the extent it facilitates the storage of high level radioactive waste, is prohibited by NRS 459.910.
 - b. The United States has failed to obtain the Legislature's consent for the proposed use.
 - c. The Congress has discontinued funding to Nevada for oversight and monitoring of the proposed use under Section 116 of the Nuclear Waste Policy Act (NWPA), 42 U.S.C. § 10136.
 - d. The proposed use contemplates the pollution of the source of supply.
 - e. The proposed use, if consummated pursuant to DOE's present administration of the NWPA, will deprive Nevada of important classes of police power in violation of the Tenth Amendment and the Equal Footing Doctrine.
 - f. The objective and manner of implementing the proposed use is unconstitutional in numerous respects.

Ruling
Page 5

g. The proposed use for a permanent repository at Yucca Mountain will be detrimental to Nevada's socioeconomic interests and will adversely impact the environment.

4. Beneficial use cannot be proven because the proposed place of use is not suitable for the proposed use.

Citizen Alert protested the applications on the following grounds:

1. Use of the water will adversely affect the water rights of the State of Nevada and the residents of the Amargosa Valley, particularly the Amargosa Farms area and the Ash Meadows wildlife refuge and endangered species.
2. There is no unappropriated water in the area.
3. The DOE, in Item 12 states that the water will be used for "meeting the Department of Energy's responsibilities under the Nuclear Waste Policy Act," and that, "[a]lthough no final determination has been made on whether or not the Repository will be located at Yucca Mountain, these applications are being filed in order to ensure priority of filing and establishment of a claim for the use of the water." The primary responsibility of the DOE under the Act is the building and operation of a high-level nuclear waste repository. This application seeks to permanently appropriate water as opposed to the temporary permits now held by the Department. This clearly indicates that the intended use of the water is not limited to site characterization but rather for the establishment of a repository which is prohibited by state statute, and therefore is not in the public interest.
4. DOE's repository waste containment and isolation strategy relies on dilution in the groundwater which is the clear intention to pollute the water, and therefore is not in the public interest.
5. Congress and the DOE have denied oversight funding required to be provided to the State of Nevada by the same Act cited [sic] by the Department as justification for this water request to "meet their responsibilities."
6. The intended use of this water is clearly not beneficial to the State of Nevada or its citizens because it is illegal and unconstitutional.

The Amargosa Water Committee and the Southern Nye County Conservation District filed nearly identical protests, and protested the applications on grounds summarized as follows:

1. There is no unappropriated water available to support the applications.

Ruling
Page 6

2. To permit these applications would exceed the perennial safe yield, lower the groundwater table, degrade the quantity and quality of water from existing wells, change the hydraulic gradient causing contamination to move off the Nevada Test Site, and threaten springs and seeps which are critical to the flora and fauna of the region.
3. To permit these applications would unreasonably lower the water table and sanction water mining contrary to Nevada law and policy.
4. Diversion of the quantity applied for would deprive the area of water needed for its environmental and economic well-being, and the contemplated use is not fully described in the applications, therefore, the applications threaten to prove detrimental to the public interest.
5. The approval of these applications without comprehensive water-resource development planning is detrimental to the public interest.
6. The approval of these applications would threaten to prove detrimental to the public interest because it would jeopardize threatened and endangered species, prevent or interfere with the conservation of species, take or harm species, and interfere with the purpose for which federal lands are managed.
7. The Department of Energy cannot show the water will be put to beneficial use as it has not obtained the necessary interests in land to extract, develop, transport or apply the water to the claimed beneficial use.
8. The Department of Energy has not demonstrated its financial capability for developing this water, therefore, the applications violate NRS § 533.375.
9. The applications should be denied because they failed to adequately include statutorily required information.
10. The applications will exceed the perennial yield thereby creating air pollution in violation of state and federal laws.
11. The applicant has failed to provide information to adequately safeguard the public interest.
12. The State Engineer has previously denied applications in the Amargosa Desert Groundwater Basin.
13. There are still applications previously denied that are under appeal.
14. Economic activity in the area is water-dependent and a reduction in the quantity or quality of said water would impact the area's way of life.
15. Removing water will adversely impact current and future economic activity.
16. The possible potential adverse effects cannot be known without further information and study.
17. The State Engineer should withhold approval of the applications until potential court cases are resolved.

Ruling
Page 7

18. The State Engineer should withhold approval until water studies are completed.

VIII.

