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Trial Transcript, Vol. 81, Morning Session

Frontier Reporting Service

File 188
No. 4439
Box 12

case # 4993

File # 188

4439

IN THE DISTRICT COURT FOR THE FIFTH JUDICIAL DISTRICT

WASHAKIE COUNTY, STATE OF WYOMING

IN RE:	)
THE GENERAL ADJUDICATION OF ALL RIGHTS TO USE WATER IN THE BIG HORN RIVER SYSTEM AND ALL OTHER SOURCES, STATE OF WYOMING.	) Civil No. 4993

FILED 6/23 1981

Margaret V. Hampton CLERK

DEPUTY

VOLUME 81

BE IT REMEMBERED that on this 18th day of June, 1981, at the Senate Chambers, State Capitol Building, Cheyenne, Laramie County, Wyoming, the above-entitled matter resumed for trial before the Honorable Teno Roncalio, Special Master Presiding, whereupon the following proceedings were had, to wit:

P R O C E E D I N G S :

ORIGINAL

APPEARANCES

FOR THE STATE OF WYOMING:	HALL & EVANS 2900 Energy Center Building 717 17th Street Denver, CO 80202 BY: MR. MICHAEL D. WHITE, Special Assistant Attorney General and MR. SCOTT KROB
FOR THE UNITED STATES OF AMERICA:	MR. JAMES CLEAR Attorney at Law Land and Natural Resources Division Department of Justice P.O. Box 7415 Benjamin Franklin Station Washington, DC 20044 and MR. THOMAS ECHOHAWK Attorney at Law Land and Natural Resources Division Department of Justice 1961 Stout Street Denver, CO 80294
FOR THE SHOSHONE and ARAPAHOE TRIBES:	SONOSKY, CHAMBERS & SACHSE 200 M. Street, N.W. Washington, DC 20006 BY: MR. WILLIAM PERRY and DRAY, MADISON & THOMSON 204 East 22nd Street Cheyenne, WY 82001 BY: MR. WILLIAM THOMSON
FOR THE PRIVATE WATER HOLDERS:	MR. JEFFREY DONNELL Attorney at Law P.O. Box 552 Worland, WY 82401

APPEARANCES (CONTINUED)

CLERK TO THE
SPECIAL MASTER:

MR. LEO SALAZAR
Attorney at Law
701 Rocky Mountain Plaza
Cheyenne, WY 82001

THE SPECIAL MASTER: We will come to order, please. Will you quit that fighting? All right.

We have Mr. Keene to complete direct and introduction of exhibits and then some cross.

MR. CLEAR: We have --

MR. DONNELL: I would like to get my appearance on the record.

THE SPECIAL MASTER: Please do.

MR. DONNELL: I'm Jeff Donnell for various private clients.

THE SPECIAL MASTER: Mr. Clear.

MR. CLEAR: Your Honor, I was reading the transcript from Mr. Keene's testimony yesterday, and I did find an error on Page 7106 on line 13. We are talking about the South Fork Owl Creek gauge, and it says, "Period of record of April and May of 1942," and that should be 1932, as is clear from the context of the transcript and from Mr. Keene's report where the period of record was set out.

THE SPECIAL MASTER: Okay, it will be noted.

MR. CLEAR: Your Honor, I also have an offer of proof. On Tuesday morning I asked Mr. Keene whether the low flow figures that were in Mr. Vogel's report were the low flow figures he gave Mr. Vogel. Mr. White objected, and the objection was sustained. I want to make a short offer of proof, and that is if Mr. Keene were allowed to

testify as to the area of the low flows in the Big Wind River between the East Fork of the Wind River and the Dinwoody Creek, that he would testify that the low flows used by Mr. Vogel were preliminary low flows given to him by Mr. Keene; that Mr. Keene revised those low flow figures, and apparently sent them to Mr. Vogel too late or somehow forgot to mail them to Mr. Vogel, and those -- so Mr. Keene revised those low flow figures and Mr. Vogel did not use them. Now, I can read the changes of Mr. Keene into the record or merely supply a copy of the changes to Mr. White and the Court.

THE SPECIAL MASTER: Why don't you supply a copy of them to Mr. White and to us.

MR. CLEAR: Fine, Your Honor. That will do.

THE SPECIAL MASTER: The distance between the East Fork of the Wind and the Dinwoody cutoff isn't but what, five miles or so at the most?

MR. CLEAR: Your Honor, I'm still at quite a disadvantage in this case, as everyone knows a lot more about these geographical layouts than I do.

THE SPECIAL MASTER: All right, thank you.

DIRECT EXAMINATION (RESUMED)

BY MR. CLEAR:

Q Mr. Keene, I refer you to the natural flow study report

keene-direct-clear

which has been marked as United States Exhibit WRIR C-301. Are there any corrections you wish to make in that report?

A Yes, there are.

Q Could you describe what those are?

A I would like you to turn to Page 9 of the report, please, for the station named South Fork Owl Creek near Anchor.

Q It is the second station?

A That is correct. The drainage area in square miles should read 85.5 instead of 87.

Q Is that 85.5 figure reflected in other places of your report?

A Yes, it is. I reference you to Page 27 of the same report. For the same station it is reported at 85.5.

Q Is there any other changes you would like to make to that report?

A Yes, there is another one.

Q All right. Would you tell us what that change is?

A On Page 25 --

Q That's Table 7?

A Table 7. For additional Study Site No. 16, North Fork Sage Creek, I had reported that flows were not quantified at this particular point, and in communication with Mr. Billstein there was a need for flow quantification, and those have been quantified, and I can read those into the

record if the Court desires.

THE SPECIAL MASTER: Okay.

Q (By Mr. Clear) Could you tell us what you reported to Mr. Billstein with respect to the North Fork of Sage Creek?

A I reported the average annual flow in acre-feet, as well as the monthly distribution of that average annual flow.

Q Could you give us those figures, please?

A The average annual flow is 6,510.

Q All right. Could you give us the monthly flows?

A Starting with the month of October, 228.

Q Acre-feet?

A Acre-feet. November, 130.

THE SPECIAL MASTER: Pardon me, does that low flow rate appear anyplace else in your report?

THE WITNESS: No, it's stated in the report this information was given to Mr. Billstein.

THE SPECIAL MASTER: Is it necessary it be put in the record, then?

MR. CLEAR: It is information he gave to Mr. Billstein.

THE SPECIAL MASTER: All right. Go ahead.

THE WITNESS: Starting with November again, 130 acre-feet; December, 98 acre-feet; January, 65 acre-feet; February, 65 acre-feet; March, 98 acre-feet; April, 195 acre-feet; May, 1,107 acre-feet; June, 2,474 acre-feet;

July, 1,172 acre-feet; August, 553 acre-feet;

September, 326 acre-feet.

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THE SPECIAL MASTER: Mr. Clear, would you make sure that the official copy of U. S. Exhibit WRIR C-301 will carry the change on Item 16 he just made? I'm noting it on my own copy that he breaks this down into monthly figures in the record as of this morning.

MR. CLEAR: Perhaps we could just have him during a break write in --

THE SPECIAL MASTER: If you will see that Mr. White approves it, that will be fine.

MR. WHITE: That will be fine, Your Honor.

MR. CLEAR: Your Honor, before I move all of the exhibits into evidence, I would apologize to Mr. White. Exhibit 302, which is the computer printout and the supplement to the report, you remember we had a little tiff about whether that information had been provided.

THE SPECIAL MASTER: But this is Thursday morning. It's five days.

MR. CLEAR: But I want to set the record straight that I was incorrect. The information that was in that report --

THE SPECIAL MASTER: Was not in that group?

MR. CLEAR: Some of it was, and Mr. White was correct.

THE SPECIAL MASTER: If that's the worst mistake --

MR. WHITE: I would like to say at this time that

I certainly appreciate that kind of cooperation and candor from the United States. We will try to match that.

It's a very high standard, and it's the kind of integrity from counsel that makes trying one of these lawsuits a pleasure.

THE SPECIAL MASTER: Well, I'm grateful to you for these remarks, and I'm sure Mr. Clear is.

We must come to an end, and we are drawing to an end, and that kind of cooperation -- We have just got to get this case submitted, November, December at the latest, and a report out by open draft form by April - May, some hearings on the draft report, and get it out of the way by next year.

All right. Mr. Clear, you are going to make your offer?

MR. CLEAR: Yes, Your Honor. At this time I would like to move into evidence United States Exhibit WRIR C-296, which is entitled, "Natural Flow Study Groups", which is -- that is the outline used as a testimonial aide by Mr. Keene, and I move that for illustrative purposes only.

MR. WHITE: No objection, Your Honor.

THE SPECIAL MASTER: Take them one at a time that way? Go ahead.

MR. CLEAR: Exhibit 297, "Stream Gauge Map, Wind River Basin", which shows the location of the gauges and lists them on the side of the map, on the index, I move that into evidence for illustrative purposes only.

MR. WHITE: No objection, Your Honor.

THE SPECIAL MASTER: Okay.

MR. CLEAR: Exhibit 298, the additional study map, which shows the B study areas.

THE SPECIAL MASTER: Non-gauging?

MR. CLEAR: Non-gauged, and I believe has an index on there as to the sites. I move that into evidence for illustrative purposes only.

MR. WHITE: No objection, Your Honor.

MR. CLEAR: Exhibit 299, the Surface Water Flow Chart, Historic Flows, Wind River Basin, which is a schematic --

THE SPECIAL MASTER: Okay.

MR. CLEAR: -- for illustrative purposes only.

MR. WHITE: No objection, Your Honor.

MR. CLEAR: Exhibit 300, the Surface Water Flow Charts, Natural Flows, which is a similar map to the Historic Flow Chart, 299, I move that into evidence for illustrative purposes only.

MR. WHITE: No objection, Your Honor.

THE SPECIAL MASTER: Okay.

MR. CLEAR: Exhibit 301, the Natural Flow Study Report, I move that into evidence as a summary of Mr. Keene's testimony and as containing some of the conclusions he reached in his natural flow studies, and that's the purpose for that.

MR. WHITE: Let me make sure I understand. The purpose is to illustrate his conclusions?

MR. CLEAR: It sets out his conclusions in detail.

