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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 II - TRANSCRIPT OF PROCEEDINGS

PUBLIC HEARING

TUESDAY, DECEMBER 15, 2009

CARSON CITY, NEVADA

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INDEX

(NOTE: Exhibits Listed in Volume V.)

CARSON CITY, NEVADA, TUESDAY, DECEMBER 15, 2009, 9:03 A.M.

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HEARING OFFICER JOSEPH-TAYLOR: Let's be on the record. Good morning everyone. We are continuing with Mr. DePaoli's cross-examination of Mr. Mahannah on Exhibit 801.

CHRIS C. MAHANNAH

called as a witness on behalf of TCID, having been previously duly sworn, Was examined and testified further as follows:

CROSS-EXAMINATION (Resumed)

BY MR. DePAOLI:

Q. Good morning, Mr. Mahannah.

A. Good morning.

Q. I may have asked you this yesterday and if I'm repeating myself, I apologize, I wasn't sure. In Exhibit 801 on page four under your conclusions, in the first sentence you indicate that based on your analyses and other conservative factors, the 50 percent municipal return flows appear reasonable. Do you see that?

A. Yes.

Q. What other conservative factors are you referring to in that sentence?

A. I believe I outlined that in the power point. Specifically, I'm referring to the customers of TMWA that aren't sewered back to the treatment plant, the urban return flows, runoff of streets that I referenced in State Engineer Ruling Number 5972.

Q. Was that it?

A. And then the potential return flow from depercolation from lawn watering, as well, as I mentioned, the urban runoff from watering lawns that goes down curbs and gutters and returns to the river.

Q. And so how did you quantify those in order to make that five percent reduction?

A. I didn't specifically quantify that. I looked at two prior analyses, I did my own analysis, a recent one, and then also looked to TMWA's water resource plan that indicated a 48 percent return flow.

Q. So, it was just a judgment on your part?

A. Yes. As well as I mentioned yesterday, testimony by Mr. Burns of 50 percent.

Q. That was an assumption on his part as well I think you said?

A. That's discussed in several places in the '89 transcript. I think in some places he says it's an assumption. In the Truckee River model, I believe he indicates it's 50 percent.

Q. As you're sitting here today, do you have any specific information as to exactly how much water Sierra Pacific or TMWA actually delivered to unsewered customers in the Truckee Meadows in each year from 1989 to 2005?

A. I don't have that actual data, no.

Q. And you wouldn't have that data for the present time either, would you?

A. No.

Q. Mr. Mahannah, I want to now turn to the timing issue, and if you could have in front of you table 4 that's attached to Exhibit 801. Do you have that?

A. I do.

Q. First of all, I want to make sure I understand what you did here. You have the average return flow by month for the years 1990 to 2005, do you not?

A. That's correct.

Q. Let's just work with January so that I be make sure I understand it. For January, the average is 82 percent?

A. Correct.

Q. And then you have below that M and I CU was 18.01 percent, and I assume you got that by subtracting 100 percent minus 82 percent?

A. That's correct.

Q. And then the next line is M and I consumptive use

storage and that number for January is 0.82 percent, and I assume you got that number by multiplying the 18.01 percent for January times the demand for January of .0455; is that where that number comes from?

A. The .82 comes from multiplying the M and I CU 18 percent times the demand of 4-.55.

Q. Okay. And then you made an adjustment to that to get to .73 percent for your 50 percent number?

A. That's correct.

Q. Was that the same adjustment across every month mathematically?

A. To get to the 50 percent?

Q. No. For example, in January your adjustment goes from .82 percent to .73 percent. In February your adjustment goes from .73 percent to .66 percent. Was that an identical mathematical adjustment that got you to those two numbers?

A. Yes. I just took the ratio of .5 over .5576.

Q. Okay. All right. Thank you. Could I have you put up Power Point slide 11 from your Power Point presentation.

While that's coming up, one more question. So, the numbers that are M and ICU storage at 50 percent, the .73 percent for January, the .66 percent for February and so on across there, you then multiplied those numbers by the total duty of 12, 684, did you not?

A. That's correct.

Q. So, that would get us to slide 11. Slide 11 shows how the 6,342 acre feet of municipal consumptive use that you calculated ought to be stored over a year, does it not?

A. That's correct.

Q. So, as I look at that, subject to check, my math tells me that over 65 percent of that storage would occur in June, July, August and September. Does that seem about right to you?

A. You're looking at the June through --

Q. -- September.

A. June to September I get 32 percent.

Q. What did you get when you added up 908, 1171, 1143 and 870?

A. I'm sorry, I was adding percentages.

Q. No, the acre feet.

A. 3288 acre feet.

HEARING OFFICER JOSEPH-TAYLOR: Do your math.

BY MR. DePAOLI:

Q. I get 4,092. I think you're off.

A. We're doing June through September?

Q. Yes.

A. Yes, 4,092.

Q. Then, if you divide that by 6,342 you come up

about 65 percent, do you not?

A. Yes, 64 and a half percent.

Q. If you look at April through October, that is about 91 percent of that storage would occur, would it not?

A. The total I get for that is 5,776. 91 percent.

Q. Now, under your suggested timing of this storage, the schedule for this storage, is there any month when the Water Authority could exercise up to 25 percent of these water rights?

A. Can you restate the question?

Q. In slide 11, and in your recommended storage pattern for this consumptive use, is there any month where the Water Authority could store 25 percent of 6,342 acre feet?

A. I'd like to refer specifically to the provision in the Orr Ditch Decree which addresses that issue. I'm reading from the Orr Ditch Decree, page --

Q. Can you refer us to an exhibit, please?

A. It's in my rebuttal, tab 1 of Exhibit 2226.

Q. What page?

A. 87, the second to the last page in that tab.

Q. Before you refer me to that, could you answer the question.

A. In order to answer the question I need to set the foundation for my answer.

Q. Okay. Go ahead.

A. So, I'm reading directly from page 87 of the Orr Ditch Decree, starting at the top of the page, the first full paragraph. "No owner or person or party entitled to the use of water under this decree shall be allowed to use for irrigation, I emphasize irrigation, during any calendar month, more than 25 percent of the quantity of," again, underscoring, "Direct water in acre feet hereby allowed for the land for the season."

So, my interpretation of this 25 percent per month issue applies to diversion for irrigation, and there's a difference between use or diversion and consumption in my opinion.

Q. Okay. So, now, answer my question: Is there any month, whether under your storage, recommended storage schedule, where the Water Authority could store 25 percent of the 6,342 acre feet?

A. My position is that storing is not irrigation.

HEARING OFFICER JOSEPH-TAYLOR: That's not the question. Just answer the question. Is there any month they could store 25 percent of 6,342.

MR. MAHANNAH: Any month they could store 25 --

HEARING OFFICER JOSEPH-TAYLOR: 25 percent of 6,342 acre feet.

MR. MAHANNAH: Based on my interpretation of this

provision, the answer would be no.

BY MR. DePAOLI:

Q. Just leaving out any argument that we would have over your interpretation of that provision, just based upon your testimony and your recommendation, in fact, the Water Authority could not store 25 percent in any one month; is that correct?

A. That's correct.

Q. Do you have any familiarity with the operating criteria and procedures for the Newlands Project?

A. Just in a general sense.

MR. VAN ZANDT: This is outside the scope of direct.

MR. DePAOLI: It's foundational related to the storage count.

HEARING OFFICER JOSEPH-TAYLOR: I'll see where it goes.

BY MR. DePAOLI:

Q. Do you understand that the operating criteria and procedure diversions outside of the irrigation season, whatever that happens to be, some time in November, to at least the end of February, any diversions under the operating criteria and procedures would be for delivery to Lahontan Reservoir?

A. Yes, as well as the Truckee Division for

stockwatering purposes.

Q. But not for -- there would be no irrigation in the Truckee Division beyond the irrigation season?

A. No.

Q. Once water is in the Lahontan Reservoir, can it be used to deliver water to the Truckee Division?

MR. VAN ZANDT: That's outside the scope of direct.

HEARING OFFICER JOSEPH-TAYLOR: I'm going to let it go. Say it again please, Mr. DePaoli.

BY MR. DePAOLI:

Q. Can water from Lahontan Reservoir be used to satisfy water rights in the Truckee Division?

A. I don't believe so.

Q. What sources of water supply does the Carson City Division have available in the April through October time frame, potentially?

MR. VAN ZANDT: Same objection.

HEARING OFFICER JOSEPH-TAYLOR: Overruled. April to September did you say?

BY MR. DePAOLI:

Q. April through October.

A. The April through June/July period is the runoff period. Surface water in the Carson River which dwindles to sometimes nothing in the middle to late summer in many years

because there's no upstream storage in the Carson River, very little.

Q. Well, there's upstream storage in Lahontan Reservoir?

A. Yes.

Q. Let me get at it this way. The potential source during that time frame for the Carson Division would be water from Lahontan Reservoir and subject to OCAP provisions water from the Truckee River, would it not?

MR. VAN ZANDT: I'm going to have a standing objection to this entire line of questioning. It's totally outside of the scope of what Mr. Mahannah was designated to testify for. We have another witness who can address issues.

It's not relevant to his expert testimony, nor was he tasked to look at any issues regarding deliveries in the Carson Division, the OCAP or anything like that.

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

MR. DePAOLI: It is related to the storage pattern that he is suggesting needs to be imposed here, and what impacts that storage pattern may have related to the two divisions which get water under claim number 3.

MR. VAN ZANDT: And we have a specific witness designated to testify on that subject and it is not this witness.

HEARING OFFICER JOSEPH-TAYLOR: Who is that?

MR. VAN ZANDT: Mr. Overvold.

HEARING OFFICER JOSEPH-TAYLOR: I'll probably not let you go a lot farther than, Mr. DePaoli.

MR. DePAOLI: I'll just waited for Mr. Overvold.

HEARING OFFICER JOSEPH-TAYLOR: Okay. Sustained.

BY MR. DePAOLI:

Q. In the very last page of your report, Exhibit 801, Mr. Mahannah, you state that storing this water in the manner you have suggested, both in your report and slide 11 here, will protect downstream water rights. Do you see that?

A. Yes, downstream return flow patterns will be maintained and downstream rights will be protected.

Q. Tell me why having the State Engineer require this storage to take place during the irrigation season is going to protect downstream water rights.

A. The premises is we're trying to match consumption and return flows with their historical pattern in time, place and amount.

Q. In the abstract?

MR. VAN ZANDT: Vague.

MR. MAHANNAH: Yeah. I'm not sure what you mean by that.

///

BY MR. DePAOLI:

Q. Well, without considering --

MR. VAN ZANDT: I have an objection, vague.

HEARING OFFICER JOSEPH-TAYLOR: He's rephrasing it, sustained.

BY MR. DePAOLI:

Q. I understand that's what you're trying to do, but tell me why that protects downstream rights during the irrigation season.

A. To ensure the return flows are left in the river for diversion to the Truckee Division and then depending on OCAP criteria, sending it to Lahontan for meeting storage targets.

Q. Could you not foresee a situation where some of this storage could be accomplished? For example, when the Truckee Division is not irrigating, that that might be useful and more protective?

A. That's a possibility. The issue that is not addressed in the applications that TMWA has filed on their face is how and when they're going to store and release that water. That's unclear to me and I think we're looking forward to that specific testimony as to how that's going to be done.

Year in and year out, my understanding based on testimony you prefilled is that that will vary year to year.

Q. Well, suppose it does vary year to year. Did you answer my question that, yes, you could foresee a storage pattern outside the irrigation season that might also protect downstream water rights?

A. It might, again, depending on situations with OCAP in particular here.

Q. Because sometimes OCAP doesn't allow any diversions under claim number 3 to the Newlands Project, right?

A. With the exception of supplying the Truckee Division.

Q. But there are times when that is limited to stockwater?

A. That's correct.

MR. DePAOLI: No further questions.

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

REDIRECT EXAMINATION

BY MR. VAN ZANDT:

Q. Mr. Mahannah, referring you back to I believe it's tab 13 in Exhibit 801, what was the purpose of putting the CES letter, including that, in your analysis?

A. Just to provide another analysis that another consultant had done on return flows to the Truckee River as a result of municipal use of water, and that was in response to

a letter from Michael Turnipseed at the time to the City of Reno regarding their pending storage application for effluent, 29973, I believe.

Q. And do you notice if this letter was submitted to the State Engineer in conjunction with that application?

A. I believe it was, yes.

Q. Was it considered by the State Engineer in his decision?

A. My understanding is it was.

Q. In thinking of your answers to some of Mr. DePaoli's questions, you explained some of the differences between your 1991 report, which is tab 11, and the CES legal. Were there any other differences that you'd like to explain to the State Engineer?

A. Yeah, I guess I'd like to refer back to my table 3.

Q. Table 3 in 801?

A. Table 3 in Exhibit 801. There was a line of questioning from Mr. DePaoli regarding discrepancies between what was reported by the Truckee River M and I diversions and the CES report where there was overlap, and then the prior WRD report.

And I did check last night. All of the numbers that I've reported under column one match exactly to the acre foot with what the Water Master reports in his annual

diversions for M and I also looked to TMWA's water resource plan and there are some differences.

For the most part, they're similar but there are some years, for example, in 1992 TMWA water plan had 42,963. The Water Master showed 45,562. In 1993, TMWA's water plan showed 42,871. The Water Master showed 48,804.

Q. So, despite the changes in the numbers, does any of that change your analysis with regard to --

A. I went through and reran TMWA's numbers just for grins, and the overall percentage for column ten did not change at all, the average percentage.

Q. That's the return flow without effluent irrigation reuse?

A. Yes. Column nine changed from 45 percent to 46 percent.

Q. And in your analysis, is the ultimate conclusion in Exhibit 801, did you use your figures in table 3 or did you use the ones from the CES report?

A. I used 50 percent, which again is testimony provided by Mr. Burns. It's very close to what's report in TMWA's water resource plan of 48 percent.

HEARING OFFICER JOSEPH-TAYLOR: His question was did you use your numbers or CES's numbers?

MR. MAHANNAH: I made a judgment and used 50 percent. I didn't use 54 percent, I didn't use

44 percent.

HEARING OFFICER JOSEPH-TAYLOR: Is that your number or is that the CES number, or is that a different number?

MR. MAHANNAH: It's a different number. It's a judgment that I made based on the prior analysis, my analysis and what's TMWA's water resource plan.

BY MR. VAN ZANDT:

Q. Would you look at Exhibit 2219, Mr. Mahannah? Could you show in Exhibit 2219, Mr. Mahannah, where Truckee Meadows Water Authority states its number with regard to effluent return flows?

A. It is stated starting on the bottom of page 106, that based upon a 10-year, 1992 to 2001, average ratio of effluent to supply 48 percent.

Q. And what is your understanding as to how that 48 percent number was derived based on this 10-year, 1992 to 2001, average?

A. I don't see that they've provided the calculations for how that was specifically arrived at.

Q. I guess my question is do you have an understanding whether that's based on surface water return flows or groundwater return flows or does it matter?

A. I don't think it matters.

Q. Now, Mr. Mahannah, the fact that M and I return

flows may fluctuate over the course of a year, how does that affect your analysis?

A. I believe the State Engineer is looking for a number about --

MR. DePAOLI: Objection, nonresponsive.

MR. VAN ZANDT: I think that is responsive.

HEARING OFFICER JOSEPH-TAYLOR: Well, the question was based on the fact that M and I return flows fluctuate over the course of a year, how does that affect your analysis. I don't understand starting into, "I believe what the State Engineer is looking for," is responsive, so I'm going to sustain the objection and have you re ask the question.

MR. VAN ZANDT: I'd like to point out to have Counsel interrupt his answer when it may just be a foundational statement to what his answer really is not appropriate.

HEARING OFFICER JOSEPH-TAYLOR: You do the same, sir, so let's all be a little more lenient.

MR. VAN ZANDT: Then he should just move to strike it if he doesn't think the answer is responsive instead of cutting the witness off.

HEARING OFFICER JOSEPH-TAYLOR: I'll pay attention to it, Mr. Van Zandt. Go ahead.

MR. VAN ZANDT: Thank you.

MR. MAHANNAH: I think you can address the point you're making here. There's variability in the average return flows in municipal from year to year, and Mr. DePaoli had me go through a calculation yesterday of I believe it was in 2003.

I don't think I stated I don't feel it's appropriate to cherry pick and choose one year and apply a return flow.

You need to look at an average. I believe that's what the State Engineer is going to entertain, an average CU number. If we come to come back year in and year out to determine what the CU is for that year, I suppose the State Engineer could entertain that.

HEARING OFFICER JOSEPH-TAYLOR: Do you really think that's realistic, to be redoing this every year, Mr. Mahannah?

MR. MAHANNAH: That's precisely my point, that we don't want to just choose a worst-case scenario, we want to look at an average.

HEARING OFFICER JOSEPH-TAYLOR: Okay.

BY MR. VAN ZANDT:

Q. On your slide 11 there, Mr. Mahannah, Mr. DePaoli took you through some calculations. Based on your analysis, is there kind of an expectation by downstream users based on historic return flows as to quantities of water that would

remain in the river?

A. Yes.

Q. What exactly was your purpose for doing this month-by-month analysis of percentages?

A. To match historical M and I return flows to meet the downstream rights, including those of claim 3.

Q. Now, the water that the Truckee Meadows Water Authority is determining they will store upstream, is it water that is in addition to the current M and I demand or is it included in the current M and I demand?

A. I believe it's in addition to the current M and I demand.

Q. So, the question would be that entire amount of water that is now going to be stored upstream by the Truckee Meadows Water Authority, what is happening with that water right now?

A. Based on how it was dedicated, it's remaining in the river not being called upon except during those drought years when the supply does dwindle.

Q. So, is there in fact a reduction in the amount of water flowing in the river as a result of the storage of this consumptive use portion?

A. There would be.

Q. And is that then expressed in the Floriston rates somehow?

A. Yeah, that would be part of the Floriston rates.

Q. And would Floriston rates increase or decrease under this scenario?

A. Under the storage scenario?

Q. Yes.

A. I'm assuming they would decrease.

Q. Now, did you have an opportunity to look at any additional materials last night that would assist in responding to some of Mr. DePaoli's questions about the necessity for maintaining certain flows in the river to protect downstream users?

A. Yes, I did.

Q. Could you describe what those are?

A. This relates to the City of Reno's calculation for storage of effluent under 29973, which the State Engineer at the time, Michael Turnipseed, approved in 1995.

I'm reading from the permit conditions where he addresses the surface water and groundwater components of the effluent. He says, "The surface water and groundwater component will be administered separately and be subject to specific requirements under each secondary permit consistent with the agreement dated May 31, 1994, which was entered as Exhibit 89 at the hearing held in May and June of 1994."

Then he goes on to state, "The groundwater component consists of 6700 acre feet of effluent of the

Truckee Meadows water reclamation facility. The surface water component he calls the remaining portion of this permit in the amount of 13,470 acre feet annually."

Then he further states, "Prior to any secondary application being issued, an application to change must be filed to show the disposition of any water rights for which the surface water components of the effluent is being substituted."

