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File # 185

4436

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 1982

Margaret L. Hampton CLERK

DEPUTY

VOLUME 78

BE IT REMEMBERED that on this 15th 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. JAMES MERRILL and MR. MICHAEL D. WHITE, Special Assistant Attorneys 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:	WILKINSON, CRAGUN & BARKER 1735 New York Avenue, N.W. Washington, DC 20006 BY: MR. R. ANTHONY ROGERS
FOR THE PRIVATE WATER HOLDERS:	MR. GEORGE RADOSEVICH Attorney at Law 910 15th Street, Suite 866 Denver, CO 80202
CLERK TO THE SPECIAL MASTER:	MR. LEO SALAZAR Attorney at Law 701 Rocky Mountain Plaza Cheyenne, WY 82001
ALSO PRESENT:	MR. MICHAEL KEENE

THE SPECIAL MASTER: Let's convene this morning and we'll wait a few minutes for -- I'm not hurrying you, take what time you wish. I want to put a few things in the record this morning. The record should show, ladies and gentlemen, that we spent last Wednesday, June the 10th, on the one-day helicopter tour and visited the Wind River Indian Reservation . Mr. Sandy White of the State of Wyoming was on this as was Mr. Tom Echohawk for the United States and Mr. Harry Sachse, Counsel for the Tribes. In addition, Craig Sommers of the State Engineer's office --

MR. WHITE: He's a consultant for the State.

THE SPECIAL MASTER: Soil scientist and consultant for the State; Mr. Ralph Saunders --

MR. WHITE: HKM.

THE SPECIAL MASTER: HKM employee for the United States; Mr. Henry Sostrom, specialist --

MR. WHITE: He's a consultant for the State with Banner and Associates.

THE SPECIAL MASTER: Right, and Mr. Al Kersich of HKM and a witness for the United States accompanied me on that tour, and I think it was a very beneficial one. I received approval this morning from Judge Joffe to pay for the helicopter so we need not wait for payment. And we also had a Court Reporter, Mary Nelson, on that tour.

It is my opinion that the tour was well worth its

expense because it was an orientation of what we are talking about in working with a new comprehension and presentation of the vastness of the area as well as a vastness of the legal problems we're confronting.

I think it was especially benefitted by seeing the blue holes site for potential water storage on the main stem of the Wind River, if it is to be our good fortune that some day something like that could be constructed out of this litigation.

Mr. Echohawk, Mr. Kersich said he would have for me a document published in February, 1981, by the Bureau of Reclamation dealing with sites for water storage in Water Division No. 3. And I wonder if you could help me get that. I just forgot to ask him for it.

MR. ECHOHAWK: Okay. I think he's coming down this afternoon and I'll make sure he brings it.

THE SPECIAL MASTER: That's fine. We'll wait until you're ready.

MR. ROGERS: Your Honor, may I raise a preliminary matter?

THE SPECIAL MASTER: Sure.

MR. ROGERS: The trial in July is scheduled to start Monday morning, July the 6th.

THE SPECIAL MASTER: That is correct.

MR. ROGERS: Which I suddenly noticed one day is the

Monday following the July 4th weekend.

THE SPECIAL MASTER: You wanted to make that Tuesday the 7th?

MR. ROGERS: I haven't asked anybody if they agree to this or not, whether they might agree to start court on July the 7th.

THE SPECIAL MASTER: I won't ask anybody, I'll order it. That's a true blue all-American request and I grant it.

MR. ROGERS: We may all have travel difficulties anyway if the air traffic controllers go on strike.

THE SPECIAL MASTER: All right. The following Monday is July 13th. I have a son going to the University of Wyoming and it is necessary that his father be with him that day for enrollment. So we will start Tuesday the 14th instead of the 13th, so that will give me one day with my son and I have to attend that.

So that's two days off of our July, and we'll run those into Fridays if necessary, but again, we hope that we can -- Judge Joffe said that asking more than two weeks of work in any one month of trial is almost too much, in his opinion. So I got a little moral support from him on this business of our schedule.

Okay. Mr. Echohawk and Mr. Clear.

MR. CLEAR: Your Honor, before we begin we have one matter which we think we should inform the court. Last

Friday we received a copy of the decision in the case of the United States versus William Boyd Walton, which is a Ninth Circuit decision which involved water rights of nonIndians on an Indian Reservation. I don't know whether other counsel of the court is aware of the decision, but I do have copies here.

THE SPECIAL MASTER: I would welcome a copy of that if you have it.

MR. ROGERS: There's also a copy attached to the brief.

THE SPECIAL MASTER: I thought that when you handed it in this morning.

MR. CLEAR: Your Honor, since it's a recent decision, the Government has not decided whether it's going to take an appeal or anything like that on it.

* * * * *

MR. CLEAR: Your Honor, we would --

THE SPECIAL MASTER: One moment. Before -- Mr. Clear, the case you just handed me, Colville Confederated Tribes versus Walton, does not include as one of its parties Barbara J. Anderson at all, does it?

MR. ROGERS: No, sir, that's a different case.

THE SPECIAL MASTER: All right. Thank you. Go ahead.

MR. CLEAR: Your Honor, the United States now is at the stage where we're going to put on three witnesses, Mr. Toedter, Mr. Keene and Mr. Billstein. And we're going to put on what's normally called a -- eventually lead up to Mr. Billstein's testimony on the systems operation. That is, testimony which will show that there is sufficient water in the Wind River System to supply the water claims made by the United States on behalf of the Indians.

The first witness in this leading up to Mr. Billstein will be Mr. Toedter, who testified before. He will testify on what's called "Depletions." That is the water now removed from the system through the agriculture activities of man.

Then Mr. Keene will come up and testify as to --

THE SPECIAL MASTER: Mr. Keene?

MR. CLEAR: Mr. Keene.

THE SPECIAL MASTER: K --

MR. CLEAR: K-E-E-N-E.

THE SPECIAL MASTER: He will be a new witness, is that correct?

MR. CLEAR: Yes. And he will testify as to natural flows. That is the amount of water in the system if we look at the stream system as if it were unimpaired by any activities of man.

And then Mr. Billstein will come on and be the final witness for the Government on the system's operation.

THE SPECIAL MASTER: Very well.

MR. CLEAR: So at this time we would like to recall Mr. Robert Toedter.

(Pause.

THE SPECIAL MASTER: I neglected to ask this morning if there were new appearances, and I'm sorry I didn't do that. Would you like to enter an appearance, Mr. White, for co-counsel?

MR. WHITE: Off the record, Your Honor.

(Discussion off the record.

(Pause.

THE SPECIAL MASTER: Mr. Toedter, welcome back to the lawsuit.

THE WITNESS: Pleased to be back.

THE SPECIAL MASTER: May I remind you that you're still under oath under penalties of perjury from the first oath that you took when you were here before.

THE WITNESS: Yes.

THE SPECIAL MASTER: All right. You may take the stand.

(FURTHER) DIRECT EXAMINATION

BY MR. CLEAR:

Q Mr. Toedter, you're the same Mr. Toedter who testified earlier in this trial?

A Yes, I am.

Q Will you please briefly summarize what you're about to testify to at this point?

MR. WHITE: Objection. Foundation, Your HOnor.

THE SPECIAL MASTER: Oh, