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STATE OF NEVADA

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

DIVISION OF WATER RESOURCES

BEFORE SUSAN JOSEPH-TAYLOR, HEARING OFFICER

IN THE MATTER OF PROTESTED APPLICATIONS 73783, 73791 THROUGH 73797, 73799, 73800, 73849 THROUGH 73855, 73863 THROUGH 73872, 73908 THROUGH 73915, 73917, 73986, 73987, 74076 THROUGH 74085, 74193 THROUGH 74202 AND RELATED SECONDARY APPLICATIONS (TMWA APPLICATIONS).

IN THE MATTER OF PROTESTED APPLICATION 78034 AND RELATED SECONDARY APPLICATIONS (CITY OF FERNLEY APPLICATIONS).

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VOLUME III - TRANSCRIPT OF PROCEEDINGS

PUBLIC HEARING

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INDEX

(NOTE: Exhibits Listed in Volume IV.)

HEARING OFFICER JOSEPH-TAYLOR: Downstream of where?

THE WITNESS: Vista.

HEARING OFFICER JOSEPH-TAYLOR: Redirect?

MR. FERGUSON: No, I don't have any further questions.

HEARING OFFICER JOSEPH-TAYLOR: Questions from staff? Now, that's how to move a witness. You get to play with us. Thank you, Mr. Briscoe.

Let's be off the record while we switch witnesses.

LEE G. BERGFELD

called as a witness on behalf of the Applicant, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. DePAOLI:

Q. Mr. Bergfeld, would you please state your name?

A. Lee G. Bergfeld.

Q. Mr. Bergfeld, is what has been marked as Exhibit 120 a summary of your educational, professional and employment history?

A. Yes, it is.

Q. Please describe your educational background since college.

A. I have a bachelor's of science degree in civil engineering from the United States Air Force Academy and a master's of science degree in civil engineering from the University of California at Davis.

Q. And would you also briefly describe your employment history and what you were doing in each position?

A. Yes. Since graduation from the academy in 1995, I spent approximately five and a half years as a commissioned civil engineering officer in the United States Air Force. I worked on a variety of civil engineering-related projects related to maintaining an Air Force base and being ready for deployments.

After that, I spent about four months working with the U.S. Geological Survey from May of 2002 through September of 2002 prior to returning to graduate school. There I worked as an engineer studying water resource issues and data collection in the Sacramento, San Joaquin River Delta in California.

While attending graduate school at Davis I also worked at the U.S. Army Corps of Engineers hydrologic engineering center. The engineering center developed software for analysis of water resource projects and issues for the Corps of Engineers and others.

I also worked as a teaching assistant at the University of California Davis working, teaching the hydraulics lab there for undergraduate students.

In June of 2003 I began to work part time while continuing my master's degree at Science Application International Corporation. There I worked in a variety of different water resource projects.

That company provided civil engineering consulting services and I worked there after I received my graduate degree and continued working there until October of 2005, at which time I joined MBK Engineers in Sacramento and continue to work there until today, hopefully through today and I worked on a variety of water resource issues and problems.

Q. What generally does MBK Engineers do?

A. MBK Engineers provides civil engineering services on water-related issues.

Q. And what is your position there?

A. I am a senior engineer.

Q. Are you a registered civil engineer in any states?

A. Yes, I am.

Q. Which states?

A. California and Nevada.

Q. What previous experience have you had in

calculating the consumptive use of applied water?

A. My previous experience in calculating consumptive use of applied water has been primarily in the Sacramento and San Joaquin Valleys in Sacramento. There I have utilized weather station data and estimates or calculations of evapotranspiration provided by the California Irrigation Management System, or CIMS.

I've used those data and developed estimates for the consumptive use of applied water in order to develop irrigation demands in those two valleys.

I've done this using a variety of different techniques and utilizing information provided by the California Department of Water Resources for estimates of evapotranspiration. I've done this work on both a large and small spacial scale, looking at localized areas such as individual irrigation districts as well as for the entire Sacramento Valley.

Q. Who were you working for when you were doing that work?

A. I've conducted this work for the U.S. Bureau of Reclamation, the California Department of Water Resources and individual irrigation districts.

Q. What was the work that you did used for?

A. The irrigation demands which were based on the consumptive use of applied water were used in support of

different modeling efforts, most notably they were used to develop the hydrology and irrigation demands that are incorporated into the primary planning model used by the Bureau of Reclamation and the California Department of Water Resources in answering questions relating to the operations of the central valley project in California.

Q. Have you done any related work in the Klamath River adjudication?

A. Yes, I have. MBK has been involved in the Klamath River adjudication, working on several different tasks. Tasks that I was directly involved with and performed were the calculation of effective precipitation in the Klamath Basin and I also reviewed work by others at MBK that developed estimates of consumptive use of applied water for that adjudication in order to quantify or prove the claim duties for the Klamath project.

Q. In some of this work that you've done, was one of the crops that you looked at alfalfa?

A. Yes, I looked at alfalfa in both the work that I've conducted in California and in the Klamath Basin.

Q. Is the work that you did in those other jobs, was it similar to the work that you've done for the Truckee Meadows Water Authority in connection with these change applications?

A. Yes, it was.

Q. What did the Water Authority ask you to do in connection with these change applications?

A. They asked me to calculate the consumptive use of applied water of alfalfa in the Truckee Meadows.

Q. And have you prepared a report on that task?

A. Yes.

Q. Is that Exhibit 121 in this proceeding?

A. Yes.

Q. First of all, what is your understanding of the phrase consumptive use?

A. My understanding of the phrase consumptive use --

HEARING OFFICER JOSEPH-TAYLOR: Hold on.

MR. VAN ZANDT: Are we finished with the qualifications and moving into the witness' testimony?

MR. DePAOLI: Yes.

MR. VAN ZANDT: I would like to voir dire the witness on his qualifications if I may since the State Engineer is being asked to make a determination that he's qualified as an expert on the consumptive use determination that he's prepared to testify about.

HEARING OFFICER JOSEPH-TAYLOR: Are you offering him as an expert?

MR. DePAOLI: Well, I'm offering him as someone who is qualified to do what he did here. I don't know in terms of what that means as an expert. He is qualified to

perform the tasks that he did here, which was calculating the consumptive use of applied water of alfalfa in the Truckee Meadows based on the proceedings evolved.

HEARING OFFICER JOSEPH-TAYLOR: He hasn't offered him as an expert, he's offering him as an engineer.

MR. VAN ZANDT: We'll listen to the questions.

MR. DePAOLI: May I inquire as to what the difference is?

HEARING OFFICER JOSEPH-TAYLOR: I see experts as people who are qualified to make particular opinions from the factual evidence that they present.

MR. VAN ZANDT: I note for the record that in the designation Mr. Bergfeld is indicated by the TMWA, that he will testify concerning, as an expert witness concerning consumptive use of applied water for alfalfa. That's why I'm confused.

MR. DePAOLI: He is testifying as an expert witness in calculating the consumptive use of applying water to alfalfa in the Truckee Meadows pursuant to the procedures that he followed in his report.

HEARING OFFICER JOSEPH-TAYLOR: I'll let you do some voir dire because I'm probably going to qualify him as an expert. So, go ahead.