Now I'd like to refer to the 1994 agreement that was entered into by the Tribe, Sierra Pacific Power, Washoe County Water Conservation District, cities of Reno and Sparks and Washoe County. Provision 5 of that agreement, section 5.2(b), states, "The cities shall ensure that return flow to the Truckee River is no less than it would have been had the surface water component not been used by the cities, and that the timing of such return flow is not changed."

Following that Lyman McConnell of TCID sent a letter to the State Engineer dated January 4, 1996.

MR. DePAOLI: I'm going to object to this information in this letter as being hearsay.

HEARING OFFICER JOSEPH-TAYLOR: Overruled.

MR. MAHANNAH: Again, this is all part of the administrative record in the State Engineer's Office. I feel the issues that Lyman raises here are important, so I'm going to read his letter, it's fairly short.

"Dear Mr. Turnipseed. The District has in the past protested water right transfers in the Truckee Meadows that have been filed to change an existing irrigation water right to an M and I water right. The District was concerned with maintaining return flows and that the transferred water remain subject to the Orr Ditch Decree, which includes the Truckee River Agreement.

"The State Engineer's Office has taken the position that the full water right can be transferred because return flows are maintained to the discharge of effluent in the Truckee River from Reno/Sparks Wastewater Treatment Plant and the water right is also subject to the Orr Ditch Decree, including the Truckee River Agreement.

"The District would like to avoid having to file a protest on these applications. The District would like to reach a clear understanding and agreement with the State Engineer as to what conditions would be placed on the approval of future Truckee River water right transfers.

"The reason for the District's concerns are that the cities of Reno and Sparks are beginning the process of shifting some of their effluent to land application and some of the future transfers may result in less return flows.

"Also, Washoe County has constructed a wastewater treatment plant in the south Truckee Meadows and I understand that water does not return to the Truckee River. In

addition, the Pyramid Lake Tribe is persisting in having the flow of discharged effluent discontinued, requiring the Sewage Treatment Plant to find an alternative point of discharge other than the Truckee River.

"Moreover, Sierra Pacific Power Company wants to store upstream in the TROA water that has been transferred to them for M and I which is currently not being used and provide that stored water to Pyramid Lake. Our concern is that less return flows will result and will be adverse to the Newlands Project water supply."

So, in response to Lyman's letter, Mr. Turnipseed in his letter dated June 5, 1996, states in part, "As you know, in the past the State of Nevada State Engineer has allowed the transfer of agricultural rights in the Truckee Meadows to municipal rights based on the full decreed duty. We have done this full well knowing that we have expanded the season of those water rights and changed the regime of the return flow.

"We have rationalized transferring the full duty with the idea that there was a return flow component of the water right as an ag use, that that would be compensated for by the return flow of the municipal use as long as it was collected and treated through the Reno/Sparks Wastewater Treatment Plant.

"You are correct in that the operators of the

Reno/Sparks wastewater treatment plant are now contemplating use of some of that effluent on parks and golf courses. If you will look at Exhibit 89 from the hearings held on the Truckee River unallocated water, you will see that wastewater with effluent is broken into two components.

"There are certain restrictions agreed upon by all parties and how those two components will be used, but in any event, for every acre foot put to reuse out of the sewage treatment plant," then he underscores this, "an acre foot of water must be left in the river," end of underscore, "so as to not impair the rights of downstream users.

"It is true that the agreement allows for credit storage of groundwater component, and I see that there may be a timing issue as to when water is released and becomes a part of the divertible flow of the Truckee River, I'd be glad to meet and discuss any concerns you have over that issue.

"I share your concerns as to any additional water transferred to municipal in the south Truckee Meadows as well as any municipal water in the north valleys that may not be sewered and not returned to the Truckee River. The formula for dedication of those municipal uses has not been agreed upon and I would welcome any comments you have on the various components to arrive at that formula.

"I am compelled by law to protect existing water rights and will do everything in my power to carry out that

charge. The last point you raise is credit storage of some of Sierra Pacific's existing agricultural right conversions. The discussions have always been limited to the consumptive use portion of those rights.

"I understand that the purpose of this credit storage to be an additional buffer to carry them through extreme drought periods. Again, we will try to ensure that the release of that water to the Sierra Pacific Power Company municipal system will also return through the Reno/Sparks Wastewater Treatment Plant; therefore, making that water available to downstream water users when it otherwise would probably not be available because of drought conditions."

MR. VAN ZANDT: Madam Hearing Officer, we have copies of the permit, as well as the two letters that were just read into the record by Mr. Mahannah to complete the record. We can offer those as new exhibits.

MR. DePAOLI: I would like to -- that's what I was going to ask. I would like to have everything that he has just referred to made into exhibits, including the agreement that is referenced.

HEARING OFFICER JOSEPH-TAYLOR: Okay.

MR. DePAOLI: And then I would like to have a copy at some point here to work with.

HEARING OFFICER JOSEPH-TAYLOR: Let's be off the record while we mark exhibits.

(A discussion was held off the record.)

HEARING OFFICER JOSEPH-TAYLOR: Let's be on the record. Pursuant to Mr. DePaoli's request, we've marked Permit 29973 as Exhibit 954, Exhibit 955 is Exhibit 89 from a May 31, 1994, hearing titled Agreement Concerning Applications to Appropriate the Waters of the Truckee River and its tributaries among Pyramid Lake Paiute Tribe of Indians, Sierra Pacific Power Company, Washoe County Water Conservation District, City of Reno, City of Sparks and the County of Washoe.

Exhibit 956 is a letter dated January 4th, 1996, from Lyman McConnell, Truckee-Carson Irrigation District, to Michael Turnipseed, Nevada State Engineer. And Exhibit 957 is a letter from the State Engineer to Mr. McConnell dated June 5th, 1996. Were we moving to admit those?

MR. VAN ZANDT: I'd like to move to admit Exhibits 954, 1955, 956 and 957.

HEARING OFFICER JOSEPH-TAYLOR: Did we take care of the power point?

MR. VAN ZANDT: Yes, I'd like to offer that as well.

HEARING OFFICER JOSEPH-TAYLOR: Any objection, Mr. DePaoli?

MR. DePAOLI: Is that an objection to all of them?

HEARING OFFICER JOSEPH-TAYLOR: Yes, all, but let's start with Exhibit 952, Mr. Mahannah's Power Point.

MR. DePAOLI: The only objection to the Power Point is subject to the same objection to his report as to any legal opinions, they're to be not considered. Other than that, no objection.

HEARING OFFICER JOSEPH-TAYLOR: So noted. Exhibit 952 will be admitted. Exhibit 954?

MR. DePAOLI: Well, in light of the ruling as to the testimony, I would like to go ahead and have 952 admitted.

HEARING OFFICER JOSEPH-TAYLOR: 955?

MR. DePAOLI: No objection.

HEARING OFFICER JOSEPH-TAYLOR: 954 and 955 are admitted. 956?

MR. DePAOLI: No objection.

HEARING OFFICER JOSEPH-TAYLOR: It will be admitted. And 957?

MR. DePAOLI: No objection.

HEARING OFFICER JOSEPH-TAYLOR: It will be admitted. Please proceed.

MR. VAN ZANDT: Thank you.

BY MR. VAN ZANDT:

Q. Now, Mr. Mahannah, you recall that Mr. DePaoli was asking you some questions I believe about some Dayton

Valley applications which are in tab 2 of Exhibit 801, and I specifically direct you to pages 32 and 33 of ruling 5829.

A. Yes, yes. This is the portion of the Dayton Valley Ruling 5823 that I referenced yesterday where the Tribe had protested a certain number of applications requesting ag CU of 2.5 be limited, and then the State Engineer found and he lists a number of applications.

Q. Did you have an opportunity to look at the applications at the top of page 33 of tab 2 to Exhibit 801?

A. Yes. And I'd just like to clarify the record in record to those. Application 4402 was a new appropriation for commercial.

74427 was a change application for commercial and the existing manner of use was commercial.

74611 was a new application for commercial.

75101 was a municipal change that changed a base right that was municipal and then that base right had in turn changed an irrigation right.

And that same situation applies to 75102, 75103 and 75104, that all had an original base right of irrigation.

75160 was commercial changing an existing right that was commercial.

75283 was a quasi-municipal right changing a base right that was quasi-municipal. I just wanted to clarify that there was a mix, a variety of applications in there.

Q. Mr. Mahannah, is the fact that some of these applications that were new appropriations, some of them dealt with commercial to M and I but were based on an irrigation right, does that change your opinion to the overall conclusion that the State Engineer reached in this ruling?

A. No, it does not.

MR. VAN ZANDT: I have no further questions.

HEARING OFFICER JOSEPH-TAYLOR: Recross?

RECROSS-EXAMINATION

BY MR. DePAOLI:

Q. Mr. Mahannah, with respect to the last question and your clarification as to tab 2, page 33, when the base rights to 75101, 75102, 75103 and 75104 were changed from irrigation to municipal, had the Pyramid Lake Paiute Tribe protested those changes?

A. I don't believe so.

Q. Going back to your testimony about the municipal return flows should be based with an average, why should it be the average from 1989 to 2005?

A. I chose a relatively recent time frame to make the analysis. Table 3 is based on a relatively recent time frame, a prior analysis also showed similar averages.

Q. Do you think there should be -- why shouldn't it be a rolling average going forward?

A. I don't see any meaningful trend in the return

flow percentages. I mean, '89 it's 43 percent, in '05 it's 43 percent in my table 3, column 10.

Q. But there were several years in there when it was in the 30 percent range, was it not?

A. Yes.

Q. So you think the State Engineer should limit the amount of water with what Water Authority can store for the communities of Reno and Sparks going now into the 21st century and forward based on the average consumptive use with your judgmental adjustments from 1989 to 2005?

A. Yes, and I believe that's consistent with TMWA's own water resource plan.

Q. Mr. Van Zandt asked you questions about whether the water that the Water Authority intends to store is being used at the present time. Do you recall that question?

A. I do.

Q. And you said it's not called upon except in drought years. Do you recall that answer?

A. Yes.

Q. You're not suggesting, though, that the Water Authority should not be allowed to exercise these water rights in order to provide more water for claim number 3, are you?

A. No. I think we've abandoned the abandonment argument.

Q. Exhibit 954, that was filed in February of 1976, wasn't it?

A. Yes.

Q. Do you have any background on efforts made by the cities of Reno and Sparks to take the position that they could store -- excuse me -- that they could use effluent from the Reno/Sparks Wastewater Treatment Plant without even talking to the Nevada State Engineer?

MR. VAN ZANDT: Objection, calls for speculation.

MR. DePAOLI: I just asked him if he knew.

HEARING OFFICER JOSEPH-TAYLOR: Yes, if he has knowledge of any efforts made on efforts to do that without talking to the State Engineer. Overruled.

MR. MAHANNAH: This is going back quite some time. I don't think I can answer that question. I don't know.

BY MR. DePAOLI:

Q. You haven't heard of any litigation where the strange bedfellows of TCID, Pyramid Lake Paiute Tribe and Sierra Pacific Power Company were fighting the cities of Reno and Sparks and their assertions about being able to use effluent without talking to the State Engineer?

MR. VAN ZANDT: Asked and answered.

HEARING OFFICER JOSEPH-TAYLOR: Overruled.

MR. MAHANNAH: I have a vague recollection. I

don't know the specifics.

BY MR. DePAOLI:

Q. Exhibit 955, do you still have that there?

A. Yes.

Q. That was an agreement entered into in 1994 among the Pyramid Lake Paiute Tribe, Sierra Pacific Power Company, Washoe County Water Conservation District, Reno, Sparks and Washoe County, was it not?

A. Yes.

Q. And did you get a chance to look at the whole agreement?

A. I kind of breezed through it. It's been a long time since I've sat down and totally digested every provision of this.

Q. But you understand the parties were trying to lay a foundation to resolve all issues related to the unappropriated water in the Truckee River with that agreement?

A. That was my understanding of the basis of this, yes.

Q. And one of the things they were trying to resolve was what sort of water right the cities might get out of Exhibit 954, were they not?

A. Yeah, that's what's addressed in section 5 of that agreement.

Q. And in Article 5 of that agreement, the parties, the cities specifically agreed that they would not exercise the groundwater component of approximately 6700 acre feet without also establishing what is referred to in 5.1(b) as in stream flow and water quality credit water. Do you see that?

A. Yes.

Q. And in stream flow and water quality credit water was to be made up of Truckee River surface water rights, was it not?

A. I believe for the most part, but I'm not 100 percent sure on that.

Q. And how that was to be established as provided in 5.1(d) was to be set forth in the Truckee River Operating Agreement?

A. That's what that provision appears to address, yes.

Q. And then the parties, cities of Reno and Sparks also in section 5.21 would deal with how they might make use of any surface water component of the effluent, did they not?

A. Yes.

Q. And what was agreed to there by them was in 5.2(b), was that they would ensure that the return flow to the river is no less than it would have been had that surface water component of the effluent not been used by the cities and that the timing of such return flows not change; is that

correct?

A. That's correct.

Q. And what they're talking about, what is being talked about in that paragraph is effluent, is it not?

A. Yes.

Q. It's not having any discussion about Truckee River water rights being stored upstream, is it?

A. They're talking about maintaining the volume and the timing of that return flow component from M and I to this goes directly to percentages I put forward in this slide.

BY MR. VAN ZANDT:

Q. Let's try that again. What they're talking about is making use of effluent from the Reno/Sparks Wastewater Treatment Plant, the portion of it that's contributed by surface water, and the timing provision that is in 5.2(b) relates to when that effluent would have been discharged.

MR. VAN ZANDT: The question is compound.

HEARING OFFICER JOSEPH-TAYLOR: Are you testifying or asking a question?

BY MR. DePAOLI:

Q. Does section 5.2(b) relate to providing water that would have the same timing as the effluent that is now going to be used for land application?

A. The way I read this is the volume and timing of the return flow should not be changed.

Q. Return flow from where?

A. The surface water component of the effluent.

Q. And where was that surface water component of the effluent coming from?

A. It was diverted through TMWA's system on to the M and I under the treatment planted and discharged as effluent.

Q. It was coming from the treatment plant. Now, do you see any similar requirement for the in stream flow water quality credit water?

HEARING OFFICER JOSEPH-TAYLOR: Which section, Mr. DePaoli?

MR. DePAOLI: 5.1(b) and (c).

MR. MAHANNAH: 5.1(b) states, "Although the groundwater components shall not have any requirement for direct return flow to the return, the cities may not exercise their rights to it unless they also establish in stream floor and water quality credit as provided below."

Provision (c) says, "The City shall have the right to establish in stream flow and water quality credit by retaining and storing the quantity of vested or perfected appurtenant Truckee River water rights."

I believe Mr. Turnipseed's response to Lyman in Exhibit 957 touched on that issue.

BY MR. DePAOLI:

Q. We'll get to that in a minute. My question is do

you see in this agreement any requirement that that in stream water quality control water provide return flows to the river that's equivalent in timing and volume to how they were returned by the Wastewater Treatment Plant?

A. Under the groundwater component?

Q. Yes.

A. Subject to reading the entire thing, I don't see it right offhand.

Q. Now, Mr. Turnipseed's letter, Exhibit 957, in the second paragraph, when he's referring Mr. McConnell to Exhibit 89 from the hearing, he's referring to what is Exhibit 955 here, is he not?

A. Yes.

Q. And in that letter in the second paragraph he's referring Mr. McConnell to Exhibit 89. Do you see that?

A. Yes.

Q. And he points out that there's certain restrictions agreed to by all parties on how these components would be used. Do you see that?

A. Yes.

Q. And then when he says, "But in any event, for every acre foot put to reuse of the sewage treatment plant an acre foot of water must be left in the river so as not to impair the rights of downstream users."

He's referring to the agreement, is he not, in

that sentence?

A. It appears he is. It could also be stated that that's his belief and position as well.

Q. Then in Exhibit 956, Mr. McConnell wanted to reach an agreement with the State Engineer which would be placed on the approval of future Truckee Meadows water right transfers. Do you see that?

A. Can you direct me specifically where you're referring to in the letter?

Q. Yes, Exhibit 956, in the third paragraph on the first page, second sentence.

A. Second sentence reads, "The District would like to reach a clear understanding and agreement with the State Engineer as to what conditions would be placed on the approval of future Truckee River water right transfers."

Q. Do you know if there was ever an agreement reached?

A. Not that I'm aware of.

Q. And do you know whether any conditions were placed on the approval of those transfers?

A. No.

Q. They were not, right, based on all the exhibits and rulings that you provided on transfers? No conditions as requested here were placed on those water rights, were they?

A. No conditions, but I think the administrative

record in this office is pretty clear what the State Engineer's concerns were as addressed in Mr. Turnipseed's letter back to Mr. McConnell on his position.

Q. So, the answer is no?

A. To your specific question, the answer is no.

Q. Then going back to Exhibit -- staying with Exhibit 956, the next to the last paragraph of Mr. McConnell's letter, he expressed a concern about storage in upstream reservoirs under the Truckee River Operating Agreement and about return flows. Do you see that?

A. Yes.

Q. And then in Exhibit 957, Mr. Turnipseed refers to that question in the next to the last paragraph of this letter, does he not?

A. Yes.

Q. And in the last sentence of that letter, Mr. Turnipseed says that, "We will try to ensure that the release of that water to the Sierra Pacific Power Company municipal system will also return through the Reno/Sparks Wastewater Treatment Plant, therefore, making that water available to downstream users when it otherwise probably would not be available because of drought conditions."

Do you see that?

A. Yes.

Q. And he's referring to the water that is stored,

is he not?

A. Yes.

Q. And he's noting that that stored water probably wouldn't be available but for the storage?

MR. VAN ZANDT: Objection, vague.

HEARING OFFICER JOSEPH-TAYLOR: Overruled.

MR. MAHANNAH: That's correct. I'd like to clarify what's unclear on the face of your applications to store is when it's released for M and I drought protection and goes through TMWA's system and is returned to the river, does that become part of the diverted flow or does that return flow component need to pass to Pyramid Lake.

I can't answer that based on what's on the face of your application.

BY MR. VAN ZANDT:

Q. Are you asking me a question?

A. I'm stating that.

HEARING OFFICER JOSEPH-TAYLOR: It's okay, Mr. Mahannah. Go ahead.

MR. DePAOLI: No further questions.

HEARING OFFICER JOSEPH-TAYLOR: Questions from staff? Do you want a few minutes?

MR. KING: Right now I only have one question.

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EXAMINATION

BY MR. KING:

Q. Mr. Mahannah, looking into the future, and I believe water conservation will become more prevalent, do you have an opinion as to what water conservation will do to consumptive use in return flow credits in the Truckee Meadows?

A. You know, I contemplated that, Mr. King, and tried to look for some sort of meaningful trend. Water conservation efforts are and have been occurring. I think the Tribe as part of their negotiation with the power company is installing retrofit flow fixtures, et cetera.

Looking at my table 3, I don't see a meaningful trend in that direction. I suppose that possibility exists. There's still always going to be some element of outdoor watering, there's going to be urban runoff back to the Truckee River as well.