On April 2, 1998, protestant Nevada Agency for Nuclear Projects filed a Motion to Dismiss the applications on the grounds summarized below:

1. The applicant does not now have the legal capability and authority under the law of the United States to apply the water to the intended use. 42 U.S.C. § 10101, et seq.

a) Since the applicant has not completed the site characterization activities at Yucca Mountain as required by 42 U.S.C. § 10133(a), and does not expect to complete such activities until 2001, the applications violate the Nuclear Waste Policy Act.

b) Since the applicant has not determined that the Yucca Mountain site is suitable for the development of a high-level nuclear waste repository as required by 42 U.S.C. § 10132(b), considering, among other things, the effect of such a repository on the rights of users of water as required by 42 U.S.C. § 10132(a), the applications violate the Nuclear Waste Policy Act.

c) Since the applicant has not prepared an environmental impact statement on the development of a high-level nuclear waste repository at the Yucca Mountain site as required by 42 U.S.C. § 10134(f) and 42 U.S.C. § 4321, et seq., the applications violate the Nuclear Waste Policy Act and the National Environmental Policy Act.

d) Since the applicant has not given full consideration to whether the development, construction and operation of a high-level nuclear waste repository at the Yucca Mountain site may require the purchase or other acquisition of water rights that will have a significant adverse effect on the present or future

development of the area in which the repository is located, nor proposed to mitigate any such adverse effects as required by 42 U.S.C. § 10144, the applications violate the Nuclear Waste Policy Act.

e) Since the applicant has not recommended to the President of the United States that the Yucca Mountain site be developed as a repository as required by 42 U.S.C. § 10134(a)(1), and the applicant is not yet permitted to make such a recommendation because it can only be made upon completion of site characterization activities at the site and after notice to the Governor and Legislature of the State of Nevada, the applications violate the Nuclear Waste Policy Act.

f) Since the President of the United States has not reviewed the applicant's recommendation that the Yucca Mountain site be developed as a high-level nuclear waste repository as required by 42 U.S.C. § 10134(a), the applications violate the Nuclear Waste Policy Act.

g) Since the President of the United States has not recommended to Congress that the Yucca Mountain site be developed as a high-level nuclear waste repository as required by 42 U.S.C. § 10134(a)(2)(A), the applications violate the Nuclear Waste Policy Act.

2. The applicant's legal authority under the law of the United States to apply the water to its intended use is dependent upon the approval or disapproval of the Governor or Legislature of the State of Nevada (42 U.S.C. § 10136(b), 10135), and the date upon which the Governor or Legislature may approve or disapprove has not occurred.

3. Because NRS § 459.910 prohibits the intended use of the water, there is no clear certainty that the Governor or Legislature will approve the development of a high-level nuclear waste repository at Yucca Mountain; thereby creating

Ruling
Page 9

the applicant's legal authority to apply the waters to their intended use.

4. The applicant's applications call upon the State Engineer to usurp the statutory powers of the Governor and Legislature under the Nuclear Waste Policy Act; therefore, the applications violate the Nuclear Waste Policy Act, and the applicant's applications call upon the State Engineer to assist the applicant in the violation of NRS § 459.910.

5. The applicant has not withdrawn, and therefore does not control, as required by the law of the United States, the land upon which the water would be applied to its intended beneficial use (Federal Land Policy Management Act, 43 U.S.C. § 1714).

6. The applicant already has sufficient water rights to meet its needs for beneficial use within the foreseeable future.

7. The applications are premature and not ripe for adjudication, beneficial use of the water is not now required; therefore, the necessity for the use of the water does not presently exist violating NRS § 533.045, and the applicant may not file a premature application for the appropriation of the public waters of Nevada for the sole purpose of establishing a priority of filing and a claim for the water.

8. The applicant cannot presently demonstrate the amount of water that is reasonably required for the use it wishes to serve violating NRS § 533.070.

9. The applicant cannot at this time provide satisfactory proof of its intention in good faith to construct the works necessary to apply the water to its intended beneficial use with reasonable diligence violating NRS § 533.370(1)(c)(1).

10. The applicant cannot at this time provide satisfactory proof of its financial ability and reasonable expectation to actually apply the water to the intended beneficial use with

Ruling
Page 10

reasonable diligence violating NRS § 533.370(1)(c)(2).

Without repeating all the reasons for so holding, the State Engineer denied the Nevada Agency for Nuclear Projects' Motion to Dismiss pursuant to State Engineer's Interim Ruling No. 4662.⁶

IX.

After all parties of interest were duly noticed by certified mail,⁷ a pre-hearing conference was held on June 15, 1999, in Las Vegas, Nevada, before the State Engineer. The purpose of the pre-hearing conference was to consider procedures and to identify issues to be heard relating to the protested applications.

X.