MR. WHITE: I would like to reserve the opportunity to voir dire that and combine that with cross-examination for the sake of time, Your Honor.

THE SPECIAL MASTER: All right.

MR. CLEAR: Fine. Exhibit 302, which is the supplement to the report, which is a computer printout showing the month-by-month natural flows for the base period of the A sites and, I believe, the B.2 sites, I move that into evidence to show the conclusions reached by Mr. Keene with respect to those sites and demonstrate the --

THE SPECIAL MASTER: I have one question on this. I'm not clear what the definition is of a synthetic stream flow as it's related to historic or natural. May I ask --

THE WITNESS: A synthetic stream flow was one

that was reconstituted or filled in because a historic stream flow record was not available for that particular month.

THE SPECIAL MASTER: So you just compute return flow from return canals and such things and try to come up with a historic flow figure?

THE WITNESS: No, sir, that is part of the statistical analysis that I was going to describe using several forms of equation and having no information at one gauge and correlating with another one. I fill it in using hydrologic characteristics in that particular statistical equation so that is combined with my historic flows and only apply for those that have any historic measure record.

THE SPECIAL MASTER: But return flows were considered in all of your evidence when you used figures that you termed historic flow?

THE WITNESS: Yes, sir.

THE SPECIAL MASTER: Okay.

MR. CLEAR: 302 shows the conclusions reached with respect to the natural flows in the A.1 sites and B.2 sites, I believe, and transmitted to Mr. Billstein.

MR. WHITE: Your Honor, could I reserve my objection and combine voir dire with cross?

THE SPECIAL MASTER: All right.

MR. CLEAR: That concludes my direct examination of Mr. Keene.

THE SPECIAL MASTER: All right. Why don't you proceed with your voir dire --

MR. CLEAR: Should we let up to 300, those exhibits in, Your Honor, so I can --

MR. WHITE: We have no objection to that, Your Honor.

THE SPECIAL MASTER: All right. Exhibits C-296, 297, 298, 299, and 300, being the same and are hereby entered into evidence for the purpose offered.

THE SPECIAL MASTER: Mr. White, you can proceed with cross-examination on the exhibits.

MR. WHITE: Could I combine that cross-examination with voir dire to shorten the time?

THE SPECIAL MASTER: Sure.

* * * * *

CROSS-EXAMINATION

BY MR. WHITE:

Q Mr. Keene, during your direct examination you testified that you gave various figures that you developed to Ron Billstein for purposes of his study. Are any of the values which you gave to Mr. Billstein not included in the exhibits which have been tendered to the Court?

A Yes, sir.

Q Which values are they?

A They are the monthly distribution of flows for the Group B sites, very similar to the one I read into the record this morning for Site No. 16, North Fork of Sage Creek.

Q Do you have those values with you?

A Yes, I do.

Q May I see them, please?

A Yes, sir.

(Whereupon, the Witness hands a document to Mr. White.)

Q (By Mr. White) Mr. Keene, did you give any information to -- excuse me, strike that. Let me start again.

Mr. Keene, did you provide Mr. Toedter with any natural flow values for use in his depletion analysis?

A He may have used some of my natural flows on the particular runs that I believe he referred to as dummy runs, and

they provided target flows for him. I do not remember specific values in specific streams, if that was the case. Once the information was available and turned over to Mr. Billstein, it could have been routed to Mr. Toedter without my knowledge.

Q What do you mean by "target flows"?

A Mr. Toedter has already testified to those things in his depletion analysis and, of course, he's the most qualified to testify to that. But there are flows that he used in the analysis to examine sort of as a calibration of his depletion model, therefore, the word "target."

Q Mr. Keene, if Mr. Toedter used your estimates of natural flows as part of his analysis, didn't that essentially make his analysis a self-fulfilling phrophesy?

A No, because if the flows were turned over, and like I said, I don't know a specific example at this time, but they would not have been the final results at one of the gauging stations that I have classified as an A.1 system. So it may have been an intermediate hydrologic data transfer similar to what I described in my earlier testimony. But again, at this time I do not know, as I sit here today, know for sure what he used in each one of his depletion studies.

Q Isn't it true that you used some form of prediction techniques as opposed to the gauge values for Poison Creek, Muskrat Creek, Little Popo Agie at Hudson, Bad Water and Cottonwood Creek?

A For the Little Popo Agie at Hudson we performed a detailed depletion analysis upstream at the Lander gauge, and at that time we were using historic flows and combining those with Mr. Toedter's estimate of agricultural depletions.

Q How about for Poison, Muskrat, Bad Water and Cottonwood?

A Those were estimated using a prediction exercise that did not totally include the historic flow records, but because they were available, they still gave me an interpretation of the hydrologic conditions as they exist today. But we did not do a detailed agricultural depletion analysis as we did on A.1 sites.

Q (By Mr. White) With the exception of those four sites; Poison, Muskrat, Bad Water and Cottonwood, are there any other sites where you used some sort of prediction techniques in spite of the fact that you had gauged flows available?

A There were so many sites that I studied, that the best answer to that I should flush through each one of them, but I will mention that Beaver Creek is one, Wind River

near Kinnear, Wind River at Riverton, Little Wind River at Riverton, the gauge downstream of Boysen Reservoir on the Big Horn River, Five Mile Creek, Muddy Creek, and that's a list of several. But I would have to go through all the numerous sites that were examined throughout my natural flow study.

Q These are all sites for which there was gauging information available, but you used prediction techniques, is that right?

A That is correct.

Q Is it true that your study did not take into consideration water quality?

THE SPECIAL MASTER: Water quality?

MR. WHITE: Quality.

THE WITNESS: I did not study water quality.

Q (By Mr. White) Could you tell the Court again the reason why you excluded the 1930s from your study period?

A Yes.

Q Excuse me, specifically the period of significant draught, 1945 to '32.

THE SPECIAL MASTER: Since you have done so much to take care of the Special Master on the ones '35 to '45, '45 to '32.

THE WITNESS: I realize that there was some concern

and question about that, and I'll be glad to take a few moments to go over the selection of my data base period. Really, one of the reasons for selecting '46 to '79 was the fact I had relatively current stream flow measurement records, and in referring to Table 1 of my report I will only give you a few examples, but there are several, the key gauges that I considered in my analysis were those such as the Wind River near Dubois, which has a measured historic record, water year basis from 1946 to''79; Wind River near Crowheart had a measured historic period of record of 1946 to 1979; Bull Lake Creek in Lenore, again, one of my key gauges, had a historic period of record from approximately 1918 to 1979, and I could keep going through the list, but the point being is that those particular gauges have relatively current measurements combined with the fact that they have a continuous period of record. There's not a broken period in there. So that adds some significance to my consideration.

The next thing is that within that 34-year period that I selected, I wanted to be sure to include representative monthly and average -- averages and variations. I did not want to upset what I think is typical of the streams, of the major streams in the Wind River Basin. If the Court will allow it, I have a keene-cross-white

work paper that might show this variability that I described.

THE SPECIAL MASTER: One page?

THE WITNESS: One page.

THE SPECIAL MASTER: Go ahead and use it. I'm always afraid of the 100-page worksheets getting xeroxed.

MR. WHITE: Off the record, Your Honor.

(Off-the-record discussion.

THE WITNESS: The work paper that I have here is what's called an annual stream flow variability plot. What I have color coded here is the deviation from the mean, and I'm working with Bull Lake Creek through Lenore. Now, if you can see it, there's a dashed line sort of centrally located, and the coloring on either side describes the deviation from that mean, and as you can see, starting back in 1918 as this plot shows, about 1918, 1919 I was below the mean, and now I fluctuate above. Remember yesterday or the day before I was describing that the 1920s were very surplus. You can see there's quite a block of coloring there that deviates from the long-term average flow.

THE SPECIAL MASTER: I appreciate that. That shows not using the '20s you didn't damage your objectivity professionally by omitting the '30s since they probably

would have been a standoff anyway or washout?

THE WITNESS: Not a standoff, but the '30s were more deficit and the '30s were more surplus. Let me continue. You can observe the variability that is characteristic of Bull Lake Creek near Lenore throughout the whole chart. So I'm maintaining what I think is characterisitc of Bull Lake Creek in Lenore with my analysis, and that was one of my objectives, was to have monthly and annual averages and variability. I can show you the same sort of thing on the Wind River that I examined.

MR. WHITE: Could I see that, Mike, please?

(Whereupon, the Witness hands a document to Counsel.)

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Q (By Mr. White) I'm going to refer to this graph that you have just displayed to the Master as Exhibit NK, for natural flow, Keene, No. 2, NK-2, and we'll make copies of it and we won't mark on the original.

As I recall, in your report, you indicated that the river system which you studied contained significant fluctuations annually and seasonally in flow; is that correct?

A. Yes.

Q. In fact, I think you called those fluctuations high fluctuations; is that correct?

A. That's correct.

Q. Aren't those high fluctuations demonstrated by the significant movement above and below the mean shown on NK-2?

A. Those fluctuations are shown, on an annual basis.

Q. With that sort of high fluctuation, how is it possible to come up with what could be called realistically a representative natural flow?

A. I think it's the best way to come up with a representative average flow because in order to soften that fluctuation, I would be disturbing the hydrologic characteristic of the stream. This is what is typical out there, and I tried to preserve that typical characteristic in my analysis.

Q. Isn't it true that to really show the representative nature,

to show values that are representative of the wide fluctuations in flow, it would be necessary to have more than one value for natural flow; in other words, a typical high year, wet year, dry year, as well as the mean year?

A. That is correct.

Q. Isn't it true on Exhibit NK-2 that there is no particular year from 1918 through 1979 shown on that graph which has the mean flow?

A. The mean that we are talking about here is the arithmetic average of all those for the period 1946 to 1979. It is not absolutely necessary to fall immediately on that line, particularly within the accuracy limitations of the study.

But that's not even the point to be made here, because the fact that if you look at the graph, it does come very close to the mean, and you have the fluctuations on either side of the mean.

Q But isn't the answer to my question that there's no year during that period 1918 to 1979 where the actual flow or the calculated natural flow that you have developed is the mean flow?