Q. And without looking at trends, generally speaking increasing water conservation, would do what to consumptive use resources?

A. It would reduce the consumptive use.

Q. It would reduce the consumptive use?

A. I'm sorry. Let me think about this for a second. It would increase the consumptive use.

MR. KING: That's all I have.

HEARING OFFICER JOSEPH-TAYLOR: Mr. Felling, any questions?

MR. FELLING: Yes.

EXAMINATION

BY MR. FELLING:

Q. I just want to look at table 3 and I want to address the issue of whether or not there are trends in return flow or consumptive use of municipal water.

In the last column of table 3, do you see a trend from 1989 to 2005 with respect to return flows?

A. I suppose I could have put together a plot with a trend line through this to see. Looking at 1989, the return flow is 43 percent. In 2005, it's 43 percent. Granted there's a couple of low numbers in '03 and '04.

Q. Well, let's go through just a little bit because this might be important. In the first 10 years, from 1989 to 1998, how many of those numbers are less than the overall average of 44 percent out of column 10?

A. You're looking for the time period from '89 through '98?

Q. Yes, in column 10.

A. Two years are equal or less.

Q. Then the following period, 1999 to 2005, how many are less than the overall average of 44 percent?

A. They're all less.

Q. So, again, based on that, do you see a trend in the consumptive use of municipal water in the Truckee Meadows?

A. Some of that may be explained by -- strike that.

Q. It's really a simple question, Mr. Mahannah.

A. Well, I'm looking back to column six where there was an assumption made, because we did not have hard data for some of those earlier years of exports made to south Truckee Meadows pursuant to my discussions earlier.

So, some of those numbers may have been higher, but you're correct, that second time frame, the return flows are less. But keep in mind that this does not include the unsewered connections and the urban return flow component.

Q. Do you think that those components are enough to make up the difference here?

A. I haven't specifically studied that, but I know it's a, just based on having an office right where Chalk Creek discharged to the Truckee River and living there since mid/early 1980s and working there and observing how that drainage changed with the urbanization upgradient from it, observing a continuous flow of discharge to the Truckee River from storm drains throughout the entire reach of the river where there's no precipitation occurring, that that potentially could be a significant portion.

Q. So, what would be the return flow, then, in that

area. You had just mentioned Chalk Creek. What's the flow of that?

A. It went from an ephemeral drainage to flowing I'd say on average a cfs or two, sometimes more during the summer period when there was outdoor watering occurring.

Q. Is there any data for 2006, 2007 and 2008?

A. I suppose there is. I did not include those. This was for data that was somewhat readily available to me. I didn't make that calculation.

MR. FELLING: Thank you. No further questions.

HEARING OFFICER JOSEPH-TAYLOR: I guess we're ready to switch to your next major area, Mr. Van Zandt. Did you need any break for that?

MR. VAN ZANDT: Sure, let's take a short break.

HEARING OFFICER JOSEPH-TAYLOR: 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. Let's continue with Mr. Mahannah's direct testimony on his next report.

MR. VAN ZANDT: Thank you.

BY MR. VAN ZANDT:

Q. Mr. Mahannah, in the course of your tasks that you were assigned for this hearing, did you have an opportunity to review the exhibits that were submitted by the

applicant?

A. Yes, I have.

Q. And in particular, did you review their exhibits regarding consumptive use?

A. Yes, I reviewed both Mr. Mahin's summary of testimony and Mr. Bergfeld's report.

Q. And I believe those are Exhibits 120 and 121; is that right?

A. Mr. Bergfeld's is 121. I don't recall Mr. Mahin's.

MR. VAN ZANDT: 117 was Mr. Mahin's report and the other was 121.

BY MR. VAN ZANDT:

Q. Those are the two reports you're referring to?

A. Yes.

Q. And in the course of your evaluation of those exhibits, did you have an opportunity to prepare a rebuttal report?

A. Yes, I did.

Q. And is that Exhibit 2226?

A. Yes.

Q. What was the purpose for preparing your rebuttal report, Mr. Mahannah?

A. Well, in response to the applicant's direct report, they put forth in Exhibit 121 a net potential

consumptive use analysis for alfalfa assuming a full water supply for the entire growing season and came to the ultimate conclusion of 2.9 acre foot per acre potential CU number.

My position is that downstream rights and historical downstream rights to be maintained, we need to look at an actual consumptive use and not some potential amount of consumptive use.

Q. Now, Mr. Mahannah, when you went through this analysis, did it change your opinion with regard to what you'd previously testified to, the 50 percent number?

A. No, it does not. This is in response to their direct report.

Q. So, would you explain what the difference is between a potential and an actual ET analysis?

A. Well, potential is what the net potential is what the crop can consume potentially, assuming ideal conditions and I'll go into the details --

HEARING OFFICER JOSEPH-TAYLOR: Excuse me one second.

(The Hearing Officer left the hearing room.)

HEARING OFFICER JOSEPH-TAYLOR: I'm sorry, folks, I need to be off the record for ten minutes.

(A short recess was taken.)

HEARING OFFICER JOSEPH-TAYLOR: Let's be on the record. Mr. Van Zandt, please continue.

MR. VAN ZANDT: Thank you.

BY MR. VAN ZANDT:

Q. Mr. Mahannah, we're ready to start your answer over again with regard to the difference between a net ET and an actual ET calculation. I think you were talking about net potential?

A. Yeah. The applicants put forward a net potential, which is basically the maximum amount of one water that an alfalfa crop could use less the effective precipitation, and as I'll go through later, there's a number of factors that reduce the potential to an actual historic number.

I notice or at least it appears that there's a difference in philosophy between what's put forth in Exhibit 1 by Mr. Bergfeld and that by Mr. Mahin in Exhibit 117, where in Exhibit 117, and I quote directly from Mr. Mahin's report, "The historical CU of a water right when used as decreed is the quantity of water that the State Engineer determines was consumed by the historic crop. The storage of the CU portion of the water right does not the result in a conflict or injury with existing rights."

I would tend to agree with most all of that statement. Historic CU in my definition and opinion is different than a potential amount.

Just a very crude analogy of the difference, if

you, for example, had a Lambroghini that could go 120 miles an hour, you could theoretically get to Fallon in 30 minutes. We all know that there's limits where that would not occur on an actual basis.

Q. So, what are some of the limiting factors that you could look at?

A. We'll go through each of these individually, why actual historic would be less than a potential, particularly in the Truckee Meadows which are surface water, flood irrigated fields.

We'll talk with water supply limitations, irrigation season length and variability, different times of methods of irrigation and field application efficiency. That issue becomes important in certain ditches in the Truckee Meadows, the various crop types.

We'll go through some mapping, examples of that, and variable sources of supply. In summary, I'd like to walk us through tables 1 through 3 and these are the revised tables that were handed out yesterday, I believe.

HEARING OFFICER JOSEPH-TAYLOR: In Exhibit 2226, Mr. Mahannah?

MR. MAHANNAH: That's correct.

HEARING OFFICER JOSEPH-TAYLOR: Under what tab?

MR. VAN ZANDT: These are in the main report, tables 1 through 3.

MR. MAHANNAH: Yes. Should be at the very end of the text. There you go. Table 1 is very similar to the table 1 I presented in my direct testimony which summarizes all of the change applications with respect to base about rights, tracing them back to the original Orr Ditch Decree claim number.

I've identified which ditch the original claim is associated with, the priority of the water right with that claim, the acreage stripped by the base right and then the next column is duty stripped and that's, because some of the claims, headgate duties vary between three and a half and four and a half, this column is computed by taking the duty divided by the acreage.

The next column is the decreed duty where I say what the decree shows as far as the duty, and you can see they vary between three and a half and four. I guess just backing up one step, if you go to the second page of table 2, I've computed the average duty which is roughly 4.0 acre foot per acre.

The rest of this is pretty generic information. Then the last column is comments or notes in the Orr Ditch Decree which pertain to a particular claim number. We'll come back to that when we go through the mapping exercises and I'll reference that later in the testimony.

Table 2 is taking table 1 and grouping them by

ditch and summing the acreage and then sorting it from the ditch with the highest number of transfers or acres changed to the lowest. So, you'll see north Truckee as roughly 24 percent of the rights seeking change or extensions, or 17, Steamboat and Highland, so on, for a total acreage, again, if you trace it back to an acreage amount is 3146 acres, roughly.

Table 3 is again just taking table 1 and grouping it by ditch. So, there's no new information here. I have shaded the application numbers where we've done some detailed GIS mapping of the original base right that stripped a portion of the original claim right. So, we'll certainly come back and go through each of those originals.

That's summarizing tables 1 through 3. I'll be referring to this map quite a bit which is included in tap 11 of Exhibit 2226. It's behind me on the wall. I've also got a hard copy here if the State Engineer can't see this or that, you can refer to the mounted copy and the folded copy as well.

What we've done here, and this is with the assistance of Mr. Andy Stroud is in the office, I've retained his services to map the original base right where they fell in the Truckee Meadows.

So, what we've got here is the alignment of the Truckee River, the alignment of all the ditches, where

there's associated transfers, and then the green shaded areas represent existing places of use where we did not do the detailed mapping.

There's, I believe, 55 applications. We chose 18 representative sites for detailed mapping and those are identified with the blue shading with a letter A through R. So, I'll be referring back to this map later in the testimony quite frequently.

BY MR. VAN ZANDT:

Q. Now, Mr. Mahannah, in reviewing the applications, was there an actual CU amount that was requested by the applicants?

A. Yes. I believe in the attachments to the applications they requested a dot of at least 2.5 acre feet per acre. In Exhibit 121 with a net potential number now seeks to score 2.9 acre feet per acre.

Q. What has been the historical CU number that the State Engineer --

A. The number that the State Engineer has historically used is 2.5. I reference permits 67182, 283, 67525, 226, 71333, 71669, which are included in Exhibits 2111 through 2216.

I believe those are all the in stream wildlife applications that TMWA or Washoe County has filed. And in each of those there's a condition on the permit because the

issuance of this permit is for the consumptive use portion only being 2.5 acre feet per acre of the base right. The remaining portion of the base right will remain in the river for use by other decreed right holders.

Q. And was there an analysis in which the Truckee Meadows Water Authority participated that used the 2.5?

MR. DePAOLI: Objection, and I'm going to object to, assuming we're getting to the next two bullets on this slide, I'm going to object to any opinions by Mr. Mahannah as to what impact going above 2.5 will have on the environmental analysis for the Truckee River Operating Agreement.

HEARING OFFICER JOSEPH-TAYLOR: Can I have the question, Mary?

(The record was read.)

HEARING OFFICER JOSEPH-TAYLOR: Overruled for right now, Mr. DePaoli. You can answer that question.

MR. MAHANNAH: Well, I'm not sure -- I don't know that the Truckee Meadows Water Authority did an analysis of the 2.5. I have had discussions with Mr. Tom Scott at the Bureau as to what consumptive use number they used in their modeling efforts that are addressed in the final EIS under TROA.

HEARING OFFICER JOSEPH-TAYLOR: I'm going to stop you there and sustain his objection, because we're not going into TROA. We're working with the evidence here.

MR. MAHANNAH: Okay.

HEARING OFFICER JOSEPH-TAYLOR: So, until you get another question, you can stop. Go ahead, Mr. Van Zandt.

MR. VAN ZANDT: If I may be heard, the issue is not having to do with the TROA with EIS but a party admission in the TMWA participated in this process in which they actually used the 2.5 acre feet CU number.

HEARING OFFICER JOSEPH-TAYLOR: And the State Engineer is going to go on the evidence that's presented at this hearing.

MR. VAN ZANDT: All right.

BY MR. VAN ZANDT:

Q. So, Mr. Mahannah, this 2.5 number that you said the State Engineer has used previously, how does that relate to the actual historical CU number that you've calculated?

A. It's going to take me the rest of the presentation to get to that answer, so let me proceed. We'll address this 2.5 will exceed actual CU, especially in drought years.

Q. So, now you're talking about some of the factors that you considered?

A. Yes, I focused on the water supply limitation and irrigation season and length. I think this was addressed in Mr. Schank's testimony yesterday about shortage, and Hearing Officer Taylor correctly noted that if you can run out of

water, irrigation stops. So that's the thrust of where I'm going with this series of slides.

So, presently a potential number of 2.9 alone is meaningless if the crop does not have sufficient supply to meet its demand. I mean its potential. The applicants have assumed that a growing season based on weather data in two weather stations in the Truckee Meadows from April 15th through October 31st, roughly 200 days, were 6.6 months.

I'd like to reference tab 2 now which was the special master's report prepared by George Talbot, and there's a lot of good information in this, so I would encourage a full reading of that document, but I'll reference numerous sections of that.

Q. This is tab 2 to Exhibit 2226, correct?

A. Correct. So, in that report Mr. Talbot says the irrigation season varies considerably. He references 165 days, or approximately 5.5 months. So, if you go to page 33 where he states the appropriations have been for and are allowed for an indefinite irrigation season approximating five and a half months or 165 days.

At page 93, he also addresses this issue and says the defendants have testified that ordinarily the irrigation season in the Reno Valley begins about the middle of April but varies considerably in different years and lasts for about five or five and a half months.

In looking and visiting with the Water Master staff, when they compute rates, diversion from the river for a full supply, they assume 160 days for an irrigation season is, not 200 days.

At tab number 4 I've included a number from 1989 to 2007, Federal Water Master's Truckee River ag diversions, and I won't belabor going through each one of these, but if you just kind of scan through and look at the ditches between Steamboat and Vista, many times the irrigations don't start until May, many times they end in September. So, roughly 150 days which is in general agreement with the special master report at tab number 4.

Q. You said the source of this data was the Federal Water Master in tab 4?

A. Yes. And specifically in drought years, 1992, 1994, irrigation season was substantially shorter, ending in June through August, obviously depending on the severity of the drought.

I also reference under tab number 3 a water use study that was done on six tracts of land in the Truckee Meadows, and these were formed by E. P. Osgood who is a surveyor and engineer retained by the Bureau. He prepared a plane table map that we'll get to later, he under the direction of Mr. Harding, who was an irrigation expert that provided testimony during the stages of the decree, conducted

those trials.

That's included at tab 6. Unfortunately, this document, it's a blueprint, so it's pretty difficult to read. So what I've done, the very first page of that is summarized data that's included in this report that's entitled data on the water requirements of certain land in the Truckee Meadows zoned by actual use of water on five separate tracts.

HEARING OFFICER JOSEPH-TAYLOR: Mr. Mahannah, do we know the priority date of the water on those tracts?

MR. MAHANNAH: We don't. So there's a lot of numbers here, but what I want to point out, these were field trials done on the university experiment station and then the asylum farm where they've got a number of plots, let's just started at the to.

They show the acreage, the applied water, absorbed water and then waste, and by waste they're just referring to tail water runoff. We'll get into that in some later slides then they compute a waste percentage.

What I want to focus on here is the first irrigation and the last irrigation. You can just scan down through the data there, and I've also computed the irrigation season length based on these field trials.

So, the first irrigation ranged from the 1st through the 15th of May, the last irrigation date ranged from August 5th through the 10th of September for an average

season length of 111 days for these six tracts.

There was also some notation of soil type and the crop, all of this was alfalfa, and then crop yield.

Applicant's assumption of 200 days every year to compute the potential CU will overestimate the actual consumptive use and we'll get into that in more detail. Water Master diversion records and Talbot special masters would support an average season length of 150 to 10060 is days.

BY MR. VAN ZANDT:

Q. Did you also do an analysis of the water supply?

A. Yes. I took a look at Floriston rates, which I believe in the Truckee River Agreement you will find those rates at the Farad gage for March through September, 500 cfs and then through the winter months, October through February of 400 cfs.

And pursuant to discussions with water master staff, the premises in this analysis I'm going to go through is that a full irrigation supply can be attained when Floriston rates are met, and that either a shortened season is or some deficit irrigation occurs when the rates are not being met which limits the consumptive use, the actual consumptive use.

So, at tab 5 there's a number of spread sheets. I won't go through all of them, but I looked at Farad flows

from 1909 through 2006 and looked at an irrigation season over a period of April through October and computed the total flow during that time frame, and then divided that by the annual average over that time frame and that resulted in what I referred to as the flow index.

So, an index of one would mean it's an average year. This range varied from .22 in the most extreme drought year, or 22 percent of the average in 1931, to almost 3.0 in the flood year 1983.

So, then I went through each of those years by month to determine the last month that Floriston rates were met for each of those years, and I didn't use an exact cut off of 500 and 400, I looked at a number of gage accuracy considerations of five percent.

For example, if floors were during the summer period 475 cfs, I indicated that it would make rates in October. If the rates were 380, I indicated it would make the rate. Also I was able to get some monthly fish flow releases from the Federal Water Master from 1994 through 2006. Those were, those monthly numbers were subtracted from the Floriston rates before I determined the month in which Floriston rates would no longer be met.

There was also fish flow releases from 1976 through 1994. However, the monthly distribution of those is unknown according to Water Master staff or difficult to

quantify. So, I did not address those, so this is somewhat of a conservative estimate.

So, just briefly referring, if I could reference everybody to tab 5, I did this analysis again over the 1909 through 2006 time frame. So, column one there is the year and then I've grouped these by the month in which Floriston rates would have been met through that month.

So, for example, in 1992 and 1934, rates were met up through April. And then I've computed an average index for each of those months. At the very end of that table is the summary table which I have on the overhead at the moment.

So, over that 98-year period of record there was, based on this analysis, 65 years where the rates were met all season long, or 66 percent of the time, with an average index of 120 percent of the average.

September there was three years, or 3 percent, you can see how general the index is, flow index reduces the earlier, the supply is cut off, which obviously makes sense when you have a drought situation like we had in 1991, 1992, 1994, you're going to be cut off much sooner in the season.

So, 34 percent of the time or 33 of those 98 years rates were not being met the entire season, which limited either the season length and the actual ET or consumptive use.

Now, recognizing that there were things that

happened in that intervening time frame, I looked at a couple of different averages from 1940 through 2006 which would have included the time frame when Boca Reservoir came online in 1939 and Prosser in 1962, and that changed the results slightly.

So, 27 percent of the time if you look at that time frame rates were not met the entire season. Now, if you just look at from 1962 through 2006, the percentage of time is 33 percent that rates are not met the entire season. So, it jumps back up probably largely in part due to the drought in the '90s.

So, just in summary, with storage, 22 to 33 percent of the time rates are not met resulting in a reduced irrigation season.

HEARING OFFICER JOSEPH-TAYLOR: You said 22, Mr. Mahannah. Did you mean to say 22?

MR. MAHANNAH: 27 to 33 percent of the time, thank you, rates are not met resulting in a reduced irrigation season or delivery amount. That's reducing the actual to less than potential consumptive use.

So, I'd like to switch gears a little bit now and reference the applicant's report in Exhibit 121, table 5 where they have gone through a net potential CU analysis for available water with alfalfa, and I put adjusted here because at the end of the day on their analysis they come up with a

number and then it's unclear to me how they go from 3.1 to 2.9, but they address temporary and how they make that calculation, I'm not sure.