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VOIR DIRE EXAMINATION

BY MR. VAN ZANDT:

Q. Good afternoon, Mr. Bergfeld.

A. Good afternoon.

Q. Looking at Exhibit 120, I didn't see any work done in the Truckee Meadows prior to this time, is that correct, prior to this task?

A. That's correct.

Q. And you testified that in the Sacramento River Basin and San Joaquin River Basin you have done similar type of work to what you've done here for the Truckee Meadows Water Authority.

Did that work also include field operations where you actually ran lysimeters or other gage information to develop data with regard to consumptive use or evapotranspiration?

A. No, it did not.

Q. So, the data that you were interpreting was gathered by somebody else; is that right?

A. That is correct.

Q. And the methods that you determined to use to do the calculations in the Sacramento and San Joaquin River Basins, did you educate yourself or were you taught by somebody how to do that?

A. I would say a little bit of both.

Q. Did you take formal courses on evapotranspiration and consumptive use when you were studying for your bachelor or graduate degree?

A. I haven't had a formal course specifically on consumptive use or evapotranspiration, but I have had courses on hydrology that typically covered these subjects.

Q. The efforts that you expended in the Sacramento and San Joaquin River Basins, did they result in a study or report similar to the ones you prepared for the Truckee Meadows Water Authority?

A. No, they have not.

Q. So, would it be fair to say that this is the first time you've done a calculation such as the one that's in your Exhibit 121, your expert report?

A. No. The work did not result in a report similar to what I have submitted here, but it's not the first time that I've done these calculations.

Q. But this prior effort that you engaged in, was it specifically for potential evapotranspiration?

A. Yes.

Q. And have you done an analysis of actual evapotranspiration for alfalfa before?

A. I have made estimates of the evapotranspiration of alfalfa. Can you define the actual evapotranspiration?

Q. Well, I guess the question is potential

evapotranspiration is a theoretically ideal situation with a plant; would you agree with that?

A. Yes.

Q. Whereas the actual determination of the actual evapotranspiration is something that you try to actually measure, given a lot of other limiting factors; isn't that right?

A. Then, no, I have not performed a study of the actual measure of evapotranspiration.

Q. Have you ever done a historic actual consumptive use analysis on alfalfa?

MR. DePAOLI: Excuse me. It seems like we may be getting into cross-examination here rather than voir dire. We're not offering him or saying that that is what he's done here. What he has done here is very clear.

MR. VAN ZANDT: I'm trying to understand the breadth of his experience with regard to evapotranspiration and consumptive use. I think these are fair questions to get that understanding.

HEARING OFFICER JOSEPH-TAYLOR: I'll let you go a little longer.

THE WITNESS: Can you repeat the question?

BY MR. VAN ZANDT:

Q. Well, based on what I described to you as the difference between ET and actual ET, I think you were about

to answer that you do not have experience with doing the actual calculations; is that right?

A. That is correct.

Q. The various formulas and reference material that you have included in Exhibit 121, did you use that in the Sacramento/San Joaquin Valley investigation as well?

A. I have used slight variations. The ASCE equation is very similar to the CIMS equation that is used in the Sacramento and San Joaquin Valleys.

Q. So, in the Sacramento San Joaquin Valley, how many times have you performed these calculations?

A. Somewhere between five and ten times.

Q. Were you supervised by somebody in conducting this work?

A. No.

Q. You said you were doing some of this work for the U.S. Bureau of Reclamation. Was somebody in the U.S. Bureau of Reclamation overseeing your effort and confirming your results?

A. Yes.

Q. And you said the Klamath work that you did, you were calculating an effective precipitation and then you reviewed work by others who did the actual consumptive use work; is that correct?

A. That is correct.

Q. So, you didn't do these actual calculations in the Klamath effort, right?

A. Not of the consumptive use.

Q. And Mr. Bergfeld, have you ever testified as an expert before?

A. No.

Q. Have you ever been deposed as an expert?

A. No.

HEARING OFFICER JOSEPH-TAYLOR: Isn't it fun?

THE WITNESS: I decline to answer.

MR. VAN ZANDT: Based on the limited experience that Mr. Bergfeld has, I don't believe that he has the qualifications the State Engineer would normally look to for this type of testimony and I'd object on that basis.

HEARING OFFICER JOSEPH-TAYLOR: The State Engineer has already determined that he is fine with Mr. Bergfeld's qualifications. Please proceed, Mr. DePaoli.

DIRECT EXAMINATION (Resumed)

BY MR. DePAOLI:

Q. I think my last question, Mr. Bergfeld, was to tell us your understanding of the phrase consumptive use of applied water.

A. Yes. The phrase kind of has two parts, the consumptive use and then of applied water. To define the consumptive use, I would define that as the water that is

consumed by the plant as it goes through the processes of transpiration and evaporation from the soil surface.

To combine that with the consumptive use of applied water, I would define that as the portion of the total consumptive use that is met from applied water typically calculated as the total consumptive use, minus the effective precipitation.

Q. Your assignment here was to determine the consumptive use of applied water of alfalfa, was it not?

A. Yes, it was.

Q. And why was alfalfa selected?

A. I was directed to calculate the consumptive use of applied water for alfalfa specifically by legal counsel. It is my understanding that the reason that that direction was provided is because alfalfa has been used in similar proceedings regarding water rights in the State of Nevada.

Secondly, I also reviewed the 1925 special master's report which stated that alfalfa was the principal crop grown in the Truckee Meadows.

Q. Are you familiar with alfalfa being used in other proceedings in Nevada as a crop for consumptive use?

A. It is my understanding that it was used in the Alpine Decree and some recent rulings by the State Engineer.

Q. What is the American Society of Civil Engineers?

A. The American Society of Civil Engineers is a

professional organization for civil engineers. The purpose of the society is to advance the profession and the science of engineering.

Q. What is the ASCE standardized reference evapotranspiration equation?

A. The ASCE equation is the method for calculating the referenced evapotranspiration from.

Q. Why was it developed?

A. The ASCE formed -- excuse me. ASCE recognized a need because of the existence of numerous different methods for the calculation of evapotranspiration that were in existence to develop a standardized equation for use in water rights proceedings, for use by scientists and engineers as a standard and reproducible method to represent some of the best science available for making the calculation.

Q. And did you use that equation here and if so, why?

A. Yes, I used that equation here, and I used it for those exact reason that it was developed, because it is a standardized equation developed for these types of proceedings and represents some of the best science available.

Q. Has it's been accepted or endorsed by others?

A. The ASCE equation has been endorsed by the Irrigation Association. Additionally, the U.S. Committee on

Irrigation and Drainage and the University of California have conducted workshops to instruct individuals in its application, and it is my understanding that this equation has also been used by the State Engineer.

Q. What steps did you take in arriving at your opinion as expressed in your report?

A. Generally, I reviewed and collected the available weather data for the Truckee Meadows area. I then used that data in the ASCE equation to calculate the referenced evapotranspiration for a reference crop. Next, I determined the growing season for the Truckee Meadows based on temperature records.

I then applied crop coefficients to calculate the consumptive use for a specific crop as opposed to the reference crop that the equation has been developed for. Then I calculated the effective precipitation and subtracted that amount from the total crop consumptive use.

And then last I reviewed historical weather data for the Truckee Meadows. It covered a longer period of record than the period of data that I had available to make the calculation of evapotranspiration and made an adjustment based on differences between the long-term period of record and the period of available data that I used.

Q. What weather station data did you consider?

A. I began by looking at all the available weather

station data that I could find. This included information provided by the National Climate Data Center, the Western Regional Climate Data Center, CIMS stations nearby in California.

I also looked at some weather station data collected in Washoe County, and after review of that data I used data from two stations illustrated here in figure 1 of my report.

These stations are maintained and data are collected by the Desert Research Institute. The first station is located at the Reno Valley Road Farm north of Interstate 80 and west of Highway 395.

The second station labeled here is the South Reno Station that is located west of 395 and south of downtown Reno on the Wolf Run Golf Course.

Q. But what's the period of weather station data which you considered from these two stations?

A. The period of available data at these two stations was for the Reno Valley Road Farm Station from January of 2000 through December of 2006, and at the South Reno Station from April of 2000 through December of 2006.

Q. Was that the only data available from those two stations?

A. Yes, it was.

Q. How did you assess the quality of that data?

A. The ASCE task committee that developed the standardized reference ET equation also recommended and provided guidelines for the assessment of the quality of weather stations data to be used in the equation. Those standards are included as appendix D to the task committee report and I followed those guidelines and procedures.

Q. What did you learn from that assessment?

A. I learned that the data were of generally good quality. The most significant issue that I found through this quality assurance check was that the incoming solar radiation data at the Reno Valley Road Farm Station for the period of April 2000 through approximately June 2001 was in error.

I determined this by a comparison of the measured solar radiation plotted here as the red circles next to the maximum possible incoming solar radiation plotted as the blue line. The observed solar radiation should not exceed the maximum cloud-free solar radiation, and as this figure illustrates, during that time period it frequently did.

So, I used for this period the incoming solar radiation data from the South Reno Station for the calculations at the Valley Road Farm Station.

Q. Have you been referring to what is figure 2 of what has been marked as Exhibit 126 when you reference the plot?

A. I have.

Q. And is that also figure 2 in your report?

A. Yes, it is.

Q. After reviewing and assessing the quality of the available weather station data, what did you do next?

A. Next I determined that I had to make one adjustment to the weather station data. At both of these stations the wind speed is measured at a height of three meters and the ASCE equation is based on a wind speed measurement at two meters. So, I made the adjustment again following the recommendation in the task committee report for performing that adjustment.

Then I used the weather station data from both of these two stations to calculate a reference ET using the ASCE equation.

Q. What is a reference crop ET or evapotranspiration?

A. Reference ET is the evapotranspiration that occurs from a reference crop growing under reference conditions. There are two different common reference crops used for the ASCE equation. One is a short clip grass and the other is a tall crop similar to alfalfa.

Grown under reference conditions indicates that the crop is at full cover, dense, and is not short of available water.

Q. What did you use for a reference crop here?

A. I used the short grass reference crop.

Q. And why did you do that?

A. I did an analysis using both reference crops, both the short and the tall, and based on that analysis and carrying that analysis through a few more steps as outlined in the task committee report for the equation, determined that the short reference crop provided a better estimate for the ET in the Truckee Meadows.

The long reference crop overestimated the ET for the Truckee Meadows.

Q. After calculating the reference crop evapotranspiration, what did you do next?

A. I determined the growing season for the Truckee Meadows.

Q. How did you do that?

A. I determined the growing season based on the last killing frost defined as 20 degrees Fahrenheit for alfalfa in the spring and the first killing frost in the fall. To determine when those first and last killing frosts occurred, I consulted and reviewed long-term weather station data available for the Reno Airport and these are shown as figure 3 on the screen, as well as in my report.

I selected the median date for a date with a probability of excedence of 50 percent for 20 degrees

Fahrenheit. So, on this plot for the spring, that is the light blue line on the left side of the plot. That light blue line crosses the 50 percent excedence line approximately some time in the first week of April.

I made a similar determination for the fall. Here the light blue line is at the far right side of the plot and that line crosses the 50 percent excedence probability some time in the first week of November. So, I approximated the growing season to occur from the first of April through the 31st of October.

Q. Is there a difference between what you determined to be the growing season and what you ultimately used as the irrigation season?

A. Yes, there is.

Q. What is the difference?

A. The growing season is defined by the temperatures in the area. The irrigation season can be defined differently. Again, consulting and reviewing the special master's report of 1925, it stated that the irrigation season typically began on the 15th of April.

I limited the calculation of the consumptive use of applied water to begin April 15th as opposed to the consumptive use that may be begin on April 1st with the growing season.

Q. Have you reviewed some historical data related to

the irrigation season in the Truckee Meadows prior to the 1960s?

A. Yes, I have.

Q. And what is that data?

MR. VAN ZANDT: I'm going to object. This isn't in Mr. Bergfeld's report, any of this historic information.

MR. DePAOLI: It is not in his report. We did not obviously see the information that Mr. Mahannah presented regarding ditch diversions from 1989 to 2005 until after both the first exchange and the second exchange. And so, we did not have any idea that this issue would be an issue about when the ditch is diverted in the Truckee Meadows.

After we received that, I asked Mr. Bergfeld to review diversion data that was actually provided to us by the Truckee-Carson Irrigation District in the Donner Lake Trial, and that is what he reviewed and that's what these plots are from.

HEARING OFFICER JOSEPH-TAYLOR: Mr. Van Zandt?

MR. VAN ZANDT: Well, the analysis that was based on actual ET and that was based on historical information. So, I don't know why it couldn't have been anticipated that Mr. Bergfeld would have to address those issues.

We also note that Mr. Bergfeld, I believe this is correct, is not one of their listed rebuttal witnesses. So he's about to give rebuttal testimony and he's not a listed

rebuttal witness. So, this information, it's not on this slide, but it's coming up in the next couple slides, is entirely new and we've never seen it before.

HEARING OFFICER JOSEPH-TAYLOR: I have some problems with that.

MR. DePAOLI: He is actually providing information that supports his original determination of the irrigation season, and I see a problem with TCID having this information and not presenting it through Mr. Mahannah.

MR. VAN ZANDT: Having what information? I'm confused.

HEARING OFFICER JOSEPH-TAYLOR: So am I.

MR. DePAOLI: The historic information in the Truckee Meadows ditches that was provided by Mr. Binder in the Donner Lake Trial.

HEARING OFFICER JOSEPH-TAYLOR: I don't care what was presented in the Donner Lake Trial. I care what was exchanged here and what people were prepared for here. So, I do have some problems going into brand new evidence that wasn't exchanged prior. How much of this do you have?

MR. DePAOLI: We just have three which you haven't seen yet. We have three figures.

HEARING OFFICER JOSEPH-TAYLOR: I'm not going to allow it, Mr. DePaoli.

MR. DePAOLI: We will leave those for an offer,

then, and we will move forward.

BY MR. DePAOLI:

Q. Mr. Bergfeld, after determining the growing season, what was your next step?

A. It was to apply crop coefficients to calculate the consumptive use for alfalfa as opposed to the reference crop.

Q. And what is the purpose of applying a crop coefficient?

A. The crop coefficient accounts for differences between how the reference crop consumes water and the crop of interest, in this case alfalfa, consumes water.

Q. What crop coefficient did you use in your analysis, and why?

A. I used crop coefficients from the Food and Agriculture Organization of the United Nations, Irrigation and Drainage Paper 56, or what's commonly referred to as FAO 56.

Q. And why did you use that?

A. I used those crop coefficients because they're appropriate for the Truckee Meadows and have been developed by some of the same authors as the ASCE equation and the ASCE task committee report references FAO 56 as a source for crop coefficients.

Q. How did you account for the fact that alfalfa is

harvested several times during the growing season?

A. There are two methods that can be used to account for the cutting and regrowth of alfalfa in the calculation of the consumptive use. The first method that I used was to use an averaged crop coefficient during the growing season that accounts for the cutting of the crop, the initial growth phase as it recovers, the development phase as it again grows to maturity and then harvesting again.

The second method is to apply crop coefficients assuming some number of cuttings that directly account for the harvesting of the crop, the initial growth phase, the development phase and the mature phase until the next cutting.

I performed calculations using both methods and determined that there was not a significant difference between the two, and used the average crop coefficients from FAO 56 in my final analysis.

Q. And what is the result of multiplying the crop coefficient by the reference evapotranspiration?

A. The result of that calculation is the total consumptive use or the total ET for the crop.

Q. What was your next step in calculating the consumptive use of applied water?

A. My next step was to calculate the effective precipitation.

Q. What is effective precipitation and how did you calculate it here?

A. Effective precipitation is the portion of the total precipitation that is available to meet the consumptive demands of the crop. It's calculated as the total precipitation minus the portion that runs off, minus the portion that depercolates past the root zone.

I calculated effective precipitation here using methods developed by the National Resource Conservation Service and detailed in the National Engineering Handbook.

Q. For precipitation to be effective precipitation, must it occur during the growing season?

A. Generally, but not necessarily. For example, precipitation that immediately precedes the growing season could be effective if it is stored in the root zone and is available to the crop when it begins growing.

Q. What was the next step in calculating consumptive use of applied water for alfalfa in the Truckee Meadows?

A. Recognizing that precipitation occurring prior to the growing season can be considered effective, I took the total consumptive use calculated with the reference equation and the crop coefficients, and then subtracted the effective precipitation, including that effective precipitation for the month of March that immediately preceded the growing season from the total consumptive use of the crop.

Q. And what was your calculation of consumptive use of applied water in alfalfa in the Truckee Meadows during that period April 15th through October 31st for the time frame that you looked at?

A. I performed the steps that we've discussed here for both the Reno Valley Farm Station and for the South Reno Station, and then I averaged those two stations. The result of those calculations minus the effective precipitation was that the consumptive use of applied water of alfalfa in the Truckee Meadows during that period was 37.2 inches or 3.1 feet.

Q. And did you compare your calculations to reports of measured consumptive use of applied water to alfalfa in the Truckee Meadows?

A. Yes, I did.

Q. And what were the reports and what did that comparison show?

A. I prepared a slide that illustrates that comparison which I'll move to. I compared it to measurements conducted by Houston from 1950 through 1953 and from Tovey, 1959 to 1966. Those two studies measured a range of consumptive use of applied water illustrated here. For Houston, that range was from 33 to 34 inches, and for Tovey, it was from 31.2 to 40 inches.

The triangle here on those bars is the average

that I calculated for the consumptive use of applied water for the period.

Q. When you're referring to here, you're referring to supplemental table 1, comparison with measured CUAW, which is the last page of Exhibit 126?

A. Yes.

Q. That exhibit is not in your report, is it?

A. No, it is not.

Q. Did you compare your calculation to reports of consumptive use of applied waters of alfalfa in Washoe Valley?

A. Yes, I did.

Q. What is that report and what did that comparison show?

A. That report was prepared by Mr. Huntington and his estimates following very similar methods in the Washoe Valley indicated the consumptive use of applied water of alfalfa ranged between 2.88 feet and 3.65 feet.

Mr. Huntington also used the same data from the recent Valley Road Farm Station as used in my analysis, although for a slightly shorter period. His analysis went through 2005, and he calculated for the Reno Valley Road Farm Station an estimate of 39.75 inches.

Q. Did he use a longer irrigation season than your analysis in the study that he did?

A. He calculated the consumptive use of applied water for the entire growing season, from April 1st through October 31st.

Q. If you had done that with your calculation, what would your calculation have been?

A. My calculation for that station would have been 38 inches or 3.17 feet.

Q. I believe that when you said earlier the steps that you went through in this process, you indicated that you looked at some longer-term weather data?

A. Yes, I did.

Q. And why did you do that?

A. Because the period of data available for applying the ASCE equation was limited to the period of 2000 through 2006 or for seven years. I wanted to see how that period compared to the long-term data available in the Truckee Meadows to see if it was representative.

Q. What longer term weather data did you consider?

A. I used weather data for temperature and precipitation which were available through the Western Regional Climate Center at the Reno Airport from the beginning of March 1937 through 2006.

Q. What was the result of this comparison?

A. The result was that the period from 2000 to 2006 compared to the long-term average was a period of

below-average precipitation and above-average temperature.

Q. What adjustments, if any, did you make to your calculation of consumptive use of applied to alfalfa as a result of that comparison?

A. I went back and used instead of the March through October effective precipitation based on the 2000 to 2006 period, I used the long-term average effective precipitation based on the longer period of record available at the Reno Airport.

I also went back and adjusted the temperatures used in the calculation of the reference ET to be similar to the long-term monthly average temperatures in the longer period of record.

Q. So, was that everything that you did to reach your opinions in your report?

A. Yes.

Q. Based on that record, what is your opinion of the consumptive use of applied water to alfalfa in the Truckee Meadows?

A. My opinion is that it is 2.9 feet.

Q. Based on your calculated consumptive use, what is the irrigation efficiency for an average water duty of 4.0 acre feet that's involved here.

A. It would be 72.5 percent.

Q. Is that a reasonable number from your

perspective?

A. Yes, it is.

MR. DePAOLI: I have no further questions. I would like to offer into evidence Exhibit 120 and Exhibit 121. I would like to have supplemental figure 1, supplemental figure 2 and supplemental figure 3 removed from Exhibit 126 and marked separately as Exhibit 127.

MR. VAN ZANDT: The last page remains in the exhibit, I believe.

MR. DePAOLI: Yes, the last page does remain. With that, I would offer Exhibit 126.

HEARING OFFICER JOSEPH-TAYLOR: Any objection to Exhibit 120, Mr. Van Zandt?

MR. VAN ZANDT: Is he offering 120?

HEARING OFFICER JOSEPH-TAYLOR: I'm going back to 120, Mr. Bergfeld's resume.

MR. VAN ZANDT: No objection.

HEARING OFFICER JOSEPH-TAYLOR: 120 will be admitted. 121?

MR. VAN ZANDT: We do object to 121 based on our qualification objection.

HEARING OFFICER JOSEPH-TAYLOR: So noted. It will be admitted. Exhibit 126?

MR. VAN ZANDT: No objection.

HEARING OFFICER JOSEPH-TAYLOR: It will be

admitted.

MR. DePAOLI: I would offer Exhibit 127.

MR. VAN ZANDT: We would object to that for the reasons stated.

HEARING OFFICER JOSEPH-TAYLOR: You were going to make that an offer of proof, Mr. DePaoli?

MR. DePAOLI: I'm offering it. I am assuming it's going to not be admitted.

HEARING OFFICER JOSEPH-TAYLOR: It's not admitted.

MR. DePAOLI: That's all.

HEARING OFFICER JOSEPH-TAYLOR: Cross-examination, Mr. Van Zandt?

MR. VAN ZANDT: Can we take a short break?

HEARING OFFICER JOSEPH-TAYLOR: Yes, we can. We'll be off the record for about ten minutes.

(A short recess was taken.)

HEARING OFFICER JOSEPH-TAYLOR: Let's be on the record. Mr. DePaoli, you wanted to raise something?

MR. DePAOLI: All I was going to say, Madam Hearing Officer, is that with respect to the offer of proof on Exhibit 127, the representations that I made to the Hearing Officer when the issue first came up would be my offer of proof.

HEARING OFFICER JOSEPH-TAYLOR: Thank you.

Cross-examination, Mr. Van Zandt.

MR. VAN ZANDT: Thank you.

CROSS-EXAMINATION

BY MR. VAN ZANDT:

Q. Mr. Bergfeld, in doing the analysis that's in your report, Exhibit 121, you said you limited it to alfalfa, correct?

A. That's correct.

Q. And that was at the direction of legal counsel?

A. That's correct.

Q. But you said you did some cross-checking, I believe you referenced the 1925 special master's report which is actually in evidence at Exhibit 2226, tab 2, I believe. Is that the special master's report you're referring to?

A. I don't have that in front of me, but I believe that is the same.

Q. Somebody can get it for you. Somebody can pull it for you.

HEARING OFFICER JOSEPH-TAYLOR: Do you need it, Mr. Van Zandt?

MR. VAN ZANDT: No, I believe the witness is correct, that's the one he looked at.

BY MR. VAN ZANDT:

Q. My question is I think you said it was the principal crop that you saw in the Truckee Meadows based on

what was in the special master's report. Do you recall that?

A. Yes.

Q. So, my question is when you say principal crop, isn't it true that you could have 50.1 percent in alfalfa and that would be the principal crop?

A. That could be the case, yes.

Q. And so, you could have other crops, such as small grains or beets or other types of crops that are not alfalfa that constitute over 40 percent of the crop, right?

A. Yes.

Q. Did you make any inquiries as to what the actual crop ratio was in the Truckee Meadows in doing your calculation?

A. No, I did not.

Q. Now, I think you actually referenced looking at some of the consumptive use work in the Alpine Decree, do you recall that?

A. I referenced that my understanding was that using alfalfa as the crop to base consumptive use off of was determined by a precedent set in the Alpine Decree.

Q. Did you actually go and look at the determinations in the Alpine Decree of how consumptive use for alfalfa was determined?

A. No, I did not.

Q. Were you aware that there were actually a couple

of consumptive use numbers that were actually determined in the Alpine Case?

A. No.

Q. And you don't know what those numbers are?

A. No.

Q. Now, you said you looked at some weather data, and if I look at your figure 1 there, you said you looked at some national weather data and some regional weather data and then some Washoe County, but specifically you were looking at these two stations here, correct?

A. These are the two stations I used in performing the analysis.

Q. Now, it appears to me, and you can confirm this, Mr. Bergfeld, that the Reno Valley Road Farm Station seems to be in a highly urbanized area?

A. It is surrounded by urban area, but that particular weather station is located in an area with irrigated agriculture there on the campus.

Q. Did you make any adjustments for any parameters -- I think you indicated that you made some adjustments for temperature and I think there was one other parameter, but my question is did you make any adjustments for humidity at that station?

A. No, I did not.

Q. Wouldn't you agree that a station like that in an

urban setting would tend to have lower humidity than out in a large alfalfa field?

A. Reference conditions are defined by an area of the same crop growing with an expanse of approximately 100 meters. I didn't make specific measurements from the weather station at that location to urban areas, but it is located not immediately adjacent to some of the surrounding urban areas.

It is in the middle of the farm station there.

Q. Have you been to the site?

A. Yes, I have.

Q. Do you know how large of acreage we're talking about what that site consists of?

A. No, I do not.

Q. And is the measurement site actually in the center of the field or is it in one of the corners?

A. As I recall, the farm plot there is rectangular and it is located more or less in the center of the station, of the field.

Q. Now, the South Reno site that you referred to, I believe you indicated that it's on a golf course?

A. That's correct.

Q. Did you make any adjustments there for humidity with regard to that site?

A. No, I did not.

Q. So, in doing your calculations, Mr. Bergfeld, would it be fair to say that you did not make any adjustments for the effects of the urbanization that has occurred in the Truckee Meadows in the last 40 or 50 years?

A. I didn't make any adjustments for humidity that may be influenced by that urbanization. If there is some affected temperature related to that urbanization, then that would be incorporated to some degree in the adjustment that I made for the long-term temperature.

Q. Well, you said that you looked at some long-term temperature information. I think it goes back into the '30s, is that right, 1937 or thereabouts?

A. That's correct.

Q. Did you attempt to match any of the temperature data that we're talking about to the locations for these change applications where the water was transferred from originally?

A. I'm not sure I understand the question. Can you please repeat it?

Q. Well, some of the changes, the original changes from irrigation to M and I in these applications occurred a long time ago, back in the '50s, for example, '50s through 2003, I believe. Did you try to do any kind of matching with regard to temperature for the actual location of the irrigation rights for the work that you were doing?

A. No.

Q. Mr. Bergfeld, I think you testified that you primarily were looking at a growing season which you defined based on the occurrence of frost conditions; is that right?

A. Correct.

Q. But you did say that you looked at irrigation seasons as well, correct?

A. Correct.

Q. And you recognize that there is some variability between a growing season and an irrigation season, correct?

A. Correct.

Q. And that in the special master's report that you referenced, there's an irrigation season that's about 160, 165 days? Do you recognize that?

A. Yes.

Q. Whereas your growing season is in excess of 210 days; would you agree with that?

A. Yes.

Q. And it's true that the difference between the length of the growing season and the irrigation season will have an impact on your calculations, correct?

A. I'm sorry, could you repeat the question?

Q. Well, if you use a different amount of time for the consumptive use calculation, that will change the calculation, will it not?

A. Yes, it will.

Q. Now, you said you made some adjustments for cutting of alfalfa. Do you recall that?

A. What I said is I applied a crop coefficient that incorporated the effects of cutting on alfalfa.

Q. And I think you also indicated there was a reference ET for what you called short clip grass?

A. Yes.

Q. That's the one you choose as a reference, right?

A. Yes.

Q. So, it was the cutting of the short clip grass that you were looking at for the crop coefficient?

A. No.

Q. So, you looked at a crop coefficient for alfalfa based on bulletin 56?

A. Yes.

Q. And did that bulletin actually analyze cutting, the number of cuttings and the size of the cuttings that would be reflective of the conditions in the Truckee Meadows?

A. The crop coefficients in FAO 56 are appropriate for use in the Truckee Meadows, but I do not know if they would reflect the number of cuttings that occurred in the Truckee Meadows.

Q. Or even the size of the cutting, correct?

A. Correct.

Q. And would that affect the calculation if you had a different number of cuttings and even size of a cutting?

A. Yes.

Q. Now, in conducting your analysis, Mr. Bergfeld, would it be fair to say you did not look at any water supply limitations in the Truckee Meadows?

A. Yes.

Q. And you did not consider the irrigation season variability in the Truckee Meadows?

A. That's correct.

Q. And you also did not consider different irrigation methods?

A. That's correct.

Q. Nor did you consider any field application efficiencies that were specific to the fields we're talking about here?

A. That's correct.

Q. Nor did you consider any other crop type other than alfalfa, correct?

A. Correct.

Q. And you did not look at variable sources of supply either, correct?

A. Correct.

Q. Now, wouldn't you agree, Mr. Bergfeld, that there is a difference between an idealized or potential

evapotranspiration number for a crop and the evapotranspiration for that crop?

A. There may be.

Q. There may be or there is?

A. There may be.

Q. Under ideal conditions, would it be your opinion that the potential ET will always be met?

A. Yes.

Q. And under other than ideal conditions, would it be fair to say that most likely we're going to have actual evapotranspiration as being the actual number for a crop?

A. It would be another number, yes.

Q. Would that number always be more or less?

A. If the crop does not receive the water that it needs, it would be less.

Q. Now, isn't it true, Mr. Bergfeld, that a shallow water table will have an effect on the consumptive use calculation?

A. It may, yes.

Q. It may or it will?

A. It may.

Q. So, if alfalfa, for example, if that's the crop we're talking about, it draws some of its water from a shallow water table, that would have an effect on consumptive use, right?

A. The crop will consume the water that it needs. If it's drawing it from the shallow water table or if it's coming from irrigation, it will consume the water that it needs.

Q. Your calculation was on the applied water, correct, not water --

A. That's correct --

Q. Your calculation was based on the applied water, not the water that may have been available to the crop that was not applied?

A. My calculation was done for the water that was not met through effective precipitation. So, I assume that that would be the applied water.

Q. And that would not include shallow groundwater?

A. No.

Q. Now, do you have or can you get Exhibit 2226, please? Before we do 2226, I wanted to ask you, if there is a contribution from a shallow water table and that has not been subtracted from the consumptive use calculation, that will result in a higher number, will it not, when you do your applied water analysis?

A. Higher than if the portion of the consumptive uses that may be satisfied by the shallow groundwater table were to be subtracted?

Q. Yes.

A. Yes, it would be.

Q. And if you don't have contribution from a water table, shallow water table, you should have a lower CU number, right?

HEARING OFFICER JOSEPH-TAYLOR: Say that again.

MR. VAN ZANDT: If you don't have contribution from a shallow water table, then you'll have a lower CU number from applied water.

BY MR. VAN ZANDT:

Q. Correct?

A. I'm sorry, one more time. It sounds backwards.

Q. We've established if you have a shallow water table contribution and you're trying to calculate that water table but you don't account for that, you're going to have a higher consumptive use number, correct? It will be a higher number, right?

A. If you're attempting to calculate or maybe partition the consumptive use of water not by effective precipitation into the consumptive use of applied water and the consumptive use of water from a shallow groundwater table, then the consumptive use of applied water will be less if a portion of the consumptive use is met from a shallow groundwater table.

Q. Thank you. That answered my question. Let's look at tab 2, page 71 of Exhibit 2226 if we could. In that

last full paragraph at the bottom of page 71, did you review this information in doing your analysis, Mr. Bergfeld?

A. I have read this.

Q. And you considered it in your analysis?

A. Yes.

Q. So, is it your opinion that your 72.5 number that you testified to is comparable to the 67.6 that the special master notes here?

A. I'm sorry, what number did you say I testified to?

Q. 72.5 percent as an irrigation efficiency.

A. As an efficiency? Is comparable to the numbers reported here?

Q. Yes.

A. Comparable, yes.

Q. So, if we take the 67.6 percent of the 3.184, you've already done this math, it's been testified to yesterday, 2.152 acre feet is the ET number calculated according to the bulletin that was reported by the special master.

MR. FELLING: Could we have that again, please?

BY MR. VAN ZANDT:

Q. The 67.6 percent of the 3.184 reported here is 2.152 acre feet.

MR. KING: My understanding of the 72 and a half

percent, 72 and a half of four gave you the 2.9 consumptive use number that Mr. Bergfeld came up with. So, that was of the 4.0 duty. You're multiplying 67 times 3.1. That's where I'm having the disconnect. I don't know if other people are or not.

MR. VAN ZANDT: Well, thank you, Mr. King. I hope the witness can explain it as well as you have, but you've helped him considerably with my next question. And Mr. Turnipseed used to do that to me all the time.

HEARING OFFICER JOSEPH-TAYLOR: Then the tradition continues.

BY MR. VAN ZANDT:

Q. So, the 72 and a half percent efficiency, you're multiplying that by your four acre foot water duty?

A. Yes.

Q. Any reason to disagree with the information that's reported on page 71 of the special master's report?

MR. DePAOLI: Vague as to which information.

BY MR. VAN ZANDT:

Q. Well, the evapotranspiration determination by the University of Nevada bulletin that's cited there.

HEARING OFFICER JOSEPH-TAYLOR: I didn't find it vague, so overruled. You're talking about one paragraph.

THE WITNESS: I don't have enough information in this one paragraph to form an opinion on the information

that's stated.

BY MR. VAN ZANDT:

Q. But you don't have any basis to disagree with it, correct?

A. No, I don't.

Q. Now, would you go to page 94 of tab 2 of Exhibit 2226, please? Actually, you can start at page 93. This is the part of the special master's report addressing irrigation season. Do you see that?

A. Yes.

Q. Did you consider this in doing your evaluation?

A. No, I did not.

Q. You did not. So, you did not consider the fact that on page 94 in the paragraph at the bottom, the special master observes that, although there may be some fluctuation in the irrigation season, as long as February to November or December, that that is a rare occurrence?

A. I'm sorry, where did you start?

Q. In the last paragraph on page 94.

A. No, I did not.

Q. Now, would you look at tab 14 of Exhibit 2226? Tab 14 was testified yesterday to Exhibit 2226, base right area for application 73797. You see we have a plane table map there that shows rocky pasture, orchard, alfalfa, and also Evans Creek? Do you see that?

A. Yes, I do.

Q. Now, it was testified to by Mr. Mahannah yesterday that this is some steeply sloping areas with contoured irrigation. Did you do any analysis like this for your determinations of ET?

A. Analysis such as evaluations of maps like this? Contours, ditch irrigation? I'm not exactly sure what you're asking.

Q. Well, did you do any consideration of steeply sloping lands that were being irrigated?

A. No, I did not.

Q. Or irrigation based on contoured irrigation?

A. No, I did not.

Q. And did you do any determinations with regard to contributions from a creek, such as Evans Creek?

A. No.

Q. Would you look at tab --

HEARING OFFICER JOSEPH-TAYLOR: Mr. Van Zandt, we very clearly understood that this is a potential ET and your client and your witness talked about actual ET. I don't know how many of these questions you have to ask. Your record is very clear.

MR. VAN ZANDT: Just one more that I'll point out to him.

HEARING OFFICER JOSEPH-TAYLOR: Is that a lawyer

one more?

MR. VAN ZANDT: No, of this tab.

HEARING OFFICER JOSEPH-TAYLOR: I'm going to cut you off pretty quickly, because we've got it.