A. In interpretation of those lines on the graph, you are probably correct, that one does not fall exactly on the line.

keene-cross-white

I could have done a confidence limit study in which case I examine what I think within a probability of occurrence of those flows occurring on either side of the mean, but, more importantly, I was using the remark section of the USGS Water Supply paper to obtain, so when I was stating long term annual flows, it is not necessary for a flow to fall exactly on that because we are going through and using thirty-four years of measured record with depletions added back in.

Q. Why did you not, as often used, the median rather than the mean flow?

A. The median and mean are both measures of central tendency, but if I had used a median, it would not have satisfied the purpose for what I was trying to establish.

Q. Why not?

A. Again, with the distribution that I think is representative for Bull Lake Creek Lenore, the arithmetic mean was satisfactory, and I am using thirty-four years of record.

Now, I did examine the stream flows for Bull Lake Creek Lenore on a more extensive statistical basis looking at different distribution possibilities, the normal distribution possibilities allowing more distribution and so forth, and in that case, I could start looking at different measures of central tendency, but keene-cross-white

it was very satisfactory for me to satisfy the purpose for the study, that the arithmetic mean is the central tendency value that serves my purpose.

Q. Isn't it true that with reference to NK-2, the trend in the natural flows which you have developed is that those natural flows are decreasing?

THE SPECIAL MASTER: Over the decades?

Q. (By Mr. White) During the study period. I think it's 1946 to '79. Was that the study period?

A. 1946 to '79 is the study period.

Q. Yes. Isn't it true that the trend there is that those natural flows are decreasing?

A. As opposed to 1918 to '79, the average annual flow and the mean monthly flows are lower in the 1946 to '79 than they are for the representation on that particular graph.

Q. Do you have any reason to believe that that trend will not continue?

MR. CLEAR: Objection, Your Honor. Speculative.

MR. WHITE: He can answer if he knows, Your Honor. He can tell us it's speculative.

THE SPECIAL MASTER: I suppose you can answer if you know. Do you have data, knowledge, information, on which you can base an answer to that question?

THE WITNESS: I do not --

THE SPECIAL MASTER: Go ahead and answer if you do.

THE WITNESS: I do not. It becomes a simulation exercise, another synthetic exercise of trying to constitute data which you do not have.

Q. (By Mr. White) Are you able to state with any certainty that the natural flow values which you have developed based on your study period would hold true in the future?

A. I am confident that the data base period that I have selected, 1946 to '79, is representative of long term averages, and just as I have said, that I could move it a short distance back in geologic time, I could probably move it forward in geologic time, but as the example I gave earlier, I think I said 1000 A.D. and 2001 A.D., that I am not saying that these flows may be the same at those particular times.

Q. Let's turn specifically -- let's back up then, instead of going into the future in terms specifically of the period 1868 through 1918.

Do you have any basis for concluding that the natural flows which you have calculated as the average or mean during your study period would be the average or mean natural flow during that previous period, 1868 to 1918?

A. I did not have stream flow measurements back at the time

that he is stating, and the climate information was inadequate for me to use for an analysis that would include climatologic characteristics and watershed characteristics to estimate or synthesize stream flow records.

THE SPECIAL MASTER: Do you know what the earliest gauged stream flow records are on the Wind River Indian Reservation?

THE WITNESS: I do know Bull Lake Creek and Lenore had some permits in 1909, and there's a few others scattered throughout, but those are isolated, and I did not use them in my particular study.

So to continue, I did not feel that I had adequate information to estimate flows specific to those years, but recalling that my statement in conclusion is that my flows are representative of long term conditions, long term average conditions, I have some additional work papers that related to this topic. I didn't get to go through all of my reasons for that.

THE SPECIAL MASTER: How many pages of additional work papers?

THE WITNESS: Oh, a couple. You could cut me off at whatever point you desire.

MR. WHITE: We would like to see them, Your Honor.

THE SPECIAL MASTER: Well, you mentioned them, and I -- Do you want to see them?

MR. WHITE: I don't care.

THE SPECIAL MASTER: Well, I think we have worked this point pretty well.

I would like a definition between median and mean at this point.

MR. WHITE: Perhaps the witness could give it to you.

THE SPECIAL MASTER: Would you do that, as you two used it in your exchange just now?

THE WITNESS: The mean is just an arithmetic average, and the mean is the central value.

THE SPECIAL MASTER: Central value?

THE WITNESS: Central. In other words, if I had between ten and twenty, the median would be fifteen, and it just so happens in the example I gave you that the arithmetic average would also be fifteen. That was a poor example.

Q (By Mr. White) In other words, with the median you are using a median natural flow, there would be as many years during your period of study that would have a flow greater than the median as there were years that have a flow less than the median; is that correct?

A. Yes.

THE SPECIAL MASTER: Well, I will leave that for the rest of your case. Go ahead, Mr. White.

* * * *

Q (By Mr. White) Mr. Keene, when you went about selecting your study period, did you review --

THE SPECIAL MASTER: Go ahead. I'm sorry.

MR. WHITE: I'm sorry, Your Honor, I thought you were going to ask me something about that.

THE SPECIAL MASTER: No, no.

Q (By Mr. White) Mr. Keene, when you went about selecting your study period, did you review the deliberations that went into the selection of study periods in other contracts such as the study period for the Colorado River that led up to the contract negotiations there, or the Red Ram, which led up to the contract negotiations there, both of which, I might add, if you don't know, came up with values for the study period which were not borne out by subsequent experience?

A I do not know the specific years for those bases, but I have read some archaelogical information about the periods of climate and the fact in those particular cases there may have been an over-appropriation of water. But let's get closer to home. The Wyoming Water Plan in October, 1972, the State developed a water plan, used the data base period 1948 to 1968, and at that time they had similar reasons to why I selected mine, that is you have relatively current measurements, you have many of the

gauges in the Basin that have continuous record and so forth. The U.S. Bureau of Reclamation for their Wind Division Report several years ago used a very abbreviated period in the late '50s and early '60s to size some of the reservoir facilities. So there have been several studies done in our particular Basin that have used those years I have quoted, and in referencing back to Counsel's question, yes, I do know that there have been situations in the past where those particular flows have not panned out as history has passed on. But I feel confident with my results, and if the Court would allow, I do have these other techniques that I examined in substantiating the '46 to '79 period.

THE SPECIAL MASTER: It would depend upon whether or not Mr. White wants it or not. Do you need some water?

THE WITNESS: I'm working on it.

MR. WHITE: Mike, do you want to take a short break?

THE WITNESS: I'm fine. Let's keep going as long as I can.

THE SPECIAL MASTER: Yeah. Let's finish up, gentlemen.

Q (By Mr. White) Isn't it true, Mr. Keene, you were provided information by the State of Wyoming during discovery that showed based on a tree ring analysis that

the period around 1968 was a period of relative draught?

A I listened to the deposition and briefed some of the material, but that does not particularly concern me because the purpose of my study selection, the data base period that is representative over long-term conditions, and the movement of my flows to a specific year, is not my intent, my intent is to establish flows that are representative of long-term conditions, and I feel that I have done that.

THE SPECIAL MASTER: How would you define the purpose of your study?

THE WITNESS: The purpose of my study was to identify natural occurring flows at selected points of interest. Those flows were to be mean monthly flows representative of long-term conditions, and those flows would be gone to other study components for utilization in this particular litigation.

Q (By Mr. White) Mr. Keene, on Page 3 of your report I believe you indicated that the stream flow of perennial streams, runoff of those streams, is derived primarily from melt and snowpack, and I believe that also appears on Page 4, is that correct?

A In general, that is correct.

Q Isn't it true, however, that part of your study did not

include -- that your study did not include a snowpack analysis?

A I only examined snowpack measurements, particularly for some of the prediction exercises that I performed where I did not have stream flow gauge records.

Q Isn't it true that you excluded from your natural flow values any contribution from intermittent streams?

A There are some intermittent streams contained within the Group A's and B's, so intermittent streams have not been excluded.

Q How did you include them?

A I can start on a very general basis and get more specific as needed. The intermittent streams generally did not receive a detailed depletion analysis because it was not necessary, we took basically the hydrologic potential within my A.1 sites, and in studying these other streams on other tributaries to complete my bookkeeping process to my A.1 sites and to the end of my geographic scope, which is the Wind River Canyon and, of course, a portion of the Owl Creek study. So using the historic measure records, if they are available even on an intermittent stream, I would gain the general perspective of the hydrology, but I must keep in mind those are probably impaired drainages that without studying the diversions,

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depeletions, that sort of thing, can I adjust those? So that gave me a general perspective.

From there I proceeded in using available prediction techniques to estimate the average annual flow, and the prediction techniques, as I stated the other day, included one of several, and we can get into the specifics of that, but those that fell within my bookkeeping exercise I still need to get those average annual flows on a monthly basis, and I would perform a regionalization exercise, that is, looking at other streams in the Basin that have a similar watershed or similar hydrologic characteristic and select a monthly distribution that I think is representative of those types of watersheds or those types of streams, and using that monthly distribution I would take my average annual and redistribute it and come up with an intermittent stream. Now, for the purpose of the Court, an intermittent stream, opposed to perennial, and intermittent flows only seasonally, and a perennial would be flowing year around. So there may be some months I had no flows predicted, and I'm saying that is representative of long-term conditions. But on any given month you may have a thunderstorm with resulting runoff, but that was beyond the scope of my study. I didn't study those details. So on a long-term basis you

could have some months with zero and, therefore, have some seasonal and other months with no runoff.

Q (By Mr. White) Mr. Keene, also on Page 3 you described groundwater effluent. Would you please describe what you mean by groundwater effluent?

A Groundwater effluent and the groundwater and the alluvium, the upper alluvium, that would be flowing as underflow in the Upper Wind areas or the overbank areas and coming back and coming into the stream to bank position or at the streambed position.

Q Isn't it true that your natural flows did not include the underflow in the alluvium?

A My natural flows were adjusted -- excuse me, let me back up. Remember that I used my historic measured period of record, my historic flows as they were measured at a gauging station, and if that effluent came into the stream above the gauge, it is included in that gauge record. Now, if it bypassed --

THE SPECIALL MASTER: How do you know -- how do you measure it if it's a natural drainage of groundwater? How can you possibly measure how much of that was back into the stream upstream of the gauging station so that you could adjust your historic by adding that figure to come up with a natural?