But I've taken table 5 and reduced it by that percentage to come to basically a recreation of table 5 in their report to arrive at a cumulative net CU of 2.9: And then the next slide I go through an example using this data, so keep this number in your head for a moment, 1.72.

So, assuming I deal conditions, full water supply, using the applicant's data, the crop would have potentially used 1.72 acre feet through July.

Now, let's look at a supply limited year. In 1991 actual conditions when diversions ended in July. Per the applicant's data the CU per that year is 1.72 CU per acre.

Assuming an average water holding capacity of roughly eight inches in a five-foot root zone for alfalfa, and depleting 50 percent of that, or giving them basically four inches of soil moisture storage, that extends that CU to roughly two-acre foot per acre.

Now, going through that same example, if diversions ended in June as they did actually in 1992 and 1994, the actual CU would have been reduced to 1.44 using the applicant's data and the same soil moisture assumptions. These calculations do not reflect the additional limitations

to actual CU which I'll go through.

Switching gears to another consideration that's particularly important for certain ditches in the Truckee Meadows is what's referred to as the field application efficiency, which is the ratio of how much applied water or headgate duty of four-acre foot per acre ends up in the effective root zone to meet the CU of the crop, or you could express it as the CU divided by headgate delivery.

BY MR. VAN ZANDT:

Q. What is the source of the field application efficiency concept?

A. The source?

Q. Yes, the source. I believe you have it at tab 7.

A. Yes, I'm sorry. Tab 7 is excerpt from the FAO or irrigation and drainage paper 24, there's a number of pages. There's also some die I'll go to in a second which I'll reference which visualize some of these concepts. I'll go through that right now.

So, on flood irrigated fields a portion of the water that you apply runs off as tail water and a portion infiltrates as depercolation beyond the effective root zone of the crop.

And this is a function of a variety of factors which include the slope of the field, soil texture and infiltration rates, the distribution uniformity and the

surface roughness of the field.

These issues I won't go through all of this, but all of these considerations are discussed in Talbot's special master report, pages 61 through 64 at tab 2 of my exhibit.

At tab 7, this drawing which I'd like to go through to demonstrate this field application efficiency issue. What we have here is a --

HEARING OFFICER JOSEPH-TAYLOR: Mr. Mahannah, that's correct, let's identify. Tab 7, what figure?

MR. MAHANNAH: Tab 7, third to the last page, figure 25 under tab 7.

HEARING OFFICER JOSEPH-TAYLOR: Thank you.

MR. MAHANNAH: So, here we have an irrigated field. At the head of the field there's the supply ditch. Let's just say this is the Highland Ditch or the Steamboat Ditch. It looks to be a furrow irrigated field.

I'll explain in more detail the different times of surface irrigation methods. There's siphon tubes which take water out of the ditch. It flows down the slope of the field. As the field is being irrigated it's in full straits.

This dashed line represents the effective root zone of the crop. The dotted area is the wetted area as a result of the irrigation, and you can see that below the dotted line there's a different, heavier dotted area that shows what we refer to as depercolation past the affected

rooting zone.

And you can see that that is deeper at the head of the field than at the bottom of the field and that's because it takes time for water to make its way down the field. And so, there is more time for it to infiltrate at the head of the field than at the bottom of the field, and that's part of what a farmer learns when he's irrigating as to how to best manage that.

You also want this to occur for leaching requirements, the general amount that's commonly used wants a 15 percent leaching requirement to remove the salts from your soil profile. So, what isn't consumed by the crop or percolated past the effective root zone will run off as tail water either into a downgradiant ditch or downgradiant fields.

At the bottom end of the field you can see they've expressed some variation in that wetting profile and this gets to the distribution uniformity which can result to slope and soil texture. So, there might be an area where there was a sandy year section of soil so there was more infiltration then, say, this area over here in the felt.

So, the application efficiency here would be the amount of water used by the crop divided by the headgate duty. So, now I'll combine different methods of irrigation with published values for field application efficiency. I'll

refer you to tab 6, which is a report entitled The Irrigation of Field Crops in Nevada by C.S. Knight and George Hardman, 1996, by the ag experiment station, University of Nevada published in 1919 and this also looks like it was entered as an exhibit in the Orr Ditch Case, Exhibit Number 10J by the defendants.

Pages 8 through 12, they describe various types of flood irrigation methods. Again, this is all in the context that nearly all of the fields in the Truckee Meadows, especially historically, were flood irrigated.

So, flooding from contour ditches is common on more steeply sloping or rocky undulating and shallow sales. It's commonly used in pasture settings.

When we get to the detail mapping examples, it will be more evident what this looks like. That last lowest application efficiency, again referring to the FAO document at tab 7 ranging from 50 to 55 percent.

Borders generally require more level ground, require larger heads of water, where water is put in at the head of the field, you have a wide section for it to flow down and a border on either side to contain that water. That border may be several hundred feet wide. It varies obviously depending on the farmer's preference and soils, et cetera. It has a bit higher application efficiency range.

Collections and basins are used on lands which

require a greater deal of leveling. Again, a similar application efficiency. This is kind of a combination of borders where you would have water flowing down between two borders and there would be a check on the bottom and then a break in slope and another basin. So, it's kind of a series of basins, if you will.

Then, furrow irrigation which was shown on the last schematic requires lower reads of water used on more friable soils. You have to tell a narrow furrow which is maybe a foot or two or three apart and the water flows down these narrow channels and the crops are planted on the portion in between the furrow where the water flows through.

In this exhibit they note that that's a commonly used method for irrigation on alfalfa in the Truckee Meadows. Having application efficiency ranging from 55 to 70 percent. Again, that's referenced at tab 7 under the FAO documents, as well as tab 8 which is a journal of irrigation and drainage division procedures of the American Society of Civil Engineers where they also reference field application efficiencies on furrows.

Just a note, in Talbot's special master report at page 71 he references an expert, he doesn't mention him by name or the ag experiment bulletin, but when you do the math, application efficiency on a particular farm in the Truckee Meadows was 67 percent. Unfortunately, I couldn't track down

specifically which one that was.

BY MR. VAN ZANDT:

Q. Mr. Mahannah, how does this field application efficiency have an effect on CU?

A. It has an effect on lands which do not receive tail water supply from upgradient fields or ditches. In the Truckee Meadows, those apply under the highlands, Steamboat and Orr Ditches.

If I can refer back to the map which is at tab 11. The Steamboat Ditch diverts up in the Truckee Canyon upstream of Verdi and follows the alignment, the highest ditch on the south side of the river. And it flows all the way down to the south Truckee Meadows and eventually discharges back into the Steamboat Creek in Pleasant Valley.

Q. Mr. Mahannah, for the record you're tracing your hand across Exhibit 2226, tab 11, in the southwest quadrant of that map?

A. Yes. I just traced the alignment of the Steamboat Ditch. I will do the same thing now for the Highland Ditch which diverts up here just downstream of the community of Verdi, follows along the river fairly closely until you get to about the point of TMWA's water treatment plant.

This the Chalk Creek which was referred to in earlier testimony which flows into the Truckee Meadows and

referenced all that urban return flow from this area up here.

Again, the base map for this is the 276 aerial photograph. You can see all the residential development that's developed up here recently that's caused Chalk Creek here to flow perennially. But continuing on with Highland Ditch --

Q. Before you do that, just for the record, what you're tracing is about halfway down the map and about a third or maybe a quarter of the way from the left side of the man which would be the west side, correct?

A. That's correct. So, following the Highland Ditch downstream, it separates from the river more and terminates in what's now San Rafael Park and what used to be Sierra's predecessor's Highland water treatment plant. There's a detail map of that area, so we'll see that later.

The Orr Ditch --

Q. Before we do that, now we're in the northwest quadrant of the map, but actually in the southeast quarter of that and you're tracing just a little above the center, maybe 3, 4 inches, correct?

A. Correct. So, the Orr Ditch diverts just upstream of where Chalk Creek flows into the Truckee River and follows an alignment very close to the Truckee River for several miles.

Actually, TMWA has a plant on the river and out

of Orr Ditch where they pump water out to their water treatment plant at Chalk Bluff which is due north of that point, and then Orr Ditch continues along the river and then starts to separate from the river to some extent.

And then I went to the point out roughly downgradient of where Highland stops, the Orr Ditch now becomes the highest ditch in the system. The Orr Ditch continues to the north side, what's now the City the of Sparks, continuing almost in a due north fashion all the way out to Spanish Springs and wraps around. You'll see there's some irrigated areas, at least in 2000 circumstance that area is rapidly changing, that are irrigated out of the Orr Ditch.

Q. In this case what you've done is you've traced from about half way down the map and about a quarter of the way from the left or towards the west, followed the river pretty much to the center of the map and then went north, almost to the top, well, almost to the top of the map there may be 65 percent or so across the map from the west, right?

A. That's correct. I want to point out that on the Highland and the Steamboat there's no upgradient ditches, there's no upgradient irrigated fields where application of water to it would have tail water that would benefit downgradient lands or ditches.

I'd like to refer now to the special master's report at page 709 where he also notes and addresses this.

So again, tab 2, special master reports, page 709, and I quote, "Under the Steamboat Canal, the highest ditch on the south side of the river and which supplies water to lands which do not have wastewater from above, the most part of its length for about 30 miles."

A little further down in that paragraph he addressed the Highland Ditch. "Under the Highland Ditch on the north side of the river and which does not receive wastewater from ditches or lands above."

So, Talbot recognized this issue as well. I want to refer back to table 2.

Q. This is table 2 in Exhibit 2226?

A. That's correct. If you sum the acreage under Highland, Steamboat and/or ditches, approximately 36 percent of the acreage involved in these transfers is under those ditches, which for the most part don't have the benefit of return flows.

So, now I want to go through an example of applying application efficiencies and headgate duties on those situations. So, based on the previous slides where I showed a change of application efficiencies of between 50 and 70 percent, if you had a headgate duty of four, the actual CU would have to be limited to a range of 2 to 2.8 just on an efficiency basis.

Now, say you had a drought where only 50 percent

of the supply was delivered or you only delivered two. The actual would be limited to 1 to 1.4. Again, assuming that there's no return flows or waste and drain from upgradient lands or ditches.

So, moving on to another consideration. Talbot does mention that alfalfa being the principal crop, but he also references other crops grown. Also, I'd like to refer to tab 1, this is in the Orr Ditch Decree itself at page 86 where they reference reductions in headgate duties based on different types of crops. For grain crops they take the headgate and reduce it by two-thirds, which results in a headgate duty of 2.67 acre foot per acre.

For other crops, potatoes, corn and beats, they specifically reference and reduce it by four-fifths or 80 percent, applying that times four acre feet is 3.2.

I'd also like to reference the Washoe Project Feasibility Report which was published, I believe, in September of 1954 at tab 10. This was a report published by the Bureau of Reclamation and this dealt with what's referred to as the Washoe project to consider development of additional storage upstream on the Truckee and Carson Rivers to enhance water supplies for ag and M and I in the Truckee Meadows and the Newlands Project, as well as Carson Valley.

I want to specifically reference page 68 of that report, and I quote, "Most of the irrigated lands with

adequate drainage but late season water shortages, underscore that, produce alfalfa, wheat, barley, oats and rotation pastures. Some small irrigated tracts with adequate drainage where used for potatoes, on January and truck crops. Lands with drainage deficiency are generally limited to permanent native the pastures, meadow hay, and other low nutrient feed crops."

I'd also like to reference another report at tab 6, actually, I referred to this already. This is the ag experiment station bulletin 96, a defendant's opinion, they referenced a number of crops and found the most economical use of water and highest fields for the following crops using the following amounts of applied water. Alfalfa, 3.5 acre feet per acre, wheat, 2.3, potatoes, 1.4, sugar beets, 1.5, and these are applied waters, so presumably the consumptive use would be less.

I was unable to find detailed historical records over time which showed the cropping types, how much was in alfalfa versus grain versus potatoes, et cetera. So we looked to the 1913 plane table maps and did a GIS analysis, and we'll go through a number of examples.

HEARING OFFICER JOSEPH-TAYLOR: Are you just about to proceed to those examples? I need to find a breaking place for lunch, Mr. Van Zandt.

MR. VAN ZANDT: When he finishes with this slide

we can probably break.

MR. MAHANNAH: I'll just summarize. The applicant's assumption that alfalfa is the only crop which will result in an overestimate of actual CU when there were other crops grown which use less water.

I think that would be a nice place to stop.

HEARING OFFICER JOSEPH-TAYLOR: We'll be off the record until 1:30.

(The luncheon recess was taken.)

CARSON CITY, NEVADA, TUESDAY, DECEMBER 15, 2009, 1:35 P.M.

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HEARING OFFICER JOSEPH-TAYLOR: Let's be on the record. Mr. Mahannah, please continue.

BY MR. VAN ZANDT:

Q. So, Mr. Mahannah, one of the other factors you looked at in your ET analysis was other variable sources of supply. Could you refer to that, please?

A. Yes. I'd like to refer to table 1. I think I mentioned earlier in the comments section of that table 1, as well as in table 2, and table 4 and table 5, there's references to the decree where they reference supply by waste and drain, tributary creeks, springs or swampy areas which imply high groundwater tables.

The source of the supply of some of the claims are from sources other than Truckee River water, creeks, springs, potentially groundwater contributions to the consumptive use which shouldn't be allowed to be stored under the Truckee River change applications.

And Talbot's special master report he references roughly 6700 acres served by creeks, reservoirs, springs and waste, and then there's an additional 4300 some acres served from waste under river ditches, and that's referenced at page 83 of special of the special master report.

Q. Now, the tributary corrections, Hunter, Evans, Thomas and Whites, and I'll point those out on the map at tab 11, Hunter Creek -- well, all of these creeks drain the Carson Range which is the range on the west side of the Truckee Meadows, Peavine Peak to the north, Virginia Range on the east side of the Truckee Meadows, Hunter Creek drains a portion of the Carson Range, and I'm tracing my finger basically along the alignment of Hunter Creek and it is a tributary to the river in the vicinity of -- oh, actually, I'm sorry. This is actually Hunter Creek right near, the Patagonia outlet store is right here where the Hunter Creek outlet comes in.

Evans Creek is further south on the Virginia Range and I'm not tracing the basic alignment of Evans Creek. Thomas Creek in the southern portion of the map, I'm tracing with my finger the alignment of Thomas and then the very southern portion of the Thomas, Whites, and it splits here. Sometimes it's referred to as Howard's Creek in the decree or State Engineer records.

All of those are potential tributary sources for some of these claims. So, specifically, application 73797 states, "Additional water allowed for these areas from Evans Creek and Wheeler Reservoir storage."

And then on 73869, it says, "Lands can also be irrigated with spring and tributary waters of Thomas Creek."

Both of these we'll do detail mapping analysis on, but just for an overview, the location of the rights for 73797 on Evans Creek is on detail map C. You can see the alignment of the Steamboat Ditch and Evans Creek.

So, it basically has supplemental Evans Creek water associated with it. The other applications, 73869 is served by the Corcoran Ditch which diverts off the river in the central part of the Truckee Meadows, supplies Virgin Lake, makes its way south and wraps around Rattlesnake Mountain and it actually becomes a drain through the this vicinity out and near what's known as Hidden Valley now, and the base right for 73869 is on detail map I. That can also be served with Thomas Creek waters which originate off the Carson Range as well pursuant to the decree.

Then there's also, you can just scan through table 1 numerous other claims that allow for waste and drain waters to serve those claims.

So, the sources of supply continue, shallow groundwater contribution to consumptive use, it would be difficult, if not perhaps impossible, to sort out the groundwater portion of consumptive use that's derived from secondary recharge associated from irrigation practices and groundwater recharge that naturally occurs within the Truckee Meadows from infiltration from creeks and just the groundwater recharge process.

But I think when we get into details mapping, I'll point out some of that, but I think it is something that the State Engineer should have in the back of his mind when he considers these.

The applicants are seeking to store Truckee River waters associated with the Orr Ditch Decree in upstream reservoirs, therefore, it would not be possible or appropriate to store the CU component of any local, and I mean groundwater, creeks, springs or waste and drain, from non-Truckee River sources, of which historical, a source of historical CU is in upstream reservoirs.

Some portion of the existing place of use of the base rights include riparian areas along tributary streams or the Truckee River itself, which will continue to have CU. That gets into the double diversion issue that these lands, there are a few examples where they're not totally dried up and never will be.

Getting into the GIS mapping of selected base rights, I'm going to go through a series of 18 examples. This will provide a visual reference for a lot of the concepts that I've already presented.

So, just referring back to the overview map of tab 11, I've chosen 18 representative base rights to do detailed mapping on. Those are identified and summarized in table 4. In table 4 there's a map key column A through R,

and those are identified on the match, the large overview map which is behind me at tab 11. So again, the blue shaded areas with the letter and the red circle where we did detail mapping, the green are the remaining base right locations for the other applications.

There's 55 applications. I decided to spare the State Engineer of going through 55 examples. I think 18 adequate request represents. We've got one in each ditch where there's larger acreages on Steamboat, Highland, north Truckee, got a couple examples on each of those.

As I mentioned earlier, with the assistance of Andy Stroud, we overlaid the claim boundary and the existing place of use of the base right over Osgood's 1913 colored plane table maps. As I mentioned earlier, Osgood was an engineer/surveyor retained by the Bureau who prepared these quite detailed plane table maps of the Truckee Meadows.

Actually, it went all the way down to Pyramid Lake and they describe in quite detail the cultures, the location of ditches, secondary ditches, contour ditches that were in place at that time. They give a pretty detailed description of again the cultures.

So that was an overlay, as well as we looked at a series of historical aerial photographs starting in the earliest set in 1939. '39 doesn't cover the entire Truckee Meadows, so in cases where there wasn't coverage from '39, we

used 1946 photos and then 1967 photos and then 1977.

A lot of these existing places of use were being or had been converted to municipal, subdivisions, commercial by 1967 or certainly by 1977, so, for the most part what you'll see is the plane table map, either the '39 or 1946 and then the 1967 photos, so we'll go through those examples.

Tab 30 is Andy Stroud's description of his process of geo referencing the plane table maps, the aerial photos, his source for the claim boundaries and the existing places of use which are available on the State Engineer's web site. I won't go through all the details of tab 30 at this time.

So, table 5 if we could have that in front of us when I go through each of these examples, and then I'll also be referring to the map attack 11, and again if the State Engineer cannot see the one on the wall, I have a hard copy here.

So, on table 5, the first several columns -- this is the tab 11 map, I think there's also a small version of it in the binder at tab 11. It might be easier for you to look at that than the large one.

So, again, table 5, the first several columns are all information that has been presented on the previous table. Starting with the column labeled 1913 plane table cultures, those are descriptions of the cultures that are

identified under the base rights in the 1915 plane table. The irrigation method, there's a key at the bottom, if it's flood undetermined type, I just indicate F. If it's a contour ditch-type method, which has lower application efficiencies that I mentioned earlier, I put CD. B/C is borders and/or checks, and FUR would be furrow irrigation.

The next column is existing place of usefully irrigated in any aerial photo. I just indicate a yes or no. And then in comments in the notes show a portion of the Orr Ditch Decree.

I should also mention that each of the tabs are perhaps better resolution images than what we can see on the screen. So, I've referenced on the Power Point the tab and the key number. If it's already with the State Engineer, could we maybe get one set of lights turned down?

HEARING OFFICER JOSEPH-TAYLOR: Sure.

MR. MAHANNAH: Thank you. So, this is map K, tab 12, application 739 '71 on the Orr Ditch. The location of base right A is, I'm pointing to it on the map in tab 11, the Orr Ditch immediately upgradient of it.

BY MR. VAN ZANDT:

Q. Those letters are on the map, aren't they?

A. Yes. You can see A. So, on the left side of the screen the dashed line is the outlined of the claim 311 boundary and then the green line is the boundary of the base

right which in this case was 42733.

And you can see some detail. There's a little supply ditch here, and you'll note here where they reference the culture. So, in this particular one, looks like grain and alfalfa and alfalfa in the northern portion of it.

If we go to the 1939 photo, and all the 1939 photos were taken on June 29th, 1939, and 1939 was, based on my prior analysis with Floriston rates, it was a full water supply year, as well as 1967, that was actually a fairly wet year.

So, I've just indicated in the 1939 photo flood irrigated, it's difficult to tell from this the specific type. I've indicated that it's fully irrigated. You can see just due to the different coloring that some fields appear to be different or perhaps wetter than others.

By 1967 you can see more than half the existing place of use was converted to subdivisions. This would be a site in the Truckee Meadows that's relatively flat. There's not a tremendous amount of slope to this particular area in what's now part of Sparks.

So, moving on to tab 13, 73792, the location of this base right is out here at Vista. The wastewater treatment plant is now on the south side of the river right before the river goes into the Truckee Canyon.

Looking at the cultures in the plane table map,

we have clover, potatoes, wheat, alfalfa and garden. I've indicated that it's flood irrigation and I've indicated on the table existing place of use was fully irrigated.

1940, this is a case where the 1939 photo didn't cover it, so the GS 1946 photo we used here. It's not the best resolution, but you can see certainly the difference between light and dark.

And then we come to 1967, these are much higher resolution photographs. Again, you can see that certainly this area appears to be much dryer than other portions of existing place of use.

There's also where I mentioned riparian or claim areas that are associated with either the Truckee River or tributaries, here we have a base right that's been stripped that overlies the Truckee River. There's still going to be some evaporation off of that, but TMWA already converted everything in the green area to a municipal right.

There's several examples where this occurs. And then in 1977, that was a dryer year, you can see how much different that looks compared to 1967 which was a wetter year.

Moving onto detail C, tab 14, application 73797. This is the one I mentioned earlier on the Steamboat Ditch here. That also can be served by Evans Creek. Additional water for these areas from Evans Creek and Wheeler Reservoir

for storage. So, the cultures here on the plane table are rocky pasture, rocky pasture, orchard, alfalfa, drain and then there's a small orchard in there.

And this is contour ditch. You can see on the aerial photos, particularly in the 1967, this is very early in the season, these lines here are the contour ditches and then other ditches in here. This would be a fairly steep sloping site. You can see the alignment of Evans Creek, the riparian area in the 1967, as well as in the 1939 photograph.

Evans Creek is also identified on the plane table, so this is another example where this area has been stripped but there's still riparian zone that's consuming water. You can also see that I say the existing place of use is not fully irrigated.

If you look, you can see it looks like some fence lines and supply ditches. They say rocky pasture in here, but when you look at the photographs, 1939 and then even if 1967, there's a good portion on the southern portion that doesn't appear to have ever been irrigated, as well as on the north side of Evans Creek.

So, again, an example of a right that's been transferred but doesn't appear to have ever been irrigated and then the riparian issue, supplemented water supply issue. This could also be another one where the application efficiency issue would come into play because there's no

upgradient ditches or lands that would provide return flows to supplement the supply.

So, getting back to that irrigation efficiency, this is basically wild land flooding that has 55 percent application efficiency, 50 to 55. If you applied four, half that water is either going down or running off. So, the CU on this couldn't be more than two.

Detail D, tab 15, application 73799, this is out near Mogul west of Reno, the Highland Ditch goes on the north side of it. This is actually served by the Hogan Ditch, I believe. Yes. The base map on this is a bit circuitous, but when you study it long enough you'll see that the cultures and the plane table map are rocky pasture, alfalfa and orchard.

And it looked like a border and check type system to me based on the aerial photographs, how they are chopped up into smaller pieces. It's interesting when you look at this 1967 photograph, the portion that I'm outlining right here, maybe you can't see it on the screen, but if you look at it in your binders you'll see a bunch of dots there that appear to be an orchard and not alfalfa.

And you can see different colors particularly in the 1946 that are indicative of this perhaps not being irrigated to its full potential.

Map key E which is tab 16, application 73852, and

E is in Sparks on the north Truckee ditch. It's up here, again, a pretty flat piece of ground in the Truckee Meadows. Wild hay and alfalfa are the cultures in the 1913 map. I indicate that it looks like in both photographs it's fully irrigated, although in the 1967 over on the east side it certainly looks different than on the west side.

Also note that the decree allows for wastewater from people's drain and lands above are allowed for these areas.

HEARING OFFICER JOSEPH-TAYLOR: Getting to your point, Mr. Mahannah, do we really need to do all 18? I mean, your point is coming across pretty clearly. Is there a reason to do all 18?

MR. MAHANNAH: I could try and speed it up. I think most of the points I wanted to make I've made, but I just want to make sure that the State Engineer has a good, full understanding of the variety of cropping, the photographs, to understand that this wasn't alfalfa irrigated 200 days a year in the Truckee Meadows.

HEARING OFFICER JOSEPH-TAYLOR: That's come across very clearly all right, as there may be other sources, as there may be riparian vegetation that will continue to use water. I just don't know what I need or any of us need, all 18 of them, but if you need to, we will.

MR. MAHANNAH: Well, if it's okay, I'll just go

through and look at them and if there's something that I feel I haven't pointed out, I'll go into it briefly.

HEARING OFFICER JOSEPH-TAYLOR: That would be great. Thank you.

MR. MAHANNAH: This gets to the groundwater contribution quite a bit. Key F, tab 17. It's in a nature area, it's now the he will also pit, I guess that he calls it the Sparks Marina. You'll see reference to a tule swamp here.

So, with the groundwater situation there, to me there's indication that it was probably a shallow depth to groundwater. There may have been some contribution to the CU from groundwater.

You can see it in the 1946 photo, certainly a much wider area on the east side, and then by 1967 it looked like maybe they had done some drainage and gotten rid of that tule swamp.

HEARING OFFICER JOSEPH-TAYLOR: Mr. Mahannah, let me ask you a question, though. The decree gave them four-acre foot duty. Don't farmers change their crops over time and rotate fields? Do you think that might have been a reflection of the Court saying that it could be alfalfa the next year or things could change?

MR. MAHANNAH: Yeah, and I'll address that.

HEARING OFFICER JOSEPH-TAYLOR: You're on tab 19?

MR. MAHANNAH: Yeah, 19. This is another one where the claim -- it's not in the base right they're stripping, but you'll see the claim boundary extends right up to the Truckee River, and in the 1939, and particularly the 1967, that's obvious a riparian area associated with the river that is still transpiring water.

This is tab 20, application 73869. This is the other one, detail that allows for tributary waters from Thomas Creek to also serve the claim. And you can see reference in the plane table to the tule swamp again.

And then in 1939 a portion of it doesn't appear to be irrigated. In 1977 it looked like they're in the middle of an air investigation here. It looked like furrow irrigation, water is starting to make its waive down the furrows here.

I don't think there's anything new to point out on 73870.

Now, this is an interesting one, key K, tab 22, 73908. This is now what's the site of the Grand Sierra, formerly the Hilton, MGM, Bally's. The cultures here, alfalfa is not mentioned in any of these.

There's rocky pasture, rocks and sage, marshy pasture and swamp, and I don't know that there would be that many that would disagree with me that the CU off of rock and sage is probably considerably less than alfalfa. And I don't

think the State Engineer would even consider that a beneficial use of water.

In 1939, if you compare the 1939 photo with the drainages in the plane table, you can clearly see the irrigated areas here and then there's a large portion of this which is not irrigated nearly to the extent of those lower areas. Here you see brush and rocks, sage and rocks, dry seeds and rocks.

Then by 1967 this was already in a state of development of some sort. Looks like maybe a gravel operation. I think that was the predecessor to the casino.

L, tab 23, 73909, this is out in Sparks, it's kind of on the division between Reno and Sparks. You can see in 1939 actually already a portion of it was being converted to municipal.

I don't think there's anything new on tab 24.

Here's another example. This is on the Orr Ditch clear up in the north part of Spanish Springs.

BY MR. VAN ZANDT:

Q. You're referring now to tab 25, Mr. Mahannah?

A. Tab 25, correct. And wild hay and swamp, marshy with alkali spots. You can see the alkali in 1967. There's also a reference in the plane table to a rocky hill here, and the claim boundary it looked like includes a portion of that rocky hill which in 1946 and 1967 are not irrigated and never

would have been irrigated unless that hill was leveled because you couldn't get water up on the side of the hill.

You can see this is contour ditch flooding type irrigation. This is another one on Mill Street, map key O, tab 26, application 74077. Wild hay, pasture, swamp and salt grass, and you can see the contour ditch flood-type irrigation in the 1939 photo. And then by 1967 this was being converted -- actually I think this building here might be Sierra Pacific's old, or maybe they still use that facility.

This is the south Truckee Meadows on the Steamboat Ditch. This would be a rather steeply sloping site.

Q. This is tab 27?

A. Tab 27, drain, alfalfa pasture and garden. Again, in 1939 they are irrigating this to its full potential. You can certainly see different shades of light and dark. By 1967 a portion of that was irrigated, contour ditch. This is what's now Virginia Street on the east side of the parcel.

Tab 28, application 74196, looks like the claim boundary included a portion of a farm stead and a road that presumably the road and the farm stead were never irrigated, but yet that's been transferred.

And last but not least is the Highland Ditch

claim, map key R, which is a fairly large transfer off the Highland in the vicinity of San Rafael Park and the Highland Water Treatment Plant. You can see that in the plane table map, the reservoir for the treatment plant, rocky pasture, meadow and alfalfa. You can still see in the 1967 photo a portion of San Rafael Park that is contour-type ditch irrigated.

It's also interesting to note in 1939 a good portion of the existing place of use was already in residential. So, here's one of 70 years of residential use. Only it was until 1979 that they got around to stripping the water off of it.

HEARING OFFICER JOSEPH-TAYLOR: And that's relevant how or why?

MR. MAHANNAH: Well, it goes back to the M and I analysis we did, that a lot of these have been in M and I or converted to M and I decades ago.

BY MR. VAN ZANDT:

Q. So, from this analyze, Mr. Mahannah, what conclusions have you reached?

A. We still feel that the M and I CU analysis is the proper basis for the State Engineer to consider the changes based upon the testimony in my direct. 50 percent of that would translate, assuming the average duty of four, at two acre feet per acre if you looked at it from an ag CU

perspective.

And considering all the limiting factors that I've discussed, drought, supply, limitation, irrigation seasons, length, irrigability, various times of irrigation methods and something, particularly on the Steamboat, the Orr Ditch and the Highland that doesn't have the something, application becomes an issue.

Varying crop types, and I recognize that 1913 was a snapshot in time, but a lot of even the 1939 and 1946 photos didn't show fully irrigated alfalfa, PET-type crops in my opinion.

I was not able to find a detailed history of the croppings throughout time, but I do recognize that what may be a drain one year might be a different crop the next year and vice versa.

The variable sources of supply, I mentioned the tributary waters, spring waters, shallow groundwater contribution. When you factor all those in, the State Engineer can reasonably come to the conclusion that two acre feet per acre for an ag CU is also a reasonable number.

The applicant's assumption of alfalfa with a full water supply every year, the neglect of any system constraints, i.e., application efficiency, other lower CU crops, a grain that's harvested in July, for example, the fact that the decree limits the duty on grain and potatoes

and beats and other crops that I've identified in the plane tables, and other sources of supply besides the Truckee River, that results in a maximum potential number, not what was historically consumed.

Storage of a potential 2.9 number will exceed what was historically consumed and harm existing downstream rights. Consideration of any value exceeding two and a half seems to unravel any evaluations down in modeling runs.

MR. DePAOLI: Move to strike.

HEARING OFFICER JOSEPH-TAYLOR: It will be stricken.

MR. MAHANNAH: I touched on this earlier. The State Engineer should consider the ag conversions, I say the proper basis of storage, and I say this slide should be limited to 25 percent per month during the growing season of April through October to somewhat match the historical CU pattern.

But as I mentioned earlier in reading that provision of the Orr Ditch Decree, my interpretation of that, that that's what can be diverted from the direct right for irrigation, not for storage, and that the CU is different than the direct diversion right.

And if you look to the applicant's net PET numbers, the maximum percentage, if you accept their numbers in any one month, is 15 percent.

So, in order to match historical return flows, get on my positive soap box again, time, location and amount, the State Engineer should consider an actual number, not a potential, and he should time the storage in the same pattern in which it was consumed.

And if you allow storage in other months there's the potential for harm that 25 percent in, say, winter months when TCID is trying to build storage in Lahontan, that's potential for harm there when historically crops are dormant during the winter months and not consuming 25 percent of their PET in January.

That concludes my presentation.

BY MR. VAN ZANDT:

Q. Mr. Mahannah, is there sufficient information from your perspective in Exhibits 117 and 121 that address these issues for the State Engineer to make a determination on actual consumptive uses associated with these change applications?

A. Those are the applicant's exhibits?

Q. Yes.

A. Absolutely not. The PET number, I've used that data in my presentation here. Mr. Mahin's testimony I believe states that they will store the rights not to exceed 25 percent per month at the same time that they can release the return flow amount.

But they don't say when or how they're going to do that and I'm surmising that that will change year to year, and I think that's an important issue to get on the record and for the State Engineer to consider in this decision.

My understanding is they want to get at a number and then a pattern for how to store that.

MR. VAN ZANDT: Thank you. I'd like to move the admission of Exhibit 953, which is the Power Point.

HEARING OFFICER JOSEPH-TAYLOR: Any objection?

MR. DePAOLI: Yes, there is an object to the unravelling of the EIS which I think appears in two places.

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

MR. VAN ZANDT: I'd like to move for the admission of Exhibits 2211, 2212, 2213, 2214, 2215 and 2216. These are the applications that Mr. Mahannah referred to in his testimony to the change point of diversion and manner of use in the Truckee River.

HEARING OFFICER JOSEPH-TAYLOR: Any objection?

MR. DePAOLI: No objection.

HEARING OFFICER JOSEPH-TAYLOR: 2211, 2212, 2213, 2214, 2215 and 2216 will be admitted.

MR. VAN ZANDT: And I'd like to move the admission of Mr. Mahannah's rebuttal report, 2226, please.

HEARING OFFICER JOSEPH-TAYLOR: Any objection?

MR. DePAOLI: The same objection as to unravelling the Environmental Impact Statement which appears in there a couple of places, I think. Maybe just one.

HEARING OFFICER JOSEPH-TAYLOR: So noted. With that, 2226 will be admitted. Are you ready to move to cross-examination, Mr. Van Zandt?

MR. VAN ZANDT: I am not, but I'm sure Mr. DePaoli is.

HEARING OFFICER JOSEPH-TAYLOR: Mr. DePaoli, do you want a short break before you start?

Mr. Mahannah, would you like a short break?

MR. MAHANNAH: I would like a short break. That would be great.

HEARING OFFICER JOSEPH-TAYLOR: We'll be in recess for ten minutes. We're off the record.

(A short recess was taken.)

HEARING OFFICER JOSEPH-TAYLOR: Let's be on the record.

Cross-examination, Mr. DePaoli?

CROSS-EXAMINATION

BY MR. DePAOLI:

Q. Mr. Mahannah, do you have a definition for irrigation season?

A. I guess I want to distinguish between irrigation and growing season. My definition of irrigation season is it

can be less than the growing season if you have a supply limited --

HEARING OFFICER JOSEPH-TAYLOR: Chris, I can barely hear you.

MR. MAHANNAH: My interpretation of irrigation season and the way I view that is irrigation season can be less than the "growing season" if you're in a supply limited situation. Irrigation cannot meet the potential.

BY MR. DePAOLI:

Q. So, your definition is the irrigation season starts with the water available and ends when the water is unavailable?

A. Unavailable or your supply cannot meet potential and you're in a deficit situation. That doesn't necessarily mean that you're completely cut off from irrigation if you're getting less than your allocation.

Q. So, an irrigation season ends anytime you're getting less than your full water duty?

A. I'm trying to distinguish between growing season and irrigation season.

Q. Define growing season, then. What's your definition of growing season?

A. I believe that's what the applicants have described from the April 15th through October. I'm not disputing that's a potential growing season based on a

killing frost at the beginning and end of the season.

Q. And during the growing season, can water be consumed after the last irrigation?

A. Yes, and I believe I went through some examples of where you're deleting some of your soil moisture after irrigation has stopped.

Q. So, then going back to the definition of irrigation season, what's your definition of irrigation season?

A. It's somewhat of a loosely defined term. It can be limited by when the irrigation stops, plants can obviously continue to consume water after that point using soil moisture. Depleting soil moisture storage and available water holding capacity that I talked about.

Q. So, in your report when you talk about an irrigation season of 150 to 160 days, what does that mean?

A. That's based on references Talbot's report, Water Master records where on average the water is available over that time frame, five to five and a half months.

Q. So, it's based on the availability of water?

A. Yes.

Q. So, your testimony is that in the Truckee Meadows water is only available for 150 to 160 days?

A. I don't think that was my testimony.

Q. Well, what is your testimony?

A. It varies from year to year. Like in 1994, the irrigation season ended in I believe it was June.

Q. Well, did the irrigation season end or just water became unavailable?

A. Water became unavailable. The crops, assuming they had a full soil profile, at the end of when irrigation deliveries stop, which is an unknown, CU would continue to occur for some period after that depending on your soil type and available water supply capacity.

Q. I understand all that. What I'm trying to get at is you say the irrigation season is 150 to 160 days. What is it that causes you to say that's the length of the irrigation season in the Truckee Meadows in relationship to the availability of water?

A. I thought I'd answered that. It's -- the Water Master assumes 160 days, Talbot's report, 160, 165 days.

Q. You agree with the special master's report, obviously?

A. Yes.

Q. Do you know when the special master took the testimony that formed the basis for that report?

A. I'm sure we took the testimony that was signed or the date on it is June 12th, 1925.

Q. So, you took the testimony before that time, obviously?

A. Yes.

Q. The special master noted that there was great variance in irrigation seasons in the Truckee Meadows, did he not?

A. He did.

Q. Did he note that there could be irrigation as early as January or February, did he not?

A. I believe there's some reference to that as well as some late fall irrigation.

Q. Some irrigation as late as December?

A. Subject to check. I don't recall it going that late.

Q. Would you look at tab 2, page 94? Tab 2 to Exhibit 2226.

A. On page 94?

Q. Yes. The second paragraph, second sentence.

A. The second paragraph, starts, "The situation here is different with the last three years plowing has been done in February and even in January in the Reno Valley, and in very exceptional years far apart. And it may be desirable to irrigate land for flowing and seeding as early as February for winter wheat or grains as late as November or December."