After all parties of interest were duly noticed by certified mail, a public administrative hearing was held regarding the protests to Applications 63263, 63264, 63265, 63266 and 63267 on November 8th through 10th, and November 15th through 16th, 1999, in Las Vegas and Carson City, Nevada, before the State Engineer.⁸

XI.

Administrative notice was taken of all records and information available in the office of the State Engineer, specifically, those records of the administrative hearing held in September and October 1991 relative to Application 52338 filed by the U.S. Department of Energy.⁹

⁶ State Engineer's Interim Ruling No. 4662, dated August 28, 1998, official records in the office of the State Engineer.

⁷ Exhibit No. 1 and Transcript, public administrative hearing before the State Engineer, June 15, 1999 (hereinafter "Pre-hearing Conference Transcript").

⁸ Exhibit Nos. 2 and 3; Transcript, public administrative hearing before the State Engineer, November 8-10, 15-16, 1999 (hereinafter "Transcript").

⁹ Transcript, p. 7.

FINDINGS OF FACT

I.

At the beginning of the administrative hearing, the applicant and protestant Nevada Agency for Nuclear Projects entered into evidence a stipulation pursuant to which the Agency agreed that based on prior rulings of the State Engineer there is sufficient water available at the source for the appropriation of 430 acre-feet annually from Basin 227A.¹⁰ Therefore, with respect to protestant Nevada Nuclear Projects Agency's claim that there is no unappropriated water in the source of supply, the State Engineer finds that the protestant and the applicant stipulated that based on prior rulings of the State Engineer the Agency agrees that there is sufficient water at the source to allow for the appropriation of 430 acre-feet annually of underground water from Basin 227A.¹¹ The State Engineer further finds that neither he nor other protestants were parties to said agreement.

II.

The State Engineer finds that by letter received on November 5, 1999, protestant Citizen Alert indicated that its interests during the administrative hearing would be represented by protestant Nevada Agency for Nuclear Projects.¹² The State Engineer finds that Citizen Alert was not a party to the stipulation as to water availability, and further failed to provide any evidence (through its identified representative) to support its protest claims of adverse affects to other water rights, as to the relevance of Congress's and the DOE's denial of oversight funding, or as to the intended use being unconstitutional.

¹⁰ Exhibit No. 16, public administrative hearing before the State Engineer, November 8, 1999.

¹¹ Exhibit No. 16, public administrative hearing before the State Engineer, November 8, 1999.

¹² Exhibit No. 15, public administrative hearing before the State Engineer, November 8, 1999.

III.

At the beginning of the administrative hearing, protestants Southern Nye County Conservation District and Amargosa Water Committee indicated that their protests had been based on the availability of water in the region. However, since they had an opportunity to look at some of the evidence, they might be amending their protests, in total or in part. The protestants indicated that they expected to provide a very brief presentation, but would be asking questions on cross-examination.

The protestants' representative stated that "we will stick to looking at water availability issues, and if that is settled, then we will not be presenting anything beyond that."¹³ The protestant further stated that:

Our concern was and is, although it's been mitigated considerably since we've had a chance to read the materials that have been presented to us, that administratively the books are closed and there's not enough water and it's overappropriated. Thus, our concern on behalf of both entities was that if you pump out additional water, then you're not going to have enough water and you're going to lower the water table. I have modified that position and am not going to be going forward with a defense of that...I want to see the new research and ask questions about it, but my concerns are still on the record.¹⁴

At the time protestants Southern Nye County Conservation District and Amargosa Water Committee were given the opportunity to present their cases in support of their protests, their representative indicated that what these protestants have been attempting to do is come up with a better understanding of "what's going on with the hydrology of the region"¹⁵ and said representative indicated he was looking for an education. He then requested administrative notice of two reports that are records of

¹³ Transcript, p. 14.

¹⁴ Transcript, pp. 322-323.

¹⁵ Transcript, p. 305.

Ruling
Page 13

the office of the State Engineer, pointed out a few excerpts from those publications, and indicated he would defer to the applicant's witnesses. As the representative read through the excerpts he indicated repeatedly "another portion I would like to understand" and "I have lots of questions" in reference to statements made in the reports.¹⁶ "In summary, we're anxious to see what comes. It doesn't make any sense to present information in light of the incredible amount of research that's been done in the area. I would like to have an opportunity for that information to be presented and ask any questions in clarification so that I can better understand what's going on."¹⁷

In response to the protestants' statement that they would not be putting on a case and were really just attending the hearing to get an education, the State Engineer directed the protestants to NRS § 533.365 which provides that any interested person may file a protest against the granting of an application setting forth with reasonable certainty the grounds of such protest. Upon questioning, the protestant admitted the protests when filed were "certainly uncertain."¹⁸

When a protestant files a protest to the granting of an application to appropriate water, it is the protestant's burden to produce the evidence and prove said claims. It is not the applicant's job to disprove the protestant's claims. The State Engineer finds that the burden of producing evidence and proving the protestant's claims lies squarely on the protestant. The issues to be considered during a hearing arise from the contents of the application, the protests, or issues that may arise under

¹⁶ Transcript, pp. 305-321.