BY MR. VAN ZANDT:

Q. Would you look at tab 22, Mr. Bergfeld, please? You can look specifically at the 1967 aerial photo, this is detail K, application 73908, and it's fair to say you didn't make any consideration of a situation that is depicted here where you basically have a gravel pit, correct?

A. Correct.

Q. Now, would you go, please, to the last slide on your power point, which is up on the screen here. This corresponds to a discussion on page two of your report, Exhibit 121; is that correct?

A. Correct.

Q. Now, as I understand it, the purpose of doing this comparison to your calculation was to try to see if some actual field data on measured ET would compare to your calculated ET; is that fair?

A. That's fair.

Q. So, when we look, for example, at the studies that were going on conducted by Mr. Houston and Mr. Tovey, those were done using lysimeters, were they not?

A. Yes.

Q. And it was also done under controlled conditions, correct?

A. Correct.

Q. And they would have been looking particularly to optimize the irrigations, wouldn't they?

A. I would assume that they would be attempting to, yes, optimize the irrigations in the same way that a farmer would attempt to achieve the best production from his crop as possible.

Q. And they also would be trying to minimize the stress on the crop, correct?

A. Correct.

Q. And these were all done for alfalfa, correct?

A. Correct.

Q. Now, it's stated here that Houston did his studies in 1950 through 1953. Isn't it true that those were all full-water supply years?

A. I do not know.

Q. You didn't do any kind of review of what Mr. Houston and Mr. Tovey did with regard to the water conditions under which they were operating?

A. Maybe I should get more clarification. What do you mean by full water supply years?

Q. Where Floriston rates were being met all year round.

A. I don't know.

Q. Mr. Houston in his calculation, I believe you have it on your page two of Exhibit 121, uses an irrigation season that began on May 9th and ended September 26th. Do you see that?

A. Yes, I do.

Q. And that's about 137 days. Would you agree?

A. I agree.

Q. And Mr. Tovey when he was doing his study, it's only reported for two of the years -- I'm sorry, Mr. Houston's was only reported for two of the years, Mr. Tovey for the three years that he looked at, his time period was mid May to mid October. Do you see that?

A. That's correct.

Q. And that's about 150 days, right?

A. I'll trust your math.

Q. Thank you. Now, the variations that we see, for example, in the Tovey analysis between 31.2 and 42, that's in inches, right?

A. Yes.

Q. Isn't it true, Mr. Bergfeld, that the 31.2 number is reported in an area that Mr. Tovey was studying which is a well-drained portion of the field?

A. I'd have to review the actual study to confirm that, but that is my recollection.

Q. And that would be an area where there would be no contribution from the water table, correct?

A. That would be how I would define a well-drained area, yes.

Q. And the 42 inches that are reported by Mr. Tovey, isn't it true that that was in an area of the field where there was a shallow water table?

A. Again, I would have to review the study, but that matches my recollection.

Q. So, there would be a contribution from that shallow water table to the 42-inch number, correct?

A. Yes.

Q. Now, also in doing your calculations, Mr. Bergfeld, you did not take into account that some of the ditches that we're talking about where this water was originally transferred from are higher up and do not receive contributions from any other ditches above them?

A. I did not take that into consideration.

Q. Now, Mr. Bergfeld, you understand, do you not, that the number that you are providing here in this testimony is going to be used by the State Engineer to potentially allow the Truckee Meadows Water Authority to remove -- excuse me -- to store 2.9 acre feet of water that otherwise would be flowing in the Truckee River in an upstream reservoir? Do you understand that?

A. That's my understanding.

Q. And the number that you are giving, that 2.9 acre foot per acre number, that potential evapotranspiration number is not one that's going to occur every year, is it?

A. It could be, depending on the growing conditions from one year to the next, it could be more than that, it could be less than that.

HEARING OFFICER JOSEPH-TAYLOR: It's a yes or no question, Mr. Bergfeld.

THE WITNESS: Yes. I understand that 2.9 is not one that will occur every year.

BY MR. VAN ZANDT:

Q. In fact, there is a significant chance that the 2.9 number will not occur in the majority of the years; isn't that right?

A. I haven't done any analysis to determine how frequently it may or may not occur.

Q. Well, let me ask you this: If we're talking about allowing a party to store this 2.9 acre feet, that that is not the actual number that was being consumed by the plants.

In fact, assume that that number would be less. Then in essence the State Engineer would be allowing that party to remove more water from the river than actually was consumed by the plant; isn't that right?

A. My analysis is that alfalfa consumes 2.9 acre feet -- 2.9 feet per season if it receives a full water supply.

Q. That wasn't my question.

A. I'm not sure I've done any analysis to be able to answer your question.

Q. You have in your report an adjustment that's made, and it's on page 12 of Exhibit 121, the very last sentence. It says, "The result of this sensitivity analysis for both temperature and precipitation was to reduce the calculated," that's CAUW, "of alfalfa from 3.1 to 2.9 feet."

Now, you don't give any reference there for how you've made that sensitivity analysis, do you?

A. I thought it was adequately explained in the preceding paragraph, not the preceding paragraph, that paragraph that you took that sentence from.

This is the analysis that I'm referencing in this last sentence are the adjustments that I made to the temperature and the precipitation data based on a comparison between the period of available data from 2000 and 2006 when I applied the ASCE equation, calculated the consumptive use of applied water for alfalfa, and the long-term average as defined in the Reno Airport Station for the Truckee Meadows.

That's the adjustments that I made. That's what that sentence references, those adjustments.

Q. So, it was an adjustment based on temperature alone, right?

A. Temperature and precipitation.

Q. And precipitation, but we've already agreed that you did not make one for humidity, right?

A. Correct.

Q. And the other factors that I went through and you said you didn't consider, it does appear to me, Mr. Bergfeld, that if you start looking at making adjustments for what are real-time conditions, you start to reduce the consumptive use number. Here you reduce it from 3.1 to 2.9 using just two factors, right?

A. That's correct, that's what I did, in the same way that I made that adjustment to be more representative of the long-term average conditions in the Truckee Meadows, assuming that the crop has a full water supply.

If I would have just not made that adjustment, then my estimate would have been 3.1, which it could be in some years. In other years it may be less than 2.9, but my opinion is that the long-term average or a representative consumptive use of the applied water of alfalfa in the Truckee Meadows is 2.9 feet.

Q. But, wouldn't it be fair to say, Mr. Bergfeld, that you could have done a similar type of adjustment for the other factors that we've already gone through and that would

have resulted potentially in a further reduction from the 2.9 acre feet; isn't that correct?

A. It may have, yes.

MR. VAN ZANDT: That's all I have.

HEARING OFFICER JOSEPH-TAYLOR: Redirect, Mr. DePaoli?

MR. DePAOLI: Yes. Can I have a minute?

REDIRECT EXAMINATION

BY MR. DePAOLI:

Q. Mr. Bergfeld, Mr. Van Zandt asked you if you attempted to match temperature data to the locations which were the original places of use for these Orr Ditch Decree water rights. In order to have done that, what would you need?

A. I would need temperature data from those specific locations.

Q. So, in other words, you would essentially need a weather station at each one of these farms?

A. I would need temperature data for each location that I was attempting to match. If that is required, depending upon how small an area needed to be matched, each field, each farm, I'm not exactly sure, I would need considerably more data.

Q. Based on the looking that you did undertake to find out what data was available, did you run into any data

like that?