He notes in very exceptional years far apart. So, this I the reference to five, five and a half months, that's a more than average type condition.

Q. Do you think his report describes the irrigation season based on availability of water?

A. Yes, I believe that's addressed in the report.

Q. My question was do you think when the special master is using the irrigation seasons and describing it, he's describing it based on when there's water available?

A. I believe so, yeah.

Q. So, in your mind what he's indicating is that there's only one available in those 150 to 165 days?

A. I don't think that's what he's saying. I think that's -- he notes great variability, but generally it's the five to five and a half months.

Q. You don't suppose that he had something in mind as to when it might make, might be determined that irrigation was needed or required or that it be continued?

A. I'm not sure I follow the question.

Q. Do you think it had anything to do with when it might be possible to grow things?

A. Yeah, I think he references a start of April 15th. Sometimes it's earlier, sometimes it's later.

Q. In terms of this discussion we've been having, could you turn to tab 2, page 76? Would you mind just reading the last paragraph on that page that carries over to the next page?

A. "Under special master's final findings and

recommended decree, the defendants are allowed four acre feet according to their needs take an even continuous flow of 491 hundredths of an inch per acre for 160 days --

Q. Excuse me. That's 165 days, isn't it?

A. 165 days, or twice that amount for half that time to make four acre feet, or a larger or smaller flow as needed at various times instead of a continuous flow providing too little in the hot weather and too much in the spring and fall, ask those who are allowed four and a half acre feet may take according to their needs a continuous flow of 541 hundredths of an inch for 165 days or a varied flow to a him of four and four and a half acre feet.

Any additional -- an ideal allowance and regulation, especially in a locality so congested as Reno, Steamboat and Pleasant Valley will give the user his proper quantity in acre feet with the elasticity regarding the amount and time of flow and free restriction as to beginning or length of irrigation season so as to the great test benefit may have be obtained by having water delivered as needed, and so that the user will have incentive to save and be aware that if he takes the water when it is not needed or uses it longer than necessary, he is wasting his own supply and consequently may not have enough later in the season."

Q. So, he was describing considerable flexibility when people could take water, was he not?

A. Take water, that's different than consuming water.

Q. I understand that, but let's stick with what he was saying in terms of when water would be available under these water rights.

A. Okay.

Q. He's indicating that water could be available under these water rights for more or less than 165 days, is he not?

A. Yes. The decree doesn't specifically limit the season.

Q. You looked at I think it's tab 4 to Exhibit 2226, you looked at records of the Water Master concerning diversions from 1989 to 2006 in support of your conclusion that the irrigation season is about 15 days, did you not?

A. I went through '07.

Q. Through 2007? I'm sorry, I didn't hear you.

A. Yes. I think 2007 is the last sheet we have under tab 4.

Q. That period of time, 1989 into the 21st century, there was not a great deal of persons making their living by full-time agriculture in the Truckee Meadows, was there?

MR. VAN ZANDT: Calls for speculation.

HEARING OFFICER JOSEPH-TAYLOR: The question is in 1989 there were not a lot of people making their living by

ag in the Truckee Meadows?

BY MR. DePAOLI:

Q. My question was from 1989 into 2006 or 2007 much of the Truckee Meadows had been urbanized by that time; is that correct?

HEARING OFFICER JOSEPH-TAYLOR: Overruled, Mr. Van Zandt.

MR. MAHANNAH: That's true.

BY MR. DePAOLI:

Q. Do you know how many farms there were for full-time farmers in these valleys, say in 2006?

A. No.

Q. Any idea?

A. I think it's somewhat of a vague question, what a full-time farmer is.

Q. Where do you live?

A. I live in the Newlands neighborhood on Bridge Street.

Q. Do you ever drive around the Truckee Meadows?

A. Yes.

Q. Do you see much full-time agriculture anymore?

A. Most of what's left today is south Truckee Meadows. There's some left in Spanish Springs, and if we just flip to 2007, the Highland has some municipal water in it, but Last Chance, Lake and Doer, I believe those are all

diversions for just irrigation.

Q. You don't know how many of those are for people who are making a living farming versus people who might have a few acres and a couple of horses, do you?

A. Not specifically, no.

Q. Did you review any information from the Federal Water Master's Office which recorded irrigation diversions for these ditches in the 1920s?

A. No, I did not.

Q. How about the 1930s?

A. No, although I do have some of their daily sheets, worksheets, and I just as a cursory review of those, I'm not sure how accurate they would necessarily be.

Q. Did you review any similar information for the 1940s or the 1950s?

A. No, the same issue, though.

Q. That information is available, isn't it?

A. It's available.

Q. But you didn't review anything, you don't know what it shows?

HEARING OFFICER JOSEPH-TAYLOR: Yes, no?

MR. MAHANNAH: Not specifically, no.

BY MR. DePAOLI:

Q. Tab 3 in your Exhibit 2226, the Osgood field trials, first of all, in order to have made that summary you

must have either better eyes than I have or had a better copy. Could you turn to page 40 of that report?

HEARING OFFICER JOSEPH-TAYLOR: Are we in tab 3, Mr. DePaoli?

MR. DePAOLI: Tab 3, yes.

MR. MAHANNAH: I'm not ensure if I can see --

BY MR. DePAOLI:

Q. Upper right-hand corner are the page numbers.

A. The land in the landscape view?

Q. Well, now you've asked me a computer question.

HEARING OFFICER JOSEPH-TAYLOR: No, that's not a computer question. Horizontal or vertical.

MR. MAHANNAH: And I agree, this was hard to read.

BY MR. DePAOLI:

Q. Have you found a page 40?

A. No.

Q. Page 40 is about all I can read on that page. I was going to ask you what data you could read off that page.

A. Most of this, the summary data comes off the first two pages, and then the remaining pages are the detailed irrigations, so most of which -- I mean, sometimes when I couldn't read the summary I'd go back and try and make it out on the detail and if I wasn't sure of a number, I put in the number that it looks like and then compared it with

the waste percentage.

So, it was a bit of a roundabout process, but I think I did a pretty good job representing what's in this report.

Q. Was 1918 a year when Floriston rates were met for the full year?

A. Bear with me a second. Yes, they were met and --

HEARING OFFICER JOSEPH-TAYLOR: Where are you looking, Mr. Mahannah?

MR. MAHANNAH: I'm looking at my tab 5, the -- sorry, I should have numbered these, but it's the fourth page from the back.

HEARING OFFICER JOSEPH-TAYLOR: Thank you.

MR. MAHANNAH: The 1918, you can see the monthly diversions, I'm sorry, the flows at Farad, you can see June, 779, July, 668, August, 692, September, 532, October, 473, November, 428, and I indicate full season.

If you flip to the very first page where I've sorted the full season, 1918, the index was .94, so it was 94 percent of the average year for the October or April through October flows.

BY MR. DePAOLI:

Q. Do you know when the last killing frost occurred of the Truckee Meadows in the spring of 1918?

A. No, I do not.

Q. Do you know when the first killing frost occurred in the fall of 1918 in the Truckee Meadows?

A. No.

Q. You indicated that Mr. Osgood was working for the Bureau of Reclamation?

A. Yeah. He did this study under the direction of E. P. Harding. Of my understanding he was a consultant. I'm not sure of their exact relationship with the Bureau.

Q. Do you know why they were doing the study?

A. It was a water use study.

Q. No, you misunderstand my question. What do you know firsthand about why this study was being done?

A. I don't know.

Q. Do you have any firsthand knowledge as to why it covered only a period from May to September?

MR. VAN ZANDT: I'm going to object to the relevance of firsthand knowledge.

HEARING OFFICER JOSEPH-TAYLOR: I was going to ask the same question. He wasn't alive in 1918, so I don't get your firsthand.

MR. DePAOLI: That is what I'm getting at, what does he know about why the study covered only that period.

HEARING OFFICER JOSEPH-TAYLOR: But you're asking firsthand and in my mind that's were you there. So, that's where the confusion comes from.

BY MR. DePAOLI:

Q. So, you weren't there. What other knowledge do you have?

A. Hopefully I'm not that old.

HEARING OFFICER JOSEPH-TAYLOR: You will be after today.

BY MR. DePAOLI:

Q. What is your knowledge as to why it covered only that period, May to September?

A. I don't know. Basically all --

Q. I'll accept an I don't know. Thank you.

A. I was trying to finish to clarify. There wasn't the text or explanation of this report. It was basically a whole bunch of data.

Q. Do you have any information about when irrigation diversions commenced for farmers in the Truckee Meadows in 1918?

A. No.

Q. How about do you have any information about when those irrigation diversions ended for farmers in the Truckee Meadows in 1918?

A. No.

Q. In your summary, which is the first page of that tab, there's a reference at the bottom of the page to an experimental station farm.

MR. VAN ZANDT: Which tab are you referring to? Are we on tab 6?

MR. DePAOLI: I'm on tab 3, the first page of tab 3.

MR. VAN ZANDT: Thank you.

BY MR. DePAOLI:

Q. Do you see that, Mr. Mahannah?

A. Yes, uh-huh.

HEARING OFFICER JOSEPH-TAYLOR: Get me with you again, Mr. DePaoli.

MR. DePAOLI: At the bottom of the page there's a reference to the experiment station farm, alfalfa plants. Are you there?

HEARING OFFICER JOSEPH-TAYLOR: Yes.

BY MR. DePAOLI:

Q. First of all, if you know, which experiment station farm are we talking about here?

A. I'm not sure specifically. My presumption was it was the one associated with the university farm in the vicinity of what is now Wells Avenue and the freeway, the northwest area, around the fair grounds and that vicinity.

Q. Near Valley Road, is that the one you're talking about?

A. Yes.

Q. I don't know, I was just curious. In that time

frame for field plot one from May 11th to August 27th they applied 3.66 acre feet of water --

A. I'm sorry, can you direct me where you're at?

Q. The same line or the same bottom of the page, plot one.

HEARING OFFICER JOSEPH-TAYLOR: The bottom one.

BY MR. DePAOLI:

Q. It says they apply 3.66 acre feet of water for plot one and that's from the period May 11th to August 20th, and that the crop absorbed -- I shouldn't say crop absorbed. It just says absorbed water 3.66. I take it that meant they didn't record any runoff from that irrigation?

A. That was my understanding, yes. You'll see in the notes they reference porous gravel, clay, loam. I meant to point this out in the plan tables. There's a reference in one of them where they reference graveling soil that would take a lot of water.

So, what I would presume happened here is a lot of that was lost in depercolation versus tail water runoff.

Q. But it's also gravel, clay loam. Clay is not porous.

A. Well, without -- everybody's definition of how soils vary over a field, that's --

Q. We don't know, do we, that this particular plot of alfalfa might have needed additional irrigation water

after August 27th, 1918, do we?

A. Sure.

Q. Sure we don't or sure we do?

A. It could have used irrigation after that point in time.

Q. It might have needed some water before May 11th too?

A. That's a possibility. These numbers are significantly less than the 160 days, 165 that Talbot and the Water Master referenced.

Q. Mr. Mahannah, you also looked at Truckee River flows at Farad and created the index. I forgot what you called the index, but that information is at tab 5?

A. Yes.

Q. And basically when you're looking at the 1909 and 2006, there are 65 out of 98 years that we've had full Floriston rates for all of April through October; is that correct?

A. That's correct.

Q. And that was 66 percent of the time, I think?

A. Yes.

Q. And then when Boca Reservoir came on line in about 1940, and you took that into account for that period, 1940 to 2006, it upped the percentage of those 48 years to 73 percent of the time.

HEARING OFFICER JOSEPH-TAYLOR: Question?

BY MR. DePAOLI:

Q. Did it not?

A. I'm just going back to verify you that number. Can you restate the question?

Q. When Boca Reservoir came on line and you looked at the period 1940 to 2006, I think you found, did you not, that full Floriston rates were met for the April through October season 73 percent of the time?

A. 73 percent of the time they were met for the 1940 through 2006, 67 percent of the time when you looked at the 1962 through 2006 time frame.

Q. Have you ever done any work in the Carson Valley?

A. It's been a while, but I probably have.

Q. Are you familiar with the Alpine Decree in the Carson River?

A. Yes.

Q. And based on the experience you've had on the Carson River in the Carson Valley, do you have any understanding of how the water supply for the upper Carson River in the Carson Valley compares to the water supply on the Truckee River in the Truckee Meadows?

MR. VAN ZANDT: Relevance and outside the scope of direct.

MR. DePAOLI: It's foundational.

HEARING OFFICER JOSEPH-TAYLOR: Overruled.

MR. MAHANNAH: Well, the Carson in the Carson Valley doesn't have the benefit of upstream storage that the Truckee has.

BY MR. DePAOLI:

Q. It's not uncommon, is it, that the water supply drops off very quickly in the upper Carson River by the end of July of every year in?

MR. VAN ZANDT: Relevance, outside the scope.

HEARING OFFICER JOSEPH-TAYLOR: Give me the relevance of where you're going, Mr. DePaoli.

MR. DePAOLI: I think, Madam Hearing Officer, this testimony it seems to me presents a matter that is sitting for the State Engineer in considering how to deal with this kind of an issue.

Mr. Mahannah has presented testimony on how the State Engineer ought to do it on the Truckee River, and it's my belief that the State Engineer needs to consider, A, how this might have been done somewhere else, and B, how the State Engineer might need to do it in other river systems without this state.

And I think that what I'm trying to get at here is to ask Mr. Mahannah what he knows about what may have been done and why with respect to the Alpine Decree on this very same topic.

HEARING OFFICER JOSEPH-TAYLOR: I'm not sure I see the relevance on what he should do on other river systems being that this is the one we're concerned with. Did you want to respond to that, Mr. Van Zandt?

MR. VAN ZANDT: I think we're going to the Humboldt next. I don't believe that the issue -- first of all, Mr. Mahannah was not tasked to look at the Carson River, that's not within the scope, and for us to go far afield now into other river systems, that is not the point of the testimony and I think we're getting off track.

HEARING OFFICER JOSEPH-TAYLOR: I have a problem with it too, Mr. DePaoli.

MR. DePAOLI: I don't know of any situation where consumptive use determination has been limited based upon the fact that there may be years of short supply.

HEARING OFFICER JOSEPH-TAYLOR: You can ask him that question. I think the specifics on the Carson, you're getting too far afield.

BY MR. DePAOLI:

Q. Can you tell me any situation where a court in the State of Nevada has made a determination on consumptive use for purposes of a change application based on the fact that the supply of water might be limited in some years?

MR. VAN ZANDT: That calls for a legal conclusion. I'm not sure exactly what he's asking.

HEARING OFFICER JOSEPH-TAYLOR: No, I don't agree. Overruled.

MR. MAHANNAH: Would you state the question again, please?

HEARING OFFICER JOSEPH-TAYLOR: Do you know of any court that has limited consumptive use based on the availability of water in any particular year? Did I follow your question?

MR. DePAOLI: More or less, yes.

MR. MAHANNAH: Not off the top of my head in Nevada. In Colorado, what I've suggested here is precisely what they do. They have detailed records, they have detailed diversion records going back to the turn of the century. They address application efficiency issues, they match historical return flows in time, place and amount.

So, this is not a novel concept by any stretch of the imagination.

BY MR. DePAOLI:

Q. If the State Engineer were to approve these change applications with whatever, 2.9, 2.5 or something else, all the Water Authority would be able to store in a given year is the amount of water that would have been able to the farmer using the same right in that same kind of year, would it not?

A. I guess I'm thrown a bit in that kind of a year.

Q. Let me try to phrase it better. Do you really need to adjust consumptive use for less than a full water supply?

A. I think you still need to address all the other issues if you were to only store when you knew you had a full water supply, then you could remove that portion of the argument.

Q. So, maybe there's two ways you could remove that portion. If you knew for this purpose, if you knew that Floriston rates were going to be met for the full year, that wouldn't be an issue?

A. Yes.

Q. Could you also not, could the Water Master not make an adjustment if at some point in time it was determined that more water was stored than ultimately would have been available throughout the year?

MR. VAN ZANDT: Objection, vague.

HEARING OFFICER JOSEPH-TAYLOR: And I'm a little --

MR. MAHANNAH: That refers to TROA, doesn't it?

HEARING OFFICER JOSEPH-TAYLOR: Hold on, hold on. Mr. DePaoli I'm a little concerned that you seem to testify a lot as opposed to getting testimony on the record. I'd like you to be a little careful with that, please.

MR. DePAOLI: Sorry about that.

BY MR. DePAOLI:

Q. If it was determined that more water was stored than turned out to be available for the full year, there are ways to correct that issue, are there not?

A. I suppose that's a possibility. I think that gets into TROA issues as to how that would happen. And as I stated earlier, on the face of your applications you've not indicated how and when you're going to store it and that needs to be known. If that's something the State Engineer wants to go into year in and year out, nor the Water Master.

Q. I'm sorry, I didn't get the last part.

A. Nor is the Water Master going to address that issue year in and year out.

Q. Hasn't the State Engineer ruled time and time again that the Water Master has the ability to regulate water under the Orr Ditch Decree year in and year out?

A. Yes.

Q. What numerical adjustment should be made to consumptive use in this case in order to account for these drought years?

A. If you were to only store during adequate supply years, or say if Floriston rates would have been met the entire season, kind of got the chicken and egg thing there looking at forecasting, if you remove that variable and then apply variables to different control types, the application

efficiencies, all those other factors where the supply is limited --

HEARING OFFICER JOSEPH-TAYLOR: Do that again for me, please, what numerical adjustment needs to be made for drought years?

MR. MAHANNAH: Remove the arguments I made about a supply limitation and consider the application efficiency, the varying crop type, variable sources of supply, some of the claims that there are still riparian areas that are being irrigated --

HEARING OFFICER JOSEPH-TAYLOR: That's what we do for drought years?

MR. DePAOLI: That wasn't -- may I continue?

HEARING OFFICER JOSEPH-TAYLOR: Please.

BY MR. DePAOLI:

Q. That wasn't my question. Let's assume we don't remove your argument. What numerical adjustment should be made in this case to consumptive use to account for, depending on if you look at from Boca or for the 23 percent to 33 percent drought years?

A. I'm still not following the question.

Q. Well, you've told the State Engineer that you have to make an adjustment in consumptive use because there are drought years. There are years when there's less than a full supply.

My question is in this case what adjustment needs to be made to consumptive use because of the drought years that are experienced on the Truckee River.

A. Okay, I follow you. If you look at the Floriston rate analysis I did for that entire time frame and using a CU number based on that example I went through and compute the average for every year, you come up with a value of about 2.3 acre feet per acre.

When you look at just supply limited CU. When you exclude all the other factors I mentioned.