THE WITNESS: It wasn't necessary for me to estimate the groundwater return flow or the effluent coming in at those particular levels upstream.

THE SPECIAL MASTER: Did you, in fact, make some additions attributed to return of groundwater?

THE WITNESS: Now, remember Mr. Toedter's analysis includes return flow from agricultural activity.

THE SPECIAL MASTER: Yes. But that doesn't answer what Mr. White asked.

THE WITNESS: This groundwater, and through the natural process of rainfall, snowmelt, percolating through the ground and coming back through a stream, that flow if it's occurring is occurring and being registered by my gauge. I'm not recording the underflow through the streambed, I'm not measuring that at all. If it comes out in my stream system, it will show up downstream someplace, and if it doesn't, it continues into the alluvium and into the aquifer and is truly groundwater, and minus a surface water analysis. So yes, I'm considering agricultural return flow and I'm also considering the natural return flow as it comes into my stream channel system, but it is as it was recorded at the gauge. That which was not recorded and could be contributed to agricultural activity would be added to my historic flows to come up with my

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natural flow estimates.

THE SPECIAL MASTER: But you didn't make an addition for the matter Mr. White asked you about just now, did you?

THE WITNESS: If I did that, I would be double accounting my flows, and if it was a flow which went under my gauge, I didn't want to record that at that point anyway.

THE SPECIAL MASTER: Go ahead.

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Q (By Mr. White) Mr. Keene, how do you know the ground water accretions to the stream flow or additions to the stream flow or discharges to the stream flow are the result of natural as opposed to man-made activity since Mr. Page said that he was unable to either identify the location or quantify the amounts of ground water discharge to stream systems during his testimony?

A. That's consistent with what I'm saying. I did not identify points of return flow, and I am saying that the ground water effluent is into my gauge already if I wanted to include that and that which has been enhanced or included because of agricultural activity Mr. Toedter considered; therefore, I have that particular return flow component built into Mr. Toedter's depletion study in my additive factor, that being depletions.

Q What happens to your natural stream flow if there are depletions of the alluvial ground water which is not discharged into the stream?

THE SPECIAL MASTER: Isn't that getting pretty hypothetical, far away from his report? I think it does, but if you can answer it, go ahead.

MR. WHITE: I think he can answer it.

A. He's getting more into someone else's responsibility.

I have tried to concentrate my testimony here in response to his questions, to the fact that if it occurred above my gauge and I'll consider natural flows, the historic record would include that, Mr. Toedter included the agricultural depletions. Most of the evapotranspiration depletion along the stream channel is insignificant compared to the agricultural depletions, so most of these other components are outside the needs of my study, and I felt that I have explained it, and maybe you could redirect the question if I have not answered that last one properly.

Q I will try it again.

Earlier testimony, long before you had the happy experience of coming to Court here, indicated that non-agricultural uses of water might include the use of ground water, and some of those ground water uses would involve the use of alluvial ground water, and I'm asking you whether or not withdrawals of alluvial ground water in and around the stream systems which you studied would affect the flow of those streams and would affect the natural flow that you've described.

A. Again, I think Mr. Page is the most qualified to answer that, but I do have a --

THE SPECIAL MASTER: I would say that both the keene-cross-white

question and the answer have mighty little, if any, probative value to me, so I would be grateful if you could go on to the next point, Mr. White, because we are getting a departure from useful material.

Q. (By Mr. White) On Page 13 of your report, Mr. Keene, what do you mean by "hydrological potential"?

A. Hydrological potential is just a statement of the hydrology, and I'm using it here in the context of natural flows. It is that potential that Mr. Billstein is meant to consider in his evapotranspiration study. He will be examining the potential as it relates to water flow.

Q. Does hydrologic potential simply mean the amount of water that's available under natural conditions?

A. It's the amount of water that's available in natural conditions from my report.

Q. In the same paragraph, last sentence, Page 13, indicates that consideration was also given to satisfying the hydrologic needs of component studies.

What does that mean?

A. That just means that other component studies had requested input from me. I am one of several components in this litigation.

As I have indicated, the results of my study will

go on to other users, just as Mr. Toedter's information came to me, so the hydrologic needs was just a statement that the fishery study needed a statement of hydrology as did Mr. Billstein's systems operation study.

Q. On Page 4 -- or excuse me -- 14 of your report, you indicate, about four-fifths of the way down, right above where it says, "Subgroup A.2" --

MR. CLEAR: What page?

MR. WHITE: Page 14.

Q. (By Mr. White) It says, "The best prediction equation would be selected based on statistical parameters and on the ability to preserve hydrologic characteristics of the study site and period."

What does the "ability to preserve hydrologic characteristics of the study site and period" mean?

A. That means because I am reconstituting data at some of my gauge sites, that I did not have the opportunity to have a full measured period of record in which case I could add Mr. Toedter's depletions to come up with a full period of actual natural flows from my base period '46 to '79.

Because I am performing a synthetic exercise, if you will, I wanted to be sure that in correlating a short record station with a long station to accomplish

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that filling in of data that I did not disrupt or negate the hydrologic characteristics that I think were associated with my particular stream, so the preservation of hydrologic characteristics was done on the basis of looking at representative average annual flows that I thought were representative and also on the monthly distribution of those flows.

Those are the hydrologic characteristics that I didn't want to upset.

There's also the representative yield per unit area. That's a faction that we have commonly considered in hydrology.

You look at basin characteristics, and if they can be said to be similar hydrologically, you want your runoff per unit area to be representative of those similarities as well, so there are several things that go into establishing and preserving those hydrologic characteristics in this statistical exercise.

Q Isn't it true that you essentially formed an impression of what the natural flow should look like to the sites and then selected the prediction equation which would result in that type of natural flow?

A You've made it sound very simplistic, but that is one keene-cross-white

of the considerations is the preservation of hydrologic characteristics in the stream that I am studying, and in the selection of a correlation station, that being a station that had the long period of record that I'm going to use as part of my comparison gauge or my index gauge.

Q. Mr. Keene, I'm going to hand you what I have informally marked lightly in pencil so I can give it back to you in its original condition, Exhibit NK-3, which is a document that you handed to me previously concerning monthly distribution of flow.

Could you please identify what that document is and describe how you derived those values?

And I'll also hand you NK-4, which is a similar monthly distribution, but for, I believe it would be --

A. The B.2 site.

Q. -- the B.2 site and ask you to identify that and describe your methodology for that as well at the same time.

A. This particular handout is also a conclusion of my study, and it refers to the B.2 sites, those that were basically -- excuse me. Let me back up -- the B.1 sites where the streams were essentially ungauged, relatively minor tributaries, and most of them, because

I didn't have gauge records, I used prediction techniques, mathematic prediction techniques, field information, and professional judgment to come up with the average annual flow.

Each one of these contained within NK-3 represent one of the additional study sites as listed in my report or as shown on Exhibit 298 that I quantified flows and passed on to Mr. Billstein, and on a particular sheet, I have the monthly distribution for that particular study site.

For example, No. 1, Dry Pasup Creek, I have the month, the percent of annual flow, and the runoff on a monthly basis for that particular site, and as I stated earlier in my testimony, the products given to Mr. Billstein for B.1 sites were an average and the distribution of that average annual flow on an annual basis and contained --

THE SPECIAL MASTER: How many other streams besides Dry Pasup did you use the B.1 technique on, where you had no gauges?

THE WITNESS: Would you like me to read off --

THE SPECIAL MASTER: I would like to know how many of those you used that technique on.

THE WITNESS: Site No. 2 was Dry Muddy Creek.

THE SPECIAL MASTER: Hold it a half a second.

THE WITNESS: In fact, if you look in your reports, Your Honor, let's turn to Page 25.

THE SPECIAL MASTER: Yes.

THE WITNESS: That is a listing of the B.1 sites with the exclusion of Owl Creek at the bottom where it says, "See Table 8". Those will be B.2 sites.

THE SPECIAL MASTER: Right. You have answered my question. Thank you.

THE WITNESS: And on the flip side are the additional sites under that classification. That will give you an idea of the number of sites studied on this, and also the most right column is the average annual natural flow for those which I estimated. There's a footnote there --

THE SPECIAL MASTER: What percentage of your total average annual flow do you think was completed by techniques other than by the use of actual gauges; in other words, by the B.1 technique?

THE WITNESS: A very small portion apply, and as I say, the listing is right here of those that were considered under the B.1 classification.

THE SPECIAL MASTER: You feel that the total would be something less than two percent or three percent?

THE WITNESS: I have never run out the total number,

Your Honor, but to continue describing the counsel's request, what is not shown on this particular table is the monthly distribution of those flows, and they are contained on this exhibit (indicating).

THE SPECIAL MASTER: Which exhibit?

THE WITNESS: NK-3.

THE SPECIAL MASTER: Thank you.

THE WITNESS: And NK-4. NK-4 was the entry I made at the beginning of my testimony today that indicated that flows were quantified for Site 16, North Fork Sage Creek.

* * * * *

THE SPECIAL MASTER: And this constitutes the only prediction technique you used in your study?

THE WITNESS: I think there's a misunderstanding. The B.1 sites use certain prediction techniques to come up with these flows.

THE SPECIAL MASTER: Right.

THE WITNESS: I also had prediction techniques in doing my bookkeeping exercise from the A.1 sites down to the end of my geographic location on the Wind Canyon. Now, you can stretch the work "prediction" to essentially all the correlation exercises I've done, too, that is a predictive technique. Some are more reliable than others because of the available information.

Q (By Mr. White) Mr. Keene, I hate to go back, but I need to ask you one more question about your monthly distribution, and that is how did you develop your percentages and what were they?

A The monthly distributions for the B.1 sites were obtained by performing what I call a regionalization exercise. That is, I take streams in the vicinity and of similar hydrologic characteristics to these that I'm studying that may have gauge records on them, and identified what the typical month of distribution flows are for those gauges. In the absence of other streams in the immediate

vicinity, I go out a little broader and look at those I may have done a detailed depletion analysis and natural flow study and look at what is representative there. I make a tabulation of those similar streams and draw conclusions as to what I think is going to be representative on a tributary that unfortunately gauging information is not available.