A. No.

Q. Mr. Van Zandt asked you if you considered the information that's on page 94, tab 2 of Exhibit 2226, the paragraph that talks about plowing in January and February.

A. Yes.

Q. Based on both the growing season and the irrigation season that you used in your study, would any of that information have been relevant to what you did?

A. If the growing and irrigation season begin earlier, then my analysis assumed that that would have an effect. I would tend to increase the consumptive use request of applied water, or if it continued and extended past the date that I assumed in my analysis, that would also tend to increase the consumptive use of applied water.

Q. Based upon your review of the comparison of the Tovey and Houston reports, were you able to determine whether the dates during which they conducted their tests were actually the dates of the growing season as you have defined it in your report?

A. I didn't see any explanation for the dates selected in either report. I don't have a basis to make a determination of why they used those periods.

Q. I want to see if I can understand this, because I got a little bit lost when the conversation was going on

about this, but let's use Tovey and the bottom line there.

My understanding from the questioning that Mr. Van Zandt did of you was that the 31.2 inches of consumptive use there was in an area that was well drained and had no shallow groundwater table; is that correct?

A. That is my recollection, yes.

Q. And then the 42-inch consumptive use was in an area that did have a shallow groundwater table?

A. Again, that is my recollection.

Q. And do you know in the Tovey report, whether that 42 inches included or excluded the contribution that might have happened there from the shallow groundwater table?

A. I believe it included the contribution from the shallow groundwater table.

Q. It was actually measured?

A. It was measured.

Q. So, where there is a contribution from the shallow groundwater table, is that going to show more consumptive use than an area where there is no shallow groundwater table and just applied water as appears from these two numbers?

A. It appears from the Tovey study that that may be one of the results; in well-drained soil alfalfa consumes less water, and in a wet, shallow groundwater table alfalfa consumes more water.

Q. So, the fact that you did not, in the analysis you did take into account any contribution by groundwater would not necessarily mean that if there was a contribution from groundwater, your number would be lower, or better said, should be lower?

A. Not necessarily, yes.

Q. If the water that's being changed here to this use for storage had been consumed by plants, it would not be flowing in the Truckee river, would it?

A. No.

Q. And I think Mr. Van Zandt asked you some questions about in actual conditions, the consumptive use of alfalfa in the Truckee Meadows could be less than the number you came up. Do you recall that question?

A. Yes.

Q. And could it also be more?

A. It could be.

Q. In the approach that you took here to calculate the consumptive use of alfalfa, Mr. Van Zandt pointed out that you did make some adjustments for temperature and precipitation based on longer term data. Do you recall that question?

A. Yes.

Q. And then he asked or pointed out that you hadn't made any adjustments for the other things that he asked you

about, like variability in supply, variability in methods of irrigation, variability of -- well, just those two.

Do you know of a way to do that in connection with the kind of analysis you made here?

A. Your question is do I know of a way to make adjustments based on variability in water supply?

Q. Not variability in water supply, based in variability of variable sources of supply and variability of the kind of land that is involved, steep methods of irrigation, that sort of thing.

A. Not that I'm aware of.

MR. DePAOLI: I have no further questions.

HEARING OFFICER JOSEPH-TAYLOR: Recross?

RECROSS-EXAMINATION

BY MR. VAN ZANDT:

Q. Do you have Exhibit 953 there, Mr. Bergfeld? It's a newly marked exhibit, so I don't know if you have it.

HEARING OFFICER JOSEPH-TAYLOR: Chris Mahannah's power point.

THE WITNESS: Exhibit 953?

BY MR. VAN ZANDT:

Q. Yes.

A. Yes, I have it.

Q. I'm referring you to slide 12 which is on page six. Do you see that?

A. Yes.

Q. That's a chart that came from your report, correct?

A. I believe it's a summary of a chart that came from information presented in my report.

Q. And then look over at slide 13 on page seven. This was testified to yesterday by Mr. Mahannah, but basically a method for taking your information on slide 12 which is derived from your table 5 and applying some of the factors that we've been talking about and arriving at an actual CU number. Do you see that?

A. I see that.

Q. So, it is possible, Mr. Bergfeld, isn't it, to take your theoretical number and adjust that to get to an actual number; wouldn't you agree?

A. It's possible to make adjustments to that if the crop does not have the water supply available.

Q. Thank you. Now, Mr. DePaoli asked you, it was a clarification question from one I asked you about the matching temperature data. I think he misunderstood my question.

My question had to do with matching temperature data to the locations from which the irrigation rights are derived, and relating that to the time period in which the irrigation took place, not necessarily having weather

stations at a particular location, but relating it to the temperature data from the time period in which irrigation actually took place.

You did not do that kind of a calculation, did you?

MR. DePAOLI: The question is vague as to what irrigation took place.

HEARING OFFICER JOSEPH-TAYLOR: I didn't understand it either. Sustained.

BY MR. VAN ZANDT:

Q. Mr. DePaoli asked you whether or not you can match temperature data to a location and whether you'd have to have a weather station at every one of the farms in order to figure that out, right?

A. Correct, that's what he asked me.

Q. But my point is I think he misunderstood what my question was. What I was looking for is was it possible for you to match the time period for the temperature data that you analyzed to the period that irrigation was actually taking place for the base rights?

A. I attempted to match it to the long-term average and I did based on the period of data that were available, which went back to 1937. To the extent that irrigation was taking place, that is incorporated in the long-term average, but I did not attempt to make any year-by-year match or

anything more detailed than that.

Q. And Mr. DePaoli just asked you about the, I believe it was the season that was used by Mr. Houston and Mr. Tovey in their analysis which is in your power point, Exhibit 126, the last page, supplemental table 1. Isn't it true, Mr. Bergfeld, that what Mr. Houston and Mr. Tovey were trying to calculate here was a consumptive use for alfalfa over the time period for which it was being irrigated?

A. Irrigated in that study, yes.

Q. Right. And those time periods are on page two, I believe, of your report, correct, Exhibit 121?

A. Correct.

Q. So, it would be fair to say, wouldn't it, Mr. Bergfeld, that what Mr. Houston and Mr. Tovey were doing was actually looking at an irrigation season for alfalfa during the time period of their studies; isn't that right?

A. It was the period that they conducted their studies. I don't know how that relates to the irrigation season in the Truckee Meadows at large.

MR. VAN ZANDT: That's all I have.

HEARING OFFICER JOSEPH-TAYLOR: Questions from staff? Thank you, Mr. Bergfeld. You survived. I hope you have a job. Let's be off the record.

(A discussion was held off the record.)

HEARING OFFICER JOSEPH-TAYLOR: We'll be in

STATE OF NEVADA,)
) ss.
CARSON CITY.)

I, MARY E. CAMERON, Official Court Reporter for the State of Nevada, Department of Conservation and Natural Resources, Division of Water Resources, do hereby certify:

That on Tuesday, the 16th day of December, 2009, I was present at 901 South Stewart Street, Second Floor, Carson City, Nevada, for the purpose of reporting in verbatim stenotype notes the within-entitled public hearing;

That the foregoing transcript, consisting of pages 347 through 516, inclusive, includes a full, true and correct transcription of my stenotype notes of said public hearing.

Dated at Carson City, Nevada, this 4th day of January, 2010.

MARY E. CAMERON
Nevada CCR #98