Q. So, you took all of the -- were you using 2.9 when you came up with the 2.3?

A. Yes.

Q. And so, you took all of the full years and all the drought years and did an average?

A. Yes.

Q. And that got you to 2.3?

A. Yes.

Q. What should happen to the difference between the 2.3 and the 2.9 when it is a full supply?

A. You still need to consider the other factors in there.

Q. Leaving aside the other factors for the time being.

A. If you left aside all the other factors and you

had a full supply, in a perfect world, 100 percent application efficiency, no tributary waters, alfalfa was the only crop, then 2.9 in a full supply would be enough. It's not a natural number.

Q. And I don't want to debate with you what the number ought to be, I just want to understand you. So, you're saying this ought to be a variable number, then?

A. If you want to -- if TMWA wants to be able to store in any year, then I think we need to look at an average number.

If you agree to just store during wet years, then you can look at a number that is not supply limited, but also includes all the other factors.

Q. So, if TMWA wants to store in every year, then what happens to that difference between 2.9 and 2.3 in a full year?

A. Presumably that gets left in the river, but it cancels out in the dry years when it goes the other direction. We're dealing with an average.

Q. So that water then is just in the river for whoever can use it in the full years?

A. Yes.

Q. Mr. Mahannah, does the fact that there is less water for an alfalfa crop to consume in some years, does that mean that's going to make more water available for downstream

users in that particular year?

A. Are you talking about a drought situation?

Q. Yes.

A. Can you restate the question, please?

Q. Does the fact that in, say, 1992 there was insufficient water to provide irrigation to an alfalfa crop for what I think you said past May, or was it April?

A. In 1992 it looks like there was no ag diversions after June.

Q. So, the fact that there was not enough water to irrigate alfalfa past June, did that fact create more water for downstream users?

A. No, it was a drought year. In 1994 I can attest to personal experience the Truckee River was bone dry, the east side of the river before the treatment plant, there was zero water.

Q. How do you define, or what is your definition of water duty as that term relates to an irrigation water right?

A. Duty is, my definition is what the decree allows, three and a half, four or four and a half.

Q. The conceptual definition, do you have a conceptual definition of duty?

A. My view of it is the duty delivered at the head of the crop.

Q. Have you heard of any conceptual statement of it

as being the measure of water that by careful management and without waste is reasonably required to be applied to a given tract of land for such period of time as may be adequate to produce there from a maximum amount of crops ordinarily grown thereon?

A. That's in my mind synonymous with a headgate duty.

Q. And how do you define consumptive use?

A. I make the distinction between potential and actual, what the net, the actual consumptive use and what the crop actually uses, not what it could potentially use.

Q. The State Engineer in one of his rulings that you provided in one of the exhibits has defined consumptive use as consumptive use of a crop can be defined as that portion of the annual volume of water diverted under a water right that is transpired by growing vegetation and evaporated from soils, incorporated into products or otherwise not returned to the waters of the State.

Consumptive use does not include any water that false precipitation directly on the place of use or water loss due to inefficiencies or waste during irrigation process. Consumptive use of a crop is equal to the crop evapotranspiration less the precipitation amount that is effective for evapotranspiration by the crop.

Is that a definition that you would accept?

A. In my mind that's the definition of a net potential ET.

Q. But leaving out the other factors, it's a definition that you accept for consumptive use?

A. Which ruling will did you read that out of?

Q. 5823.

A. Is that the Dayton Valley ruling?

Q. Yes. You're familiar with that?

A. Yeah, and that again applied to groundwater transfers, not surface water.

Q. Is consumptive use part of the definition of what's included in what's taken into account in developing a water duty?

A. Yes, as well as the other factors I mentioned. You're well aware of the Newlands Project, three and a half to four and a half bench land/bottom land, that has to do with efficiency. On bench lands you get a higher duty because they're coarser textured and it requires a higher duty.

Q. So, consumptive use is one part of it and soil types is another part of water duty, right?

A. Soil type gets to application efficiency and water holding capacity and how frequently you need to irrigate.

Q. And all of those things are taken into account in

establishing a water duty?

A. Generally, yes.

Q. And depending on the nature of those other elements, water duties may and differ for various lands within a river system is; is that not correct?

A. Water duties, yes, headgate deliveries.

Q. The special master took those other factors into account, did he not, when he made his recommendation for water duties in the Orr Ditch Decree?

A. Yes. I think that's referenced in my table 1, three and a half to four and a half with an average of four.

Q. Pages 61 and 62, could you go to that? Are you there?

A. Yes.

Q. Under the heading Defendant's Irrigation Rights, Water Duty, seasonal allowance, acre feet limitation, the special master talks about factors in that first paragraph and then going into the second paragraph, does he not?

A. Yes, and I think I reference this in my rebuttal, this series of pages which talks about some of these factors which relate to application efficiency and soil type and slope, et cetera.

Q. And in taking those factors into account, he came up with different duties for different lands in the Truckee Meadows?

A. I believe so, yes.

Q. And the water rights here that are involved in this case involve a variety of different duties, do they not?

A. Yes.

Q. And that would have been because there was some determination that some of these factors were different for the lands that were getting the water rights; is that not correct?

A. Yes.

Q. You would agree, wouldn't you, that the water duties that were established by the decree are based upon what is needed to irrigate alfalfa and pasture in the Truckee Meadows?

A. Yes. As I mentioned, there's an adjustment in the decree for other types of crops that reduces that by either 67 percent or 80 percent.

Q. And that adjustment is based from what was allowed for alfalfa?

A. That's my understanding.

Q. And actually, there's an allowance for young alfalfa that's 110 percent of that, isn't there?

A. That's correct.

Q. The fact that lands have different water duties doesn't mean that a properly irrigated alfalfa crop growing on those lands with differing water duties is going to

consume more or less water than on the other land, does it?

A. No, not necessarily.

Q. There isn't anything in the Orr Ditch Decree that prevented someone who was growing potatoes to changing crops, is there?

A. No.

Q. There isn't anything in the Orr Ditch Decree that prohibited someone who was using one method of irrigation in 1913 to change to a different method of irrigation at some other time, is there?

A. No, but just observing air photos and living in the Truckee Meadows for several decades now, I don't see a huge change in improvement of irrigation efficiencies. It's not as if people have to go to low pressure center pivot sprinklers with the heads two feet off the ground.

Q. They've gone to asphalt in the Truckee Meadows?

A. Growing roof tops these days.

Q. There wasn't anything in the decree that prevented anyone from picking up rocks off of rocky pastures either.

HEARING OFFICER JOSEPH-TAYLOR: Question?

BY MR. DePAOLI:

Q. Was there?

A. No. People can pick up rocks if they desire, I suppose. I have one example, actually numerous examples of

rocky pastures where it was pretty evident and a lot of those when you look at the series of photos that not a lot of that happened. That one at the MGM or what's now at the Grand Sierra.

Q. There wasn't anything that prevented that, though, was there, from that happening?

A. No, but my whole point, we're trying to get to an actual number is what my feeling that the State Engineer should consider. Not what potentially somebody could come in and pick up rocks for love of the land and improve irrigation efficiencies.

Q. We may be trying to get to an actual number, but you're not asking the State Engineer to, for example, at the Grand Sierra, to somehow provide less water on the basis that that full water right should never have been granted by the Orr Ditch Court, are you?

A. I think it is worthy to point out that there was a number of examples I went through where it appeared there was either no irrigation or certainly not irrigation to alfalfa potential on a lot of those places of use.

HEARING OFFICER JOSEPH-TAYLOR: The question was you're not asking the State Engineer to reevaluate what was granted in the Orr Ditch Decree?

MR. MAHANNAH: No, but I think it's worthy to point out you folks recognize that when you consider these

changes when that condition has already occurred and you've already issued diversions to M and I. It's hard to go backwards on that. I think it's --

BY MR. DePAOLI:

Q. Well, it's hard to go backwards on what the Orr Ditch Decree says, isn't it?

A. Yes.

Q. When you traced the Orr Ditch on the large map that's behind you into the Spanish Springs Valley, were you including in that ditch the entire Orr Ditch system?

A. Can you restate the question? When I waste percentage was tracing it with my finger?

Q. You showed the State Engineer where the Orr Ditch was and you showed it went into Spanish Springs Valley, did you not?

A. Yes.

Q. Do you know if what you were tracing there includes the original Orr Ditch, the Orr Ditch extension and the Spanish Springs Valley ditch?

A. I believe that's the extension. I would have to check. There is another portion of the Orr Ditch, which is further to the south on the southern side of the Spanish Springs area, north side of the Truckee Meadows.

Q. You mentioned that some of the rights here that are the subject of these change applications have alternate

sources of supply. You're not suggesting that because of those alternate sources of supply the alfalfa or any other crop grown on those lands consumes less water, are you?

A. Assuming alfalfa was the crop, alfalfa doesn't necessarily care if it gets its water from the Thomas Creek or the Truckee River.

Q. In the Orr Ditch Decree those alternate sources of supply are just that, aren't they, they're alternate?

A. Alternate, supplemental supply. The decree specifically notes in those two examples this can be served by either Thomas Creek or Evans Creek. There's numerous references to waste and drain.

Q. And in all of those cases they can be served directly by the Truckee River, can they not?

A. Yes.

Q. They were allowed to get their full right from the Truckee River?

A. Potentially, what actually occurred is the issue that I feel needs to be addressed.

Q. What actually occurred? How do you know what actually occurred?

A. I don't know what actually occurred. What I'm referencing is what's in the Orr Ditch Decree, and just typically if 80 percent of the supply on C was supplied by Evans Creek, 20 percent of the CU was supplied by that and

80 percent by the Truckee River, you shouldn't allow the full CU to be credit stored upstream on the Truckee River.

Q. But if that 20 percent of the consumptive use was being supplied by -- which creeks were we on?

A. Evans.

Q. -- by Evans Creek, then that 20 percent wouldn't being supplied by the Truckee River, right?

A. Correct.

Q. And if on the other hand that 20 percent, all 100 percent was being supplied by the Truckee River, the 20 percent wouldn't be supplied by Evans Creek?

A. Yes, but your first instance is what needs to be addressed on those claims that have supplemental water supply. It's just as if the change apps the State Engineer considered were groundwater supplemental to surface water, he doesn't allow that supplemental groundwater to be stripped off as a separate source.

Q. But he would allow the primary?

A. Groundwater transfers he believe he has.

Q. And in this case, the owner of these water rights wasn't required to take their water from Evans Creek; they were entitled to take the full amount from the Truckee River, were they not?

A. Entitled, but did they actually.

Q. Well, if they weren't taking it from the Truckee

River, then there would have been more water in the Truckee River?

A. Resulting in less CU of the Truckee River, right.

Q. And if they were taking it from the Truckee River there would be more Evans Creek water that would have reached the Truckee River?

A. If that's the way the game's going to be played, then you need to exchange this Evans Creek supply, determine what the yield is and make sure that that supplemental portion makes it back to the Truckee River.

Q. And that's the Water Master's responsibility, is it not?

A. Theoretically. However, the State Engineer needs transfers considering an actual CU number, I believe he should be made aware that there was supplemental supplies besides the Truckee River on some of these claims.

Q. You don't have any information that suggests that these rights which have been, that are in that situation would have other supplies, that someone else is out there using those supplemental supplies at the present time, do you?

A. I'm sorry, restate the question.

Q. Do you have any information that someone else is out there using these supplemental supplies at this time, the supplemental supplies that went with these water rights which

have been converted once already to M and I use?

A. I know there's been some conversions of Thomas and Whites creek water.

Q. I'm talking about these specific water rights.

A. No.

Q. The wares and drain water rights, does that waste and drain water, do they still exist in the Truckee Meadows with respect to these particular water rights?

A. I guess we have to get into specifics here. There may be cases where you can still derive some waste and drain as part of your supply rather than a direct diversion.

Q. The State Engineer hasn't allowed any of these waste and drain rights to be transferred anywhere else. Has the State Engineer done that?

A. By waste and drain, I'm referring to the marks in the decree that address that, not -- I believe -- I'd have to check the decree. I think there are some others that are lined out separately as waste and drain.

Q. And I know what you're talking about. I was referring to the ones you were referring to in your report.

A. Can you restate the question regarding that issue?

Q. I think I'll just move on. Let's talk about the use of wastewater that may have been happening as referenced both in the decree and in the special master's report when

these lands were being irrigated.

The use of one farmer's wastewater by another farmer results in greater consumption of the first farmer's water, does it not?

A. Yes. That's why those limited application efficiency arguments to just the Highland, Steamboat and portion of the Orr, and there's probably other examples of other downgradient ditches where one wouldn't benefit from that return flow from upgradient farms and ditches.

Q. You're not saying, though, that there are no wastewater rights on the Steamboat Ditch, are you? Let me rephrase it. I don't mean to get back to that other one that you and I were talking about before.

You're not saying that there are no allowances in claims under the Steamboat ditch for waste and drain water, correct?

A. No, subject to looking through all the claims. You have the head of the ditch and there are situations where there can be probably some return flows from lands downgradient of the ditch from lands that are further downgradient.

Q. And that is the case also on the Highland, is it not?

A. Yeah, although there's similar examples at the Hogan Ditch, this D. I didn't mention that, but that's

probably a situation where there's no upgradient ditches.

Q. No upgradient ditches, but there could be lands on those ditches that receive water from upgradient lands on the same ditches?

A. Not in this particular case, this is Mogul. There's too high of mountains there.

Q. But on the Highland Ditch?

A. Yes. You could also extend that argument to all the other ditches on a case-by-case basis, depending on where they lie in the system, et cetera.

HEARING OFFICER JOSEPH-TAYLOR: Mr. DePaoli, I need to give the court reporter a break. Are you at a good breaking point?

MR. DePAOLI: Literally or figuratively? I think a break is a good thing.

HEARING OFFICER JOSEPH-TAYLOR: We'll be off the record for ten minutes.

(A short recess was taken.)

HEARING OFFICER JOSEPH-TAYLOR: Let's be on the record. Mr. DePaoli.

BY MR. DePAOLI:

Q. I will note for the record that Mr. Mackedon had I believe a city counsel meeting that he had to leave for and I excused him.

///

BY MR. DePAOLI:

Q. Mr. Mahannah, are you familiar with the concept of irrigation scheduling as it relates to alfalfa?

A. Yes.

Q. Could you describe that?

A. General sense of timing, your irrigations, to irrigate when you -- you need to know your availability water holding capacity of your soil profile and the depth and demand or potential number, and those factors come into play with how frequently you irrigate.

For example, on a sandy soil that has, say, an inch per foot of water holding capacity available, you generally try and irrigate when you depleted or less than 50 percent of the available water holding capacity.

Q. And do you try to schedule that irrigation before the plant shows any stress from a lack of water?

A. Yeah, if you want to maximize your yield you do.

Q. You would do that?

A. The available water holding capacity is defined as between 15 bars and the third bar of field capacity versus permanent wilting point.

Q. In terms of you have attached to your Exhibit 2226, tab 6, a 1919 bulletin from the University of Nevada, and on page 21 which I think you referred to on one of your -- let's see if I can find it.

Yes, it's on slide 19, you say in that report the most economical use of water and highest yield for the following crops was the amount of applied water shown in that slide and for alfalfa it was three and a half acre feet per acre. Do you recall that?

A. Yes.

Q. And actually, that amount of applied water was not the amount of applied water that produced the highest tonnage, was it?

A. Subject to review and it's been a bit since I read this in its entirety, I believe some of those statements came from the summary portion of the document.

Q. Did you look at page 21?

A. Okay, I'm at 21.

Q. And the very last line on page 21, carried over to the next page, would you read that?

A. I've read it, yes.

Q. Could you read that aloud, please?

A. Okay. I'm going to actually read it at the start of the paragraph. It stays, "Most economical depth of irrigation. The most economical use of --

HEARING OFFICER JOSEPH-TAYLOR: Whoa, whoa, whoa, where are you, Mr. Mahannah?

MR. MAHANNAH: Page 221, the last paragraph.

HEARING OFFICER JOSEPH-TAYLOR: Oh, you're

reading the heading, okay.

MR. MAHANNAH: "The most economic use of water with alfalfa is accomplished with the total irrigation of 3.5 feet applied when the plant showed need of water by dark green color of foliage producing 5.59 tons per acre or at the rate of 1.67 tons per acre foot of water.

"The use on this plot was equivalent during the period of irrigation to delivery of water at a rate of one second foot for 85 acres or .47 miner's per acre. The greatest total irrigation of 81 inches," and I just did the math, it was 6.75 feet, "Of water was accomplished by the highest yield of 6.1 tons of alfalfa per acre and the lowest yield of 1.03 tons per acre foot of water.

"Compared with a yield of 5.59 tons per acre, the increase of .6 tons was obtained at the expense of an additional use of 39 inches of water which was the rate of .1 ton per acre foot, the lowest total irrigation of 22 inches gave the highest yield of 2.23 tons per acre foot of water, but the lowest yield of 4.08 tons per acre."

BY MR. DePAOLI:

Q. So, in reading that, the crop that had the three and a half acre feet per acre, that water was not applied until the plants were showing a need of water, was it not?

A. Yeah. It appeared that there was some level of stress. It doesn't indicate obviously whether they were at a

permanent wilting point.

Q. But there was some level of stress by the time that water as applied?

A. Yes.

Q. And under irrigation scheduling methods available today, if the water were applied before the plant showed stress, you could have gotten more tonnage with additional water, could you not? Not necessarily the 6.75 feet that you concluded, but somewhere in between there?

A. Well, without knowing exactly how they did this, it may have showed stress because they waited too long in between irrigations. It doesn't necessarily directly deal with the amount of applied water.

Q. If they waited too long in between irrigations, they might have had more irrigations, would they not?

A. State that again, please.

Q. If you wait too long between irrigations, potentially there will be less irrigations?

A. Yes.

Q. So that if you irrigated at the right time, you may apply more water than the three and a half acre feet here and get greater tonnage?

A. That's a possibility, but we're talking 6.75 acre feet.

Q. Somewhere in between the 6.5 acre feet. You

wouldn't necessarily need to go up to 6.5 acre feet to get more tonnage on the alfalfa that used the 3.5, but if it showed visible plant stress by the time the water as was applied, would you?

A. To adequately address your question there, I would need to know the specifics of this soil type, more detail than what's stated in this paragraph. I would agree if you want to maximize your yield, you want to minimize the stress on the crop.

Q. In terms of what you did hear for these water rights, did you make any kind of numeric adjustment to whatever consumptive use number you were using for irrigation based on the crop variation?

A. The different types of crops?

Q. Yes.

A. Yeah, I looked at some different percentages of crops and applied the reductions in the decree.

Q. And how did you do that as far as these particular lands?

A. Well, I didn't attempt to do planimeter plane tables and come up with exhibit numbers. I assumed some ranges and percentages of different types of crops.

Q. And is that material in your report somewhere?

A. Not directly.

Q. So, can you tell us what sort of a -- what did

you start with and then how did you adjust it because of potatoes, for example?

A. Well, I ranged the duty reduction between .67 and .8 based on what's in the decree.

Q. Can you explain that to me? I'm not following.

A. Well, the decree for grain --

Q. Oh, okay. I understand that. Grain is two-thirds?

A. And the other crops were 80 percent. So, I looked at a high and low range of all of the factors that I described in my direct.