Q I direct your attention to what has been marked for identification Plantiff's Exhibit WRIR NK-300-A, which is the blue line off of your Exhibit 300 or C-300, and ask you whether or not the stream reaches shown in red on NK-300-A are the stream reaches for which you either used stream gauge information along the depletion values developed by Mr. Toedter to arrive at natural flow, or used the gauge values themselves as natural flows?

A It appears to be correct.

MR. WHITE: Did you have a question?

THE SPECIAL MASTER: That's all of them on the West slope, is it not?

MR. WHITE: Yes.

THE SPECIAL MASTER: Attached tributaries to the Main Stem on those which this technique was applied, including one on the East side, including Crow Creek and East Fork of the Wind.

Q (By Mr. White) Isn't it true, however, that you show, according to this schematic, the natural flows to continue to increase as you go downstream beyond the stream reaches for which you used either the gauge or the gauge plus depletions to derive your natural flows?

A Not in all cases.

THE REPORTER: What was your answer?

THE WITNESS: Not in all cases.

THE SPECIAL MASTER: Do you want to take a break and have a cup of hot coffee? It might help your throat.

THE WITNESS: No, I'm fine.

MR. WHITE: I'm pretty close to being done.

THE SPECIAL MASTER: Okay, let's go.

Q (By Mr. White) Let's look downstream on the areas marked in red on Exhibit 300-A, and I direct your attention to what's been marked as Exhibit NK-300-B, and first I want to show it to your lawyer, which I forgot to do. Excuse me.

(Brief pause.

Q (By Mr. White) I tell you that the same areas shown in red on 300-A are also shown in red on 300-B, and I further ask you to assume that the areas shown with green arrows or the green arrows on Exhibit NK-300-B, represent areas of return flow from existing irrigation development

in the Basin, and using that assumption or assuming that fact, I ask you if it isn't true that for the areas downstream of those stretches marked in red that you had no depletion analysis upon which to develop your natural flows?

A That is not correct.

Q What is correct?

A I did not have my agricultural depletion estimate.

Q You didn't have an estimate such as Mr. Toedter developed, who has previously testified?

A That is correct.

Q Isn't it true return flows on Mr. Toedter's printout, to which we have previously referred, where they exceed diversions, are shown as negative values and are subtracted from the historic gauge values to arrive at the natural flow?

A The printouts that I obtained from Mr. Toedter were in depletions, and the depletion is equal to the diversion minus the return flow, so maybe we are getting into a question of the arithmatic sin...

THE SPECIAL MASTER: No, actually his question was if the return was greater than the diversion, was that not a negative factor contributing to the historic flow, and it seems to me that's an easily answered question, yes,

it was, or no, it wasn't. Do you want to try it one more time?

MR. WHITE: You did it as well as I could, Your Honor. I'll try again.

Q (By Mr. White) Isn't it true the values which Mr. Toedter gave you as part of his depletion analysis included some negative values?

A That is correct.

Q Isn't it true that those negative values occur or occurred when the return flows in a particular stretch exceeded diversions?

A Yes.

Q Now, can you tell us, explain to the Court, whether you subtracted any values representing return flows or the return flows which I've asked you to assume on Exhibit NK-300-B from gauge flows in order to develop the natural flows below the red areas?

A I did not use historic stream flow records, and therefore, did not add or subtract any quantity of that nature to historic stream flow records downstream of the lines that are indicated in red. Remember that I have indicated that basically the hydrologic characteristics and potential of the Basin from the natural flows have been established by the determinants of my A.1 sites. In other words, I

have approximately 950,000 acre-feet already determined at this point. I have a combination of 87,802 tributaries of the Little Wind River combining to approximately 170,000 acre-feet. I can keep going, but the point is the A.I. studies have determined the monthly distribution of flows in this system as well as the total quantity of flows, but it was still necessary to continue my book-keeping looking at in-flows and out-flows -- I explained my simple water budget the other day -- to keep proceeding down the Basin, but I did not perform a detailed agricultural depletion analysis instream as directed by the project manager, Mr. Billstein.

Q Isn't it true, Mr. Keene, the most reliable results contained in your studies are those results which are associated with areas annotated in red in Exhibits NK-300-A and 300-B?

A As a matter of degree, yes, the most reliable are without question within the red area, but that is not a statement of unreliability of my other results.

THE SPECIAL MASTER: I'm amused at both the question and the answer. I thought it was kind of a hook, but you stepped by quite nicely and let it go by for ball one. Go ahead, Mr. White.

Is what you are telling us, your assignment in this

simply didn't consider nor had it any reason to consider in the best interest of objectivity and professionalism what the return flows were down beyond the point of the junction of all of the rivers, the Popo Agie, Little Wind and Big Wind? Didn't have any factor on whether you have a historic flow upstream or natural flow upstream, isn't that what you are saying, and if it does have a factor, it will be up to Mr. Billstein and not you when he indicates the total of all the depletions?

THE WITNESS: That is correct. Don't forget the fact it was of interest to continue my bookkeeping because I established the A.2 sites. The A.2 sites were my book-keeping sites that allowed me a simple step-wise accounting, and that will define my hydrologic potentials I described this morning of the Basin, and in addition, it gave me some flows and hydrologic information to pass on to the fishery study.

Q Isn't it true, Mr. Keene, there were several gauges on or within the river system shown on Exhibit 300 or NK-300-B below the areas marked in red?

A There are some sites, some with quite substantial information and others with very little information.

Q There's even a gauge right at the upper end of the down-stream most end of the Wind River as shown on

Exhibit NK-300-B, isn't that correct?

A Yes.

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Q (By Mr. White) And isn't it correct that for the area not marked in red, you did not do a detailed gauge and depletion analysis in order to come up with your natural flows?

A. Correct.

MR. WHITE: Your Honor, we would offer --

THE SPECIAL MASTER: Do you want to wait until we rule on 301 and 302 before you make your material --

MR. WHITE: I was going to make offers and objections at the same time and hope we could get things wrapped up.

We will object to exhibits 301 and 302 on two grounds. One is relevancy, and that is that the study period selected by Mr. Keene upon which his conclusions are based is simply not connected with either future development, which is the mass of the claims made by the United States and therefore, irrelevant to future development because he has stated that he's unable to say with any certainty that the same mean will continue in the future or that any trend downwards or upwards would continue in the future.

It's also irrelevant because it's not connected with the past. It's not connected -- there's no way to project backwards from his work to the period around and

after 1868 which we are examining in this case with respect to Congressional intent.

With respect to the other grounds, it's one of materiality or perhaps probative value, in that since the detailed analysis which comprises a portion of Mr. Keene's work is applicable to only a portion of the river system, and since his remaining work, essentially the downstream portion of the river system is based on mere prediction analysis, and since there's been no showing that there's been a verification of either the predictions or the calculated natural flows based on gauges and depletion, we would object on the second ground in addition to relevancy or materiality or lack of probative value.

And perhaps I could just go ahead and make our offer and then Mr. Clear will only have to stand up here once.

THE SPECIAL MASTER: All right. Therefore, your objection to 302 will be the same as 301?

MR. WHITE: I meant to say that, Your Honor, if I didn't.

THE SPECIAL MASTER: Since one stems from the other.

MR. WHITE: We would offer NK-2 for illustrative purposes --

MR. CLEAR: Would you repeat what they are?

MR. WHITE: That's Mike's graph of his calculated annual natural stream flow. It's a bar graph showing fluctuations above and below the mean.

THE SPECIAL MASTER: On Bull Creek?

MR. WHITE: For Bull Creek near Lenore during the period 1918 to 1979.

I'll offer Exhibit NK-3 for the purpose of showing -- I'm sorry. NK-3 is the monthly distribution of flows for Site No. 1 through -- Well, sporadically through Site No. 35 -- and NK-4, which is monthly distribution of flows for Site No. 16, North Fork of Sage Creek.

THE SPECIAL MASTER: Mr. White, do you intend to offer the very ones in your hands, or are you copying?

MR. WHITE: I thought we would do the standard thing. We have marked these informally in pencil, Your Honor, and with the agreement of counsel, we will make copies and replace the --

THE SPECIAL MASTER: Is that agreeable, Mr. Clear?

MR. CLEAR: Yes, sir.

THE SPECIAL MASTER: All right. I'm going to admit into evidence, of course, the two NK's --

MR. WHITE: I have got more to offer, Your Honor.

THE SPECIAL MASTER: All right. I beg your pardon.

MR. WHITE: And we'll offer the NK-3 and 4 again for illustrative purposes.

We offer NK-300-A and 300-B for illustrative purposes.

THE SPECIAL MASTER: All right.

MR. WHITE: And I have no further questions on cross-examination.

THE SPECIAL MASTER: All right then, Mr. White.

MR. CLEAR: I have no objection to Mr. White's exhibits, Your Honor.

THE SPECIAL MASTER: Are you going to take exception to them?

MR. CLEAR: No, Your Honor, I have no objection.

THE SPECIAL MASTER: Thank you. The identified exhibits offered for introduction by Mr. White, being the same and are hereby admitted into evidence.

(Whereupon, Exhibits NK-2, NK-3, (NK-4, NK-300-A, and NK-300-B (were received into evidence.

THE SPECIAL MASTER: The ruling on 301 and 302 and the objections thereto by Mr. White have some merit. I think, however, if they are deficient as exhibits, it will have to come out in the State's case when the State works with those exhibits because I think they have got some probative value.

There's been lots of engineering gone into them and lots of computations, and I therefore will admit those into evidence also.

(Whereupon, Exhibits WRIR C-301
(and WRIR C-302 were received
(into evidence.

MR. CLEAR: I have no redirect -- I don't know if anybody else has any cross-examination, but I have no redirect.

THE SPECIAL MASTER: Mr. Perry?

MR. PERRY: No.

THE SPECIAL MASTER: Mr. Thomson?

MR. THOMSON: No.

THE SPECIAL MASTER: Mr. White?

MR. WHITE: No.

THE SPECIAL MASTER: Will you keep yourself handy in case someone might want to recall you?

MR. WHITE: I would make the standard reservation, Your Honor, of the right to recall him pursuant to the Court's authority.

THE SPECIAL MASTER: All right. Next witness, Mr. Clear?