¹⁷ Transcript, p. 320.

¹⁸ Transcript, p. 325.

Ruling
Page 14

NRS chapters 533 or 534,¹⁹ and it is generally the protestant that is required to present its case first.²⁰

The State Engineer finds that, while these protestants listed at least 18 issues in their protests, at the administrative hearing they did not present any evidence as to any of their protest claims and in fact failed to present cases at all. The State Engineer finds the statutory process for filing protests is not to be taken lightly and is not merely a method by which protestants can throw out lots of ideas as to why an application should be denied expecting the applicant to disprove the statements in their protests. The filing of a protest is a serious matter and any protestant is expected to have reasonable grounds as a basis for their protest and is expected to provide whatever evidence and testimony it has in support of its protest. The State Engineer finds protestants the Amargosa Water Committee and the Southern Nye County Conservation District failed in this respect as their protests, as filed, were uncertain and they did not present one shred of evidence to support their protest claims at the administrative hearing.

The State Engineer considered the protests of the Amargosa Water Committee and the Southern Nye County Conservation District as required under NRS § 533.365, and the protests were not based upon reasonably certain grounds. The protestants came to the hearing with no intention of putting on a case to defend the position they took in their protests, but rather intended to use the public administrative hearing process "to learn" and perhaps dismiss many of the grounds of their protests. In their opening statement, these protestants did not address many of the issues listed in their protests. The State Engineer finds that dismissal

¹⁹ NAC § 533.210.

²⁰ NAC § 533.350.

of the protests at the administrative hearing²¹ was the appropriate course of action.

IV.

Some protest claims attempted to focus on the fact that the intended use of the water is not limited to site characterization, but rather is for the establishment of a repository, which is prohibited by State statute. The applicant attempted to focus on the fact that the intended use of the water is similar to any other facility being built in the state of Nevada.

At the pre-hearing conference, counsel for the applicant indicated that the DOE is not asking for water to inject anything into the ground, that the use of the water is only for construction of the facility and normal processes that go along with that construction, and agreed that if water was going to be used beyond that, the DOE would have to file another application with the Division of Water Resources.²² At the administrative hearing, counsel for the DOE indicated in his opening remarks that while the water may be used in the construction of a high-level nuclear waste storage facility, the only use of the water under these applications would be in conjunction with the tunneling operations to make the place ready for the emplacement of canisters containing nuclear waste, and only if the facility is ultimately licensed for that purpose. "There is no water in essence going to be used other than for dust suppression during the construction phase in those facilities."²³

Yet, in closing argument at the evidentiary hearing, counsel for the DOE asked the State Engineer to reconsider whether the DOE would have to file new applications for uses of water beyond the dust control, etc. mentioned in its applications,²⁴ and in that

²¹ Transcript, pp. 324-327.

²² Pre-hearing Conference Transcript, pp. 38-39, 52.

²³ Transcript, pp. 17-18.

²⁴ Transcript, pp. 689-690.

Ruling
Page 16

same closing argument admitted the DOE was asking for the applications to construct and eventually operate a high-level nuclear waste facility.²⁵ While counsel argues that water is not to be used to store any nuclear waste²⁶ this appears to be a question of semantics, which contradicts the testimony presented.

The testimony indicated that as to the surface facility, the DOE expects to use water for construction and operation of the facility, including dust control, concrete production, washdown of the facilities and equipment during construction, as it would be used in many other kinds of industries during the construction of their facilities. However, further testimony indicated that during operation of the facility water would be used for the decontamination of equipment contaminated with radiation, and to cool the transportation casks prior to removing either non-disposable canisters or bare assemblies.²⁷ As to the subsurface repository design, testimony was provided as to the use of water in the drilling of tunnels, including emplacement tunnels, however, once into the overlapping construction and operation phases the only use of water on the emplacement side would be for potable water for employees, fire lines and washdown facilities (in the case of a contamination event there would probably be a couple of alcoves on the emplacement side) with the main use of water on the development side of the repository being for the concrete batch plant and dust suppression.²⁸

²⁵ Transcript, p. 687.

²⁶ Transcript, p. 688.