Q. And what was the high range?

A. The high range was assuming a full supply. It assumed on just those two claims where they reference tributary supply, I assumed ten percent of that supply was supplied by tributary waters with either Thomas or Evans.

Q. I don't mean to interrupt you. I'm asking you about crop variation, not supply variations.

A. The range there I considered on the high end 90 percent alfalfa, on the low end seven percent alfalfa, the difference being other crops.

Q. So, on the high end for 90 percent alfalfa, what was the number you came up with?

A. Well, I applied the high and low range to all of these factors and made some computations.

Q. So, is there --

HEARING OFFICER JOSEPH-TAYLOR: You're losing me where you're trying to go, Mr. DePaoli.

MR. DePAOLI: I'll trying to figure out how he adjusted whatever he came up with for a maximum consumptive use based upon the fact that there may have been a different crop other than alfalfa being grown.

He says you have to make an adjustment because in 1913 some of these lands showed they were in a grain crop. I'm trying to understand what adjustments he made.

HEARING OFFICER JOSEPH-TAYLOR: Okay.

MR. MAHANNAH: Just as the detail showed, a lot of these were rocky pastures and brush as well. I believe I answered your question where on the range between the low and the high, the high end 90 percent alfalfa crop, the low range, 70 percent other crops, and I ranged the duty reduction between .8 and .67.

BY MR. DePAOLI:

Q. What number did you use for consumptive use for alfalfa?

A. Under a supply limited or not supply limited?

Q. No supply limited.

A. No supply limited, 2.9.

Q. And then you assumed that it was, with the 90 percent for alfalfa, then, what did you do with that

number?

A. I factored in all of these, the ranges for the set of applications that we have before us and came up with a range.

Q. What was the range?

A. Between 1.6 and 2.6 acre feet per acre.

Q. And how did you get to just two?

A. I assumed a potential or an ET, a net CU number or a CU number of 2.63, which I arrived at by the overall average in my Farad flow analysis where I went through that examination where I used your applicant's net CU number, added four inches of available supply in the soil profile to come up with a 2.63, roughly.

I assumed 80 percent of the crop is alfalfa, 20 percent having other types of crops, for the other types of crops I only applied an 80 percent factor, not a 67 percent. For the claims that just involve the Highland, or and Steamboat, I assume the upper range of an application efficiency of 55 percent, a headgate duty of four.

Combining all of those factors, I came up with 2.1. That does not include some of the other issues I addressed, riparian issues, supplemental groundwater supplying CU, et cetera.

Q. With respect to 2211 to 2216, are you familiar with the wildlife permits where consumptive use was limited

to 2.5?

A. Yes.

Q. Is that, do you know how the State Engineer came up with the 2.5?

A. I do not specifically, no.

Q. Do you think that is a number that should be applied consistently to the Truckee river water right?

A. Well, I went to another scenario where I assumed a full supply, and came up with a number pretty close to 2 2.5, 2.46. So, 2.5 is probably a reasonable number if you only store it in full water supply years, i.e., Floriston rates met the entire season.

Q. And in years where there's less supplier of you think there should be less stored?

A. Yes, unless, if you want to do it on a year-by-year basis, that's an option. My understanding from the pre-hearing conference, the State Engineer doesn't want to come back here year in and year out to decide that, nor probably does the Water Master. They would like a number.

Q. The problem that you have with years of less full supply is somebody getting ahead of the game in the sense of getting their water in storage before it's known that the supply is not going to be full; isn't that the problem you have with that?

A. Yeah, there's always uncertainty in forecasting.

Q. In your report where you indicate that the storage should be limited to mass historical consumptive use pattern during the growing season from April through October, does that work similarly to what you said on the consumptive use for the M and I return flow?

In other words, would you take what the crop would consume in April and whatever that amount, percentage of that amount was to whatever the consumptive use number allowed turned out to be, that's how much should be stored in April?

A. Yes. And I've made that computation based on the applicant's data.

Q. And using what our data showed for consumptive use in those months?

A. Yes.

Q. And the timing of that storage, then, would again be mostly in the June, July, August, September time frame, would it not?

A. Yes. I think I stated earlier, the maximum percentage would be in July when you have the peak ET, and that was only 15 percent, it wasn't 25 percent.

Q. And your report also talks about should be limited to the decree allowance, not to exceed 25 percent per month. Are you giving a different interpretation under this scenario than you gave under the effluent interpretation?

A. I think I -- maybe it wasn't clear. I attempted to clarify what was on that last slide.

Based on a reading of how the Orr Ditch Decree addresses that and to protect historical return flows, the storage should be matched, if we're going to use, if the basis is going to be an ag CU basis which should be stored in the same percentages as it was consumed.

Q. The 25 percent shouldn't apply to these, then, to these change applications?

A. I don't believe so, because that again references irrigation. We're not talking about irrigation, we're talking about storing a consumptive use amount. In other words, if you apply 25 percent of your water in April, the crop is not consuming 25 percent of it in April, nor is it in July.

Q. But the decree allowed irrigators to use up to 25 percent of their water in any month?

A. To divert it.

Q. To divert it.

A. For irrigation.

Q. Yes.

A. Correct.

Q. Then I think it gets the last sentence of your report, you say it would harm existing rights to allow 25 percent per month of the consumptive use to be stored

during November, March when historically the crops would be dormant and not consuming water. Do you see that?

MR. VAN ZANDT: Referring to 2226?

MR. DePAOLI: Yes. I'm sorry.

MR. MAHANNAH: Yes. I believe that was the exact example I gave in April.

BY MR. DePAOLI:

Q. If the crops in the Truckee Meadows were dormant during that period of time, would others be irrigating during that period of time downstream?

MR. VAN ZANDT: I'm sorry, which period of time are we talking about?

MR. DePAOLI: November to March.

MR. MAHANNAH: Would they be irrigator?

BY MR. DePAOLI:

Q. Is it likely that other downstream irrigators would be irrigating in that time frame when crops are dormant in the Truckee Meadows?

A. Not likely, no.

Q. So, how would their rights be harmed if there was storage taken during that time frame?

A. You'd be storing water when Lahontan is being filled.

Q. So, that concern relates to diversion of Truckee River water for storage in Lahontan Reservoir?

A. Yes, and to a small degree to the supply for the Truckee Division.

Q. For stockwater?

A. For stockwater, and there's been times certainly when that's even be an issue.

Q. Is there any situation with these change applications where even if reduced Floriston rates were being met, that the Water Authority would be storing all of that water?

A. I don't know that I can answer that question.

Q. Have you computed what the flow rate would be for these water rights if they were approved at 2.9 for the consumptive use piece, how much that flow rate would be to accomplish that storage?

A. Over what time frame?

Q. For a 4th of it in one month.

A. About 27 cfs.

Q. The consumptive use piece?

A. Yes.

Q. At 2.9 or what number?

A. No, that was the 50 percent number.

Q. Your number?

A. Yes.

Q. You can leave it at that for the purposes of this question. So, at that number, 27, would leave quite a lot of

water in the Floriston rate flow going downstream, would it not?

MR. VAN ZANDT: Calls for speculation.

HEARING OFFICER JOSEPH-TAYLOR: Overruled.

MR. MAHANNAH: Leave a lot of water? You'd be storing that.

BY MR. DePAOLI:

Q. We'd be storing 27 and the rest would be coming downstream, would it not?

A. Presumably, that's what's been indicated in Mr. Mahin's testimony, I believe.

Q. So, if the rates were at 400, there would be 373 second feet coming downstream during that one month?

MR. VAN ZANDT: I'm going to object, that's misleading.

HEARING OFFICER JOSEPH-TAYLOR: I don't see it, Mr. Van Zandt. Overruled.

MR. VAN ZANDT: He's talking about water that's getting down to the downstream users and if you've got four at Farad and you take out 27, there's no way you're going to see 373 passing Vista. It's not going to happen. That's misleading.

MR. DePAOLI: I'll rephrase it.

BY MR. DePAOLI:

Q. Based on your experience during this time of the

year that we're talking about --

A. And this time of year?

Q. November to March. -- there would be sufficient water to make any stockwater requirements in the Truckee Canal, would there not?

A. Generally, yes.

Q. And if OCAP was not allowing diversions to Lahontan Reservoir, there would be no problem with that portion of claim number 3 either, would there?

A. Yes, but when the historical depletion occurred during the summer period and those return flows have occurred during the summer, there is also diversion to the Truckee Division, depending on the status of the water year and OCAP's storage targets. It could also be water carried over to Lahontan Reservoir.

HEARING OFFICER JOSEPH-TAYLOR: Mr. DePaoli, are you going to be able to finish in 15 minutes?

MR. DePAOLI: Yes.

HEARING OFFICER JOSEPH-TAYLOR: People are getting weary. I have to break it somewhere. I can't just keep torturing Chris here for eight hours.

BY MR. DePAOLI:

Q. Going back to your answer, in this time frame if there is no irrigation, that would be sufficient water to meet the stockwater?

A. Yes, I believe I answered that.

Q. Okay. Mr. Van Zandt, I was going to let your redirect be tomorrow. Did you want to try to finish today?

MR. VAN ZANDT: No.

HEARING OFFICER JOSEPH-TAYLOR: Are you okay with that, Mr. Mahannah?

MR. MAHANNAH: Do I have a wear a suit tomorrow?

HEARING OFFICER JOSEPH-TAYLOR: I know it's been a very long day for you. I hate to not finish you today.

MR. DePAOLI: I think that's all I have.

HEARING OFFICER JOSEPH-TAYLOR: The State Engineer said if we have to wear a suit, so do you.

HEARING OFFICER JOSEPH-TAYLOR: I don't think we need to start earlier tomorrow, do you, Mr. Van Zandt?

MR. VAN ZANDT: No, the next witness will be fairly short.

HEARING OFFICER JOSEPH-TAYLOR: How long do you anticipate on redirect?

MR. VAN ZANDT: Ten minutes, 15 minutes.

HEARING OFFICER JOSEPH-TAYLOR: Do you want to do it now? I think Chris would probably prefer that.

MR. MAHANNAH: Yes.

REDIRECT EXAMINATION

BY MR. VAN ZANDT:

Q. Mr. Mahannah, very quickly, in tab 2 of

Exhibit 2226, page nine information, Mr. DePaoli was pointing you to the irrigation season and some --

A. On page 94?

Q. 94.

A. Okay.

Q. I think you actually read part of that second paragraph, the first full paragraph, but it's the second one on the page there. If you look down about halfway in that paragraph, it says the instances in which the use of water for irrigation so early or so late may be rare?

A. Yes.

Q. So, would it be fair to say that when we're talking about these elongated irrigation seasons, the special master had some conclusions with regard to how often they would occur?

A. Yes. It states they would be rare.

Q. And Mr. DePaoli was asking you about how many farms existed in the Truckee Meadows and I think he was kind of hinting that there weren't many farms left, but what would have happened to the water from all those farms starting back in, say, 1955, you looked at the time period 1955 through 2003 for these applications?

What happened to the water from those farms?

A. Based on these applications, some of them were being converted to M and I, a lot of those were being used.

A lot of these, probably half or so have certificated rights on them. There's many that may not have been used.

Q. Mr. DePaoli also asked you if you need to adjust the consumptive use number when you have less than a full water supply. My question is who defines -- well, who was in the class of people who have a full water supply, if you're answering that question? Is it limited to the Truckee Meadows Water Authority customers or does it mean somebody else?

A. I think the context was somebody else, the irrigator. I'm not sure I follow your question.

Q. Well, my question is he seemed to be limiting the question to full water supply in the Truckee Meadows. My question is there are other water right owners on the Truckee River who are also looking to get a full water supply, are they not?

A. Would not get a full water supply.

Q. And they should be factored into consideration for the State Engineer, shouldn't they?

A. Sure.

Q. Mr. DePaoli asked about the TMWA storing the consumptive use number that they have come up with, this ideal number in drought years. If they did that, if they took the 2.9 out in those drought years, what would be the impact on the water in the Truckee River system, especially

for other users?

A. If they're taking out more than what was historically consumed, there would be a further depletion. We would potentially have more years similar to 1992, 1994.

Q. Under that scenario, the Truckee Meadows Water Authority would get a larger share than the other downstream users?

A. I'm not sure I follow that question.

Q. Well, in this drought situation, what I'm asking is if they take out their full 2.9, store it upstream and we have the shortage for all the rest of the water users, what is the impact on them?

A. I guess the answer to that depends on how they release that stored water for drought protection and the return of that through the treatment plant, how that's handled by TMWA or TROA or the Water Master.

Q. Well, wouldn't it be fair to say that that water being removed from the system and the short water supply in the system, that those downstream users are going to have even less water available?

A. If they store a potential?

Q. Yes.

A. Yes.

Q. Now, Mr. DePaoli asked you about this supplemental supply, and I think you gave the example of

Evans Creek and the possibility that 20 percent of that may be supplied out of Evans Creek. My question is if you're taking the full water duty out of the Truckee River, can you also take the additional 20 percent out of Evans Creek?

A. No.

Q. So, it's not possible to have 120 percent water supply, right?

A. If the Water Master is doing his job he should deliver what the decree allows.

Q. So, in the situation where the supplemental water supply is supplying water for irrigation to these farms along these ditches, there should be a corresponding reduction in the amount of water that you should divert from the Truckee River, right?

A. Yes.

Q. What would be the impact on the CU calculation if you went to, say, 80 percent of your water duty coming from the Truckee River as opposed to 100 percent?

A. That be would be Truckee River delivery of 3.2.8 from the tributary supply.

Q. Would you look at tab 2 again, page 71. Mr. DePaoli was asking you about the calculations of consumptive use as a part of the water duty calculations under the Orr Ditch Decree. Do you recall that?

A. Yes.

Q. There's a reference here on page 71 on a calculation based on a study that was done in the Reno Valley by the Agricultural Experience Station at the University of Nevada. Do you see that?

A. Yes. This was a testimony I referenced in my rebuttal on application efficiencies.

Q. Have you done a calculation of what the consumptive use portion of the water duty listed here is?

A. Yes. They state -- let me read the entire paragraph for the record. "One of the principal expert witnesses for the defendants who has practical experience when young on a farm in the Reno Valley who has given extended study as director of the ag experiment station at UNR and has written a booklet of historical detailing in consideration of additions and requirements in the Truckee Valley estimated that the average duty or use of water in this Valley is 3.184 vertical feet.

"That such applied quantity to 25.85 vertical inches or 67.6 percent is lost by evaporation and transpiration, 1.72 inches or four and a half percent is lost by evaporation from slough and water surfaces, 7.49 vertical inches or 19.6 percent returns to the river as retarded seepage and 3.14 vertical inches or 8.2 percent is returned as wastewater."

So, the 25.85 vertical inches of evaporation and

transpiration that they've noted here equates to a consumptive use of 2.15.

MR. VAN ZANDT: Thank you. No further questions.

HEARING OFFICER JOSEPH-TAYLOR: Thank you, Mr. Van Zandt. Any recross, Mr. DePaoli?

RECROSS-EXAMINATION

BY MR. DePAOLI:

Q. Mr. Van Zandt asked you about taking 20 percent of the supply out of Evans Creek and 80 percent out of the Truckee River. Do you recall that?

A. Yes.

Q. And you also made it clear that you can't get 120 percent. So in that situation where 80 percent is coming out of the river and 20 percent is coming out of Evans Creek, if you decided to take -- if you took 100 percent out of the river and none out of Evans Creek, the river wouldn't be any different below wherever Evans Creek returns or enters the river, would it?

A. No, but that assumption requires that you guarantee that that water makes it to the river --

Q. And you think you --

A. -- through some sort of an exchange, which I don't see that in your applications or the evidence that's been put forward, that that's been addressed, how they would handle that or if it was even contemplated.

Q. Didn't you say that it was the Water Master's job to make sure that 120 percent is not taken?

A. Yes.

Q. Wouldn't it be the Water Master's jobs to ensure that if 120 percent was coming out of the river, that none of it came out of Evans Creek?

A. I think the decree allows for irrigation on that one out of Evans Creek, so the Water Master could allow diversion out of Evans Creek to serve that.

Q. At the same time as the parties taking 100 percent to serve the same claim out of the Truckee River?

A. No.

Q. That was my question.

A. Okay.

Q. In terms of the tab 2, page 71, we don't know what year this particular study was done that created the 3.184 vertical feet and the 7.6 percent loss by the evaporation and transpiration, do we?

A. No, and we actually went to the Federal Courthouse to try and dig through to find that bulletin and I was not able to get more detail. Unfortunately, there wasn't a reference or the expert witness wasn't named.

Q. Do we know what crop was grown for that experiment?

A. No. It was done at the ag experiment station and

most of what they did their trails on was alfalfa. It's not specifically stated in this paragraph.

Q. And that experiment would have been done sometime before this report was written, would it not, sometime before 1925?

A. Yes.

MR. DePAOLI: No further questions.

HEARING OFFICER JOSEPH-TAYLOR: Ten seconds to five, Mr. DePaoli. Very well done. Questions from staff?

EXAMINATION

BY MR. KING:

Q. Since there's ten seconds left, I'm not sure there's a question out there that hasn't been asked. I understand your testimony on these applications. It's your testimony that you believe the consumptive use should be based on the municipal use. If it's not, then I believe it's your testimony, is it not, that you look at the historical consumptive use of the crop?

A. Correct.

Q. So, my question is really general. So, are you advocating that as we move again into the future, all change applications that come before the State Engineer we should require some kind of a consumptive use profile on a previous manner of use in order to know how much to change? Are you advocating that?

A. Are you talking about statewide or just on the Truckee River?

Q. Statewide. You brought up Colorado for an example.

A. Yeah. Well, I think there can be a distinction made between a groundwater transfer and a surface water which is a lot more, has a lot more variability in supply, whereas an irrigator on a groundwater right theoretically has control, he can go turn his pump on.

A lot of it is sprinkler irrigated, much higher efficiencies, and can come closer to that potential number than in a surface water situation and all of the circumstances in the Truckee Meadows.

So, it's a challenging question. I believe particularly in this case, an actual number needs to be looked at.

MR. KING: Thank you.

HEARING OFFICER JOSEPH-TAYLOR: Any questions, Mr. Felling?

MR. FELLING: No.

HEARING OFFICER JOSEPH-TAYLOR: Mr. Taylor?

STATE ENGINEER TAYLOR: No.

HEARING OFFICER JOSEPH-TAYLOR: I know it was a long day, Mr. Mahannah, but thank you. You may be excused. We'll be in recess until nine o'clock tomorrow morning.

You've got one more witness Mr. Van Zandt, and about how much time?

MR. VAN ZANDT: Probably an hour on direct, maybe less.

HEARING OFFICER JOSEPH-TAYLOR: You'll be prepared to go with your first witness like 10, 10:30?

MR. DePAOLI: Yes.

HEARING OFFICER JOSEPH-TAYLOR: We'll be off the record. Thank you, gentlemen.

(The proceedings recessed at 5:03 p.m.)

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 15th 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 184 through 345, 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

MARY E. CAMERON
Nevada CCR #98