Do you want a little break?

MR. CLEAR: Well, the witnesses are over at the U. S. Attorney's Office.

THE SPECIAL MASTER: I guess we will have to have a break in that case.

Let's take a ten-minute break.

(Recess.

THE SPECIAL MASTER: We will please come to order. I just wanted the record to show that a copy of the Wind River Basin Water Supply Study, Advance Copy dated February, 1981, published by the United States Department of Interior, Bureau of Reclamation, formerly called Water and Power Resources Service, has been handed to me this morning by Mr. Tom Echohawk. This is a result of my having requested this when all parties were present on the Reservation during our visual inspection of various sites, therefore, potential dams. This deals with potential dams, water storage, including Brooks Lane enlargement or Wiggens Reservoir or the Blue Holes Reservoir or Steamboat Springs enlargement or Crowheart Reservoir or Bull Lake enlargement or Kinnear Reservoir or enlarging Ocean Lake or enlarging Raft Lake.

We are going to be another five minutes or so or two minutes until he gets the witness ready.

(Whereupon, a short recess (was taken.

THE SPECIAL MASTER: Okay, let's resume, please.

Mr. Perry, did you make an appearance? Did you want the record to show your appearance today for the Tribes?

MR. PERRY: Sure.

THE SPECIAL MASTER: All right.

MR. ECHOHAWK: Mr. Master, before the United States

calls its next witness, one bit of housekeeping I would like to take care of. As the Court is aware, the United States has filed its amended motion for the Court to take judicial notice of State water rights to establish their irrigability. My understanding is you have ruled that that does establish a prima facie case. Just for housekeeping purposes, what I would like to do is enter a supplement to that motion that generally sets out the permit number; the proof number; the aerial photo number that we have been using, sets that out; the ditch name; we have assigned tract numbers to each individual piece, and the acres contained within each tract number, within each tract. Certainly it's just a housekeeping matter so we can keep track of it.

THE SPECIAL MASTER: Mr. Echohawk, let me say that that ruling that it establishes a prima facie case I use with exactly the same legal significance as I do a prima facia recognition of a water right that we used in the stipulation at Worland regarding State water rights. This is not to say that this is not irrefutable. I don't intend to impose the five-year no use abandonment concept on Indian idle lands, but if you have adjudicated lands that have not been irrigated for a long number of years, you may have a prima facie case that a permit existed on it at one given time, but this is not to say I must

accept that as lands on which a claim for water will be granted or that the State does not have a right to refute the prima facie materials on record.

MR. WHITE: Your Honor, I --

THE SPECIAL MASTER: Go ahead, Mr. White.

MR. WHITE: Your Honor, I believe the ruling was there's prima facie evidence shown that State awarded water rights did exist for these lands. I don't think you went any further than that.

THE SPECIAL MASTER: That's about right. Now, Mr. Echohawk, you are going to have an addition to show the exhibit number and the data you just mentioned?

MR. ECHOHAWK: We are back to the same point of uncertainty that we had last time this point was raised, and you did ask for briefs on that. The question is the way the United States is asserting the State water rights are that it establishes -- it is one way of showing that land is, in fact, irrigable, the same way we have shown that other areas are irrigable. Say, for instance, the North Crowheart, we have put on the soils and engineering and the economics and we are putting on water supply, that sort of thing. We have chosen that method to ppove irrigability for that land. What we are doing in this instance is asserting the State water rights as proof of irrigability, the same way that we think it establishes

irrigability. My understanding was, Your Honor, you had ruled in our favor it does establish a prima facie case for irrigability.

THE SPECIAL MASTER: I have ruled it establishes a prima facie case for irrigability.

MR. ECHOHAWK: And, in fact, our brief we submitted supports that.

THE SPECIAL MASTER: Is that brief -- has that brief been filed?

MR. ECHOHAWK: Yes, sir, its been filed for quite awhile.

THE SPECIAL MASTER: I'll have to take a new look at it.

MR. ECHOHAWK: The State filed a brief on that also.

THE SPECIAL MASTER: Yes, Mr. White.

MR. WHITE: You may recall you gave us an opportunity when all the amendments were finally made to that motion for judicial notice, to deal with the specifics. You may recall there was a problem with the specifics. The State of Wyoming will file yet another brief in response to the United States' brief on this issue because we believe that the statutory authority cited by the United States was not the appropriate authority which was to be cited. We will rest on the testimony of Mr. Christopolus, the State Engineer, who will testify the issuance of a State

water right was not made after determination of irrigability the only question was was the land irrigated once, and if so, it gets a water right. There is no determination of whether or not the land was irrigable or whether or not there was any economic feasibility. If it was irrigated once, its got it. We will rest on that.

MR. ECHOHAWK: Your Honor, in response to a couple of Mr. White's points, the United States will take the position the time has run for Wyoming to file un-supplemented briefs or response briefs. Since these were filed quite awhile ago, we filed simultaneous briefs so any reasonable time for them to file we think has run.

MR. WHITE: Your Honor, we would have to state to the Court we advised the United States that we would accord them an opportunity to either withdraw or revise their brief which contained the inappropriate statutory citations, and we recently learned they did not intend to do so, and we will file such a brief and you can ignore it if you want to, but we will file it.

* * * * *

THE SPECIAL MASTER: I would rather think that the fairest way to handle this question would be to put the burden of proof upon the State to show that if certain parcels on some of these areas are not yielding crops, have had a drainage problem, don't deserve water, so to speak, that that I would consider to reduce the number of acres entitled to water on that type of evidence.

Generally speaking, I'm going along with the presumption that if it had a water right issue to it, it's irrigable land. Whether it's entitled to a water claim for reserved water for it, and I don't think -- we are not talking about too many acres in the first place, are we?

MR. ECHOHAWK: We are talking about approximately 17,000 acres, and that's our point exactly.

The State of Wyoming has the same opportunity with regard to the adjudicated lands as they do with regard to the North Crowheart area.

If they want to come in and put on evidence to show that that land isn't irrigable, is not irrigable by whatever method they choose to show, that's one thing.

THE SPECIAL MASTER: Whether it was irrigated and was not yielding productively and went into idle status for ten or fifteen years, because it was not productive land, I think that's acceptable evidence.

MR. ECHOHAWK: But because the land is currently idle, that in and of itself should not bump that land out. They should have to show something else, the same as North Crowheart is.

THE SPECIAL MASTER: No problem.

MR. WHITE: The State can't agree with that. I previously advised both the Court and the United States and the Tribes that at the present time at least, the State of Wyoming does not intend to submit any evidence with respect to those adjudicated water rights.

We feel that the Tribes and the United States are so wrong on the law in this one that we will take our chances on appeal, and we may change our mind, but that's the way we feel right now.

MR. ECHOHAWK: We'll certainly stand on our brief. We have just checked that. If the State doesn't --

THE SPECIAL MASTER: Let's proceed. I wish that were the only problem I had to dispose of in this lawsuit.

MR. ECHOHAWK: What I have in addition, Your Honor, is -- I have the listing broken out, as I previously described, and I also have the maps broken out similar to the ones that we've all looked at before here that deal primarly with the aerial photo number, have the adjudicated tracts marked, and the tract number identified.

THE SPECIAL MASTER: Is not the document you have in your hand identical to what has already been admitted into evidence?

MR. ECHOHAWK: This has the annotation of the tract numbers on it and deals only with adjudicated lands.

THE SPECIAL MASTER: Do you have copies of that?

MR. ECHOHAWK: Yes, and I will identify the adjudicated sets of maps as United States Exhibit WRIR C-303-ADJ, for adjudicated lands, and the adjudicated breakdown, the tables that showed the permit number, the proof number, photo number, the ditch name, the tract number, and the acreage, I would identify that exhibit as United States Exhibit WRIR C-304-ADJ.

MR. WHITE: Your Honor, we would object to the admission of those summary documents to the Court. The Court has taken judicial notice of the certificates, and unless there's evidence before the Court that shows that the summary documents accurately reflect the certificates, there's a substantial missing link, and we will object to your taking judicial notice of those as well as judicial notice of the irrigability of the lands.

THE SPECIAL MASTER: I don't intend to take judicial notice of it, but if they are offered for evidence, we will rule on the admissibility of those.

MR. ECHOHAWK: I'm making that as a supplement to our previous Motion. Eventually, we are all going to get down to the fact, if Wyoming subsequently chooses to attack these lands, we are going to have to know where we are talking about, and --

THE SPECIAL MASTER: Wyoming has a point when they say you can't have it both ways. You see, if you are going to ask for reserved water on these lands, then they are arable, and are they irrigable, and at that point, I think the burden would shift to Wyoming to show that they are not.

MR. ECHOHAWK: That's correct.

MR. WHITE: Our position again is very simply that this has nothing to do with irrigability or arability. The United States hasn't met its burden of proof.

MR. ECHOHAWK: Your Honor, the United States feels quite strongly that our brief opposes Mr. --

THE SPECIAL MASTER: All right, gentlemen, I have got it.

MR. ECHOHAWK: Essentially, these exhibits that I have identified are just supplements to our briefs for ease in administration. When and if we ever get to the point of attacking these, we will know what areas we are talking about, the tract numbers and acreages.

THE SPECIAL MASTER: Virtually all 17,000 -- Well,

I have no question. I'm sorry.

Go ahead, Mr. Echohawk, with your case.

MR. ECHOHAWK: Okay, Your Honor. These are the originals.

(Thereupon, Mr. Echohawk handed (documents to the Clerk to The (Special Master.

THE SPECIAL MASTER: Are you offering those into evidence at this time? Do you substitute this for the one already offered of the same size and format?

MR. ECHOHAWK: This is a little different. This deals only with adjudicated lands.

THE SPECIAL MASTER: Are you offering it into evidence at this time?

MR. WHITE: I object.

THE SPECIAL MASTER: The objection has already been made.

MR. WHITE: I'll also include the five-day rule, Your Honor, and absolutely no foundation.

THE SPECIAL MASTER: Has Mr. White had an opportunity to look this over?

MR. ECHOHAWK: No, Your Honor.

THE SPECIAL MASTER: Let's put it aside, and six days from now, we will pick it up, and let him see a copy of it.