²⁷ See, testimony of Dr. Matthew Gomez, project engineer for the surface facility at the Yucca Mountain project, Transcript, pp. 237-241. See, testimony of Michael Ruben, lead civil structural design engineer for the repository surface facility design department, Transcript, pp. 468-474. See also, Wendy Dixon testimony, Transcript, pp. 375-376.

²⁸ See, testimony of Dan McKenzie, project manager for the repository sub-surface design, Transcript, pp. 452-455.

Ruling
Page 17

Wendy Dixon, environmental impact statement project manager, testified as to the many steps that have to be taken before a high-level nuclear waste repository becomes a reality at Yucca Mountain²⁹, however, to date the draft environmental impact statement does not identify any impacts that the DOE believes would preclude recommending the site to the President of the United States.³⁰ Ms. Dixon testified that, if the Yucca Mountain repository is authorized at the federal level, the water will be used for the construction and operation of a high-level nuclear waste repository at Yucca Mountain.³¹ Ms. Dixon testified that the DOE has requested the 430 acre-feet annually to meet its Nuclear Waste Policy Act responsibilities and that the water would be used for all repository program phases, such as confirmation, construction, operation, possible retrieval and closure.³² Ms. Dixon testified that through the Nuclear Waste Policy Act, as amended in 1987, Congress has determined that geologic disposal is in the public interest,³³ and that site characterization has been directed to only the Yucca Mountain site.³⁴ She further testified that the environmental impact statement process does not have to consider either the need for repository alternatives to geologic disposal or alternatives to the Yucca Mountain site.³⁵

While counsel attempted to argue this is like any other water right application for mining in Nevada, that is not the case. These applications are for use of water in a facility to store

²⁹ Transcript, pp. 350-364.

³⁰ Transcript, p. 360.

³¹ Transcript, pp. 20-21.

³² Transcript, p. 364.

³³ Transcript, p. 350.

³⁴ Transcript, p. 351.

³⁵ Transcript, p. 356.

Ruling
Page 18

high-level nuclear waste. The State Engineer has reconsidered his decision whether the DOE would have to file new applications for uses of water beyond the dust control, etc. mentioned in its applications, and finds that at the administrative hearing it was flushed out that the applications were filed for more uses than just construction and finds the applicant is requesting the use of water for actual use in the receiving, transfer, and processes for the storage of high-level nuclear waste in Nevada and those uses are encompassed under these applications.

The State Engineer finds the testimony presented by the DOE leads to the conclusion that the water applied for is not merely for the normal industrial purposes identified in the applications as to road construction, facility construction, drilling, dust suppression, tunnel and pad construction, testing, culinary, domestic and other related site uses as in any other industry that is building a facility. But rather, the intent of the DOE is to move forward toward using the waters in a facility that upon approval will be operated for the storage of high-level nuclear waste in Yucca Mountain with those uses including the possible handling of nuclear waste, washdown facilities, decontamination and other uses associated with the operation of a facility to store high-level nuclear waste, if such facility becomes licensed.

v.

Protestant Nevada Agency for Nuclear Projects presented testimony that the siting could: (1) cause people to consider moving out of the area; (2) cause people to reconsider investing in Southern Nevada; (3) cause people to be concerned over the quality of life in the area; and (4) cause people to be concerned over the risk associated with the transportation of materials to the site.³⁶ The protestant also presented testimony indicating there is strong public opposition to locating a nuclear waste repository in Nevada and that opinion is united year after year

³⁶ See generally, testimony of Dr. Alvin Mushkatel, Transcript, pp. 79-140.

Ruling
Page 19

and is across the board as to regions of the state, age groups, political affiliations, education, or socioeconomic levels.³⁷ The State Engineer finds that testimony was presented indicating that it may not be in the economic interests of Nevada to have a high-level nuclear waste repository at Yucca Mountain,³⁸ and that the siting of a nuclear waste repository at Yucca Mountain causes considerable public concern.

CONCLUSIONS

I.

The State Engineer has jurisdiction over the parties and the subject matter of this action and determination.³⁹

II.

The State Engineer is prohibited by law from granting a permit under an application to appropriate the public waters where:⁴⁰

- 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.

As to protestants the Amargosa Water Committee and the Southern Nye County Conservation District, the State Engineer concludes these protestants did not provide testimony or evidence in support of their protest claims, therefore, their protests were subject to dismissal. The State Engineer concludes as to protestant Citizen Alert that testimony or evidence was not

³⁷ Transcript, pp. 230-232.

³⁸ See generally, testimony of Dr. James Chalmers, Transcript, pp. 22-78; testimony of Dr. James Flynn, Transcript, pp. 140-169.

³⁹ NRS chapters 533 and 534.

⁴⁰ NRS § 533.370(3).