MR. ECHOHAWK: Or, Your Honor, I can just simply

identify it as a supplement to the brief -- excuse me -- in the Motion we had filed, we had a listing of acreage, and I think it was permit numbers in there.

Essentially, all this is is a refinement of that acreage.

THE SPECIAL MASTER: Mr. White, technically this doesn't breach the five-day rule because you have had this, except he has added to it the tract number. The same is already in evidence.

MR. WHITE: Why don't we handle this this way so we can get on with this. We will file a Motion to Strike. Let's argue it on the fourteenth.

THE SPECIAL MASTER: All right. We will admit this into evidence, both documents, and the documents are subject to your Motion to Strike.

(Whereupon, Exhibits WRIR C-303-ADJ (and WRIR C-304-ADJ were received (into evidence.

THE SPECIAL MASTER: And go ahead now with the continuation of your case under the concept of systems analysis and proof that water exists --

Mr. Billstein, you are the same witness that testified in the case before, and you are under oath to tell the truth.

MR. BILLSTEIN: Okay.

* * * * *

THE SPECIAL MASTER: All right, Mr. Echohawk.

RONALD BILLSTEIN

was recalled as a witness by the United States, and, having been previously duly sworn, was examined and testified as follows, to wit:

DIRECT EXAMINATION

BY MR. ECHOHAWK:

Q Would you please state your name again for the record?

A My name is Ronald E. Billstein.

Q Mr. Billstein,,you have been previously sworn in this case, is that correct?

A That is correct.

Q You are still under oath. Mr. Billstein, have you been previously qualified as an expert witness in this case?

A Yes.

Q Do you recall what area you were qualified in?

A It was water resource planner.

Q Could you speak up, if possible? This area of water resource planning, does this -- would this include the determination of water availability or the ability to match water demand with a water supply that is available?

A Yes, it is. It's a key component of the water resource planning.

Q Mr. Billstein, in this case, this particular instance,

did you perform an analysis with regard to the availability of water to serve the claims presented by the United States in this action?

A Yes, I have.

Q And in what areas did you analyze?

A I analyzed the claims of the United States in three principal areas, the first was the agricultural claims, these were submitted by myself, and the historic in-use category, the future lands submitted by Mr. Mesghinna and Mr. Dornbusch, the Type VII lands submitted by Mr. Stetson and Mr. Dornbusch, and the Type VIII lands submitted by Mr. Mesghinna and Mr. Dornbusch. I also evaluated the mineral claims from surface water that were submitted by Mr. Merchant, and also reviewed the fishery claims as submitted by Mr. Vogel.

Q In addition, did you also evaluate the adjudicated land water requirements?

A Adjudicated land water requirements were part of the agricultural claims.

Q Okay. Mr. Billstein, let's get right into it. There's been quite a few months of testimony and this generally would recap up the United States' case. I direct your attention to what has been marked as United States Exhibit WRIR C-305, which is the large map on the stand.

Would you please identify that exhibit for us?

A Yes. This Exhibit, WRIR C-305, represents the agricultural land base claim as submitted by the various experts for the United States. That agricultural land base claim is delineated in the legend in five separate categories.

Q Mr. Billstein, could you stand aside from the map so we could all see it?

THE SPECIAL MASTER: Did someone bring a long pointer today?

MR. ECHOHAWK: This is the best we can do, Your Honor, a nice petite point. That's fine.

THE WITNESS: The first land base category is future development lands. Those are shown in a light-tone pattern on the exhibit. We see the various units that have been presented to the Court by Mr. Mesghinna and Mr. Dornbusch, specifically the North Crowheart Unit, South Crowheart Unit, the Arapahoe Unit, Big Horn Flats Unit, and the Riverton East Unit. The next category relates to adjudicated lands. Those adjudicated lands correspond to the claims that have been made in the amended motion and supplements to the amended motion by the United States. They are reflected in blue on the exhibit, and they also have a triangle placed within the blue lines to

cross-reference or cross-code that this particular --

THE SPECIAL MASTER: What's the reason for the triangle?

THE WITNESS: Your Honor, it's an easy way to establish a cross-referencing system to show that when a person develops the map that you can cross-reference whether the color that you have applied to that land base claim is, in fact, the proper color.

THE SPECIAL MASTER: I see.

THE WITNESS: Further, if you have to make multiple copies of the maps and have to do the coloring, it allows one to immediately spread with the coloring instead of having to work with an original.

THE SPECIAL MASTER: Mr. Echohawk, are these blue lands marked adjudicated lands on C-305 the 17,000 acres you were referring to earlier today?

MR. ECHOHAWK: That's correct. That's contained in the supplement.

THE SPECIAL MASTER: Mr. White.

MR. WHITE: Your Honor, the State would move to strike any testimony or any reference to this exhibit that includes the adjudicated lands on the basis of lack of foundation. There's absolutely no foundation established by any testimony in this action that the

lands as outlined on C-303 adjudicated that just came in or on C-305 are, in fact, the lands that are described in the certificates of which you have taken judicial notice. There's been no connection that these lands are those which have been included.

THE SPECIAL MASTER: I will overrule the objection, Mr. White.

Q (By Mr. Echohawk) Mr. Billstein, in relation to the adjudicated lands that are colored in blue and you referenced a small triangle, in the event that perhaps some of these lands would have been miscolored, which would control, the color or the triangle?

A The triangle would control.

Q All right. Please continue.

A The third category reflects the unadjudicated in-use lands, those were the lands outside of adjudicated land boundaries that was part of my testimony, reflect the lands that are in current use. They are shown in black or dark blue, so they are the colored in lands designated on the exhibit.

THE SPECIAL MASTER: Let me ask a question at this point. Mr. Echohawk or Mr. Billstein, are these unadjudicated lands in-use just designated by Mr. Billstein that land which we have often referred to in this

litigation as historically irrigated, historically in use?

MR. ECHOHAWK: That's correct, Your Honor.

THE SPECIAL MASTER: I'm trying to make sure we have a common understanding of terms. Go ahead, Mr. Billstein.

THE WITNESS: The fourth category is identified as adjudicated lands Type VII or historic type --

Q Excuse me, did you say adjudicated or unadjudicated?

A Unadjudicated lands in a Type VII category.

Q Would those be the lands that Mr. Stetson addressed?

A Those would be the lands that Mr. Stetson addressed with subsequent testimony by Mr. Dornbusch.

Q Okay.

A These were also identified as historic Type VII lands. These are shown in orange with a circle designation within the coloring.

The last category would be the unadjudicated lands Type VIII or the historic lands Type VIII. These are those lands testified to by Mr. Mesghinna and supported by Mr. Dornbusch, and they are shown in green. And I have a --

THE SPECIAL MASTER: Pentagon.

THE WITNESS: -- pentagon insignia within those

colored areas.

Q (By Mr. Echohawk) Would those be kind of a light-colored green rather than a dark green?

A They would be a light-colored green. So accumulatively these five color codes reflect all of the lands that are part of the agricultural claims presented by the United States.

Q And what base of information did you use to -- in preparing this map? Did you get the acreage and so forth from the other people?

A Yes. The acreage and locations of the various tracts were obtained from those experts and their exhibits who were responsible for the determination of said claims.

MR. WHITE: Your Honor, I wonder if I could just have a continuing objection on the adjudicated lands since there were no experts who testified as to the location of those lands as shown in the certificates. There's no connection between the certificates and any of the maps that you have been shown, no evidentiary connection. If I could have a continuing objection.

THE SPECIAL MASTER: You may have a continuing objection, and you may very well address that point when your case comes on in rebuttal in refuting the issue.

MR. ECHOHAWK: May I have one moment, please?

THE SPECIAL MASTER: Do what?

MR. ECHOHAWK: May I have one moment?

THE SPECIAL MASTER: Yes. Take a minute or two.

(Brief pause. Off-the-
(record discussion.

Q (By Mr. Echohawk) Mr. Billstein, in relation to the adjudicated lands that are depicted in light blue on C-305, and in addition to adjudicated lands that are depicted in United States' Exhibits C-303-ADJ and C-304-ADJ, is that adjudicated lands information put together under your direction?

MR. WHITE: Objection, five-day rule, Your Honor.

MR. ECHOHAWK: Laying foundation, Your Honor.

THE SPECIAL MASTER: No, I don't sustain that objection. He can ask was it put together under your jurisdiction and direction, is all he's asking now.

THE WITNESS: Yes, it was.

MR. WHITE: It has to do with exhibits or documents which were submitted in violation of the five-day rule, and I believe the five-day rule says that you can't use those. It's not a question of whether they are admitted or whether there's cross-examination on them, unless they're for illustrative purposes you can't use them.

MR. ECHOHAWK: Essentially, Your Honor, I'm laying

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foundation for the adjudicated lands up here. Also laying foundation for the other exhibits --

THE SPECIAL MASTER: I'll overrule the objection. Go ahead.

Q (By Mr. Echohawk) Was the adjudicated information put together under your direction?

A Yes, it was.

Q Was the acreage total and acreage locations depicted on C-305 and C-303-ADJ, compiled using the information from the permits and the proofs?

A That's correct.

Q That was all done under your supervision?

A That's correct.

THE SPECIAL MASTER: Let me ask a question.

MR. WHITE: I'm going --

THE SPECIAL MASTER: Just a minute, Mr. White.

In preparing this map, and you saw the water right certificate of the State Engineer with a description of acreage on it, then that's the acreage you cranked into here?

THE WITNESS: Not in all cases, Your Honor. Of course, that acreage is impacted by a number of things.

Fractionated ownership, for example, you may have a certificate of record that covers both fee and trust lands.

In that case only that portion of the service area covered by the permit specific to the trust lands was included.

THE SPECIAL MASTER: Was used, and that to the fee land was not?

THE WITNESS: That's correct, Your Honor.

THE SPECIAL MASTER: Go ahead, Mr. White.

MR. WHITE: I would move to strike on the basis this witness hasn't been qualified to make a determination as to whether or not land is fee or trust land. If he testifies that he used Exhibit M-1, which is already admitted, as the basis of it, we would withdraw that objection.

THE SPECIAL MASTER: I was about to say I would overrule the objection. I presume he was basing that on everything available to him as a matter or record, the State Engineer's office, his own office and on the Reservation.

MR. WHITE: I also object if the Witness -- or move to strike if the Witness is unable to indicate he has differentiated between land that has always been trust and left trust and then gone into fee status and then been reacquired because they're all quite different, and any systems analysis has to consider that.

MR. ECHOHAWK: The United States' position is that's irrelevant.

* * * * *

MR. ECHOHAWK: The United States' position is that's irrelevant.

THE SPECIAL MASTER: We have big, big headaches in water volumes and acreage compared to what we are discussing now, and I'm going to overrule it only because I don't believe it's going to apply to that many acres. If it's going to --

MR. WHITE: We just ask, Your Honor, that you get some evidence on that.

Q (By Mr. Echohawk) Mr. Billstein, in relation to your determinations of sorting these adjudicated acreages out and depicting only the trust lands, what information did you rely on to determine whether acreage was trust or not?

A I have trouble referring to the exact court exhibits, but we did utilize the land ownership information furnished by the United States to the Court as the basis of making the distinction between trust and fee, the exception being those areas such as Harpoon Cattle Company where we introduced information that documented that there had been a change in the patent for acquisition by the Tribes of certain fee land in the interim.

Q In addition, Mr. Billstein, did you also not make inquiry directly of the Bureau of Indian Affairs in Billings?

MR. WHITE: Objection, it calls for hearsay, Your Honor.

THE SPECIAL MASTER: Overruled. In Billings? Overruled.

Q (By Mr. Echohawk) Did you make inquiry regarding that information?

A Yes, I did, Your Honor.

THE SPECIAL MASTER: Next question.

A Basically, what I meant to say, I wanted to infer that was included in all of the information given to me by the United States.

They developed an original map, which I believe is the M-1 map that was alluded to by counsel for the State of Wyoming and they also gave me supplemental information in terms of township ownership plats that reflected more current information.

MR. WHITE: Your Honor, I'll move to strike the testimony involving lands which are considered by this witness as trust lands which are not in accordance with the evidence that's been submitted to the Court.

You have received two exhibits which brought back the question of whether particular land is trust or fee. One is Exhibit M-1. That's the yellow and red map.

The other is the deed, the Harpoon Realty or Harpoon Cattle Company deed, but what this witness is saying is he used other information in addition to those which he

indicated were more current to reach his conclusions, and I think it's inappropriate to mix apples and oranges, to use one set of information to present to the Court and another set of information as the basis of an exhibit.

THE SPECIAL MASTER: The motion is denied, Mr. White. You will have every opportunity to challenge the reliability of the exhibit when the time comes.

MR. ECHOHAWK: Just to clarify and to assure everyone that all phases will be covered, when we reconvene in July, the United States will offer, in fact, certified copies of all township title plats and, in addition, title ownership records for each individual portion of the reservation dating from date of decree, including all the title transactions that have occurred in relation to all particular tracts on the reservation.

Those documents will be supplied to the Court next time we come back.

Q (By Mr. Echohawk) Mr. Billstein, before we interrupted, let's see if I can go back to where we were.

All information regarding acreage, tract numbers, and location depicted on maps both on C-303 -- excuse me -- C-305 and 303-ADJ was prepared under your direction; is that correct?

A That's correct.

Q Using records from the State Engineer's office?

A That was the basis.

Q Now, Mr. Billstein, in addition to the areas you have already covered on Exhibit C-305, the map entitled, "Systems Operation Study," what other information is depicted on that map?

A There are two major study areas that underwent extensive operations studies.

Those two study areas are, respectively, the Big Wind Study Unit and the Little Wind Study Unit.

The boundaries for those study units are outlined in red (indicating). I'm tracing them from north to south and returning to north.

THE SPECIAL MASTER: That's virtually -- that's the whole ballpark, isn't it, the two study areas?

THE WITNESS: Your Honor, the United States does have claims in the Popo Agie watershed. It also has claims in the Big Horn River below the confluence of the Big Wind and Little Wind.

THE SPECIAL MASTER: All right.

THE WITNESS: And within the Owl Creek watershed plus a number of claims in the minor tributaries, but, yes, you're correct in saying that the vast majority of the claims of the United States do lie in the those two study units.

The Little Wind study unit is outlined in green, and I am now proceeding to go through that study unit boundary, going from east to west and returning to west (indicating).

Q (By Mr. Echohawk) Mr. Billstein, in each of those study areas, the Big Wind outlined in red and the Little Wind outlined in green, I notice there are a number of dots, either red dots or green dots.

Would you please explain the significance of those?

A Certainly. The circles are control points, and those control points are utilized to operate the system in the upstream to the downstream direction.

The control points reflect the fact that there are certain physical occurrences taking place at those locations. Those physical activities could be from the standpoint of diversions accumulating return flows, accumulating storage, releasing storage, reviewing desired flows in the stream, this type of basis.

There's a number within each one of the nodes, and that number corresponds to a schematic that reflects what that specific activity is, and I also have descriptions which later document what each of the operational activities are.

Q Mr. Billstein, you have mentioned in regard to those circles, the red circles and the green circles -- and you call them

control points on nodes -- are those terms used interchangeably throughout your discussion?

A During the course of the testimony I will probably be using them interchangeably.

Q All right, and how were those particular control points or nodes chosen?

A Those were chosen by me in terms of establishing what I felt were the key locations for the principal operational activities in the system.

They would reflect where the principal diversions were taking place, principal return flows were returning, and also gave me an opportunity to monitor stream flow at any location in the reach of the stream in the downstream direction.

This was typical of both the Big Wind and the Little Wind unit.

Q All right. Mr. Billstein, you can have a seat now. I think that's enough about that exhibit for now.

Let's begin your discussion of your analysis as to water availability regarding the agricultural portion of the United States' claims.

Generally, was the agricultural analysis divided into various study areas or different analyses?

A Yes, it was.

Q Would you please describe generally what those were?

A There were five principal studies that were done. The first study was the Big Wind, the operational analysis.

The second component was the Little Wind operational study.

The third component was a review of the water claims on the Popo Agie system in terms of simply analyzing available records versus demands.

This type of study was undertaken in an area where the amount of available water supply was so large compared to the claims that it wasn't productive to establish an operational analysis to evaluate that.

Q You said it wasn't productive. You mean not really necessary?

A It wasn't necessary. The basic conclusions concerning water availability could be established from more basic information.

Q All right. That's three of the areas. What are the other two?

A There's a study of the water-short drainages, and this was just a review of the typical water-flow patterns that are in the areas north and the minor tributaries south of the Big Horn River.

THE SPECIAL MASTER: Are those the only places you

found water-short areas on the reservation?

THE WITNESS: Well, Your Honor, under the assumption that I carried out my systems studies on, yes, and to clarify that a little bit farther, when you say "shortages" I assume what you are talking about is acceptable shortages or manageable shortages, and again the answer is yes.

Q (By Mr. Echohawk) Mr. Billstein, we need a little better clarification. What do you mean by that, the water-short drainages? Why would you refer to that sort of terminology?

A That terminology is used to reflect only the fact that the flow regime of those watersheds is such that they experience late season, dramatic late season flow recession.

In other words, to evaluate the water demands of that area in many water years, flow recedes to such an extent that water is not available in the system to meet those demands on a total year basis. That's certainly not to imply that water is not there at particular times of the year and that the people in those watershed drainages do not develop their agricultural practices around that type of flow regime.

* * * * *

Q. (By Mr. Echohawk) All right. That covers four general descriptions. What's the fifth area that you conducted some sort of analysis?

A. That was up in the Owl Creek watershed, and in the Owl Creek watershed, we reviewed the claims of the United States lying south of the Owl Creek system, whether it be South Fork of Owl Creek or the mainstem of Owl Creek as it forms the reservation boundary. In this type of analysis we took a look at the available flow in terms of recurrence interval and compared that against the demand of the claims.

Q. All right. Mr. Billstein, in making an analysis regarding water availability in general, what basically are the things you have to consider in? For example, did you consider water supply?

A. The basic inputs into any type of water availability study, of course, is the hydrology inputs, and that would be in terms of the water supply, any evaporation components that would be involved in, say, the storage area.

Q. Where did you get your information for water supply for you analysis?

A. Water supply information was furnished by Mr. Keene of our office as part of his natural flow analysis.

Q And all necessary information that you needed to conduct your water availability study was supplied by Mr. Keene?

A That's correct.

Q In regard to acreage or water demand, where did you get that component for your study?

A Acreage and water demand, of course, are two distinct areas that have to be well defined in any type of operational analysis. The acreage, as we spoke to earlier, is reflected in terms of the claims presented to the Court by the respective parties of the United States plus the adjudicated rights, and the water demands were a function of the water duties established by the agricultural consultant. In this case, Mr. Stetson and Mr. Mesghinna respectively had different tasks to play in the establishment of those water duties. They evaluated different types of lands. From that standpoint, the water duties or the water demands specific to the claims were supplied by Stetson Engineers through those two individuals.

Q Mr. Billstein, have you prepared a water duty schedule that sets out the various water duties per climatic zones and for various types of claims that you used in your analysis?

A. Yes, I have.

Q. Do you have a copy of that with you?

MR. WHITE: Your Honor, while Ron is looking for his copy, I would like to ask, instead of having to go through the refreshment of recollection drill and the witness refers to his notes, that the witness simply be asked as he refers to a page out of his notebook, take it out of his notebook and place it on the table so we can examine it as we are entitled to prior to cross-examination.

THE SPECIAL MASTER: Yeah, very good.

MR. ECHOHAWK: This is going to demand exhibits, I can see.

MR. WHITE: I noticed the witness has referred to some pages already, and thought maybe we could start that process.

THE SPECIAL MASTER: Gentlemen, it's fifteen to twelve. Would you like to go to lunch?

MR. ECHOHAWK: We are just --

THE SPECIAL MASTER: Or do you want to go another five or ten minutes? Are we at a crucial breakoff point?

MR. ECHOHAWK: We could, yeah, because the next one may draw some objections, so this may be a good as

time as any.

MR. WHITE: It will be the first exhibit that ever did, Your Honor.

THE SPECIAL MASTER: We will adjourn until 1:30.

(Whereupon, the noon recess was taken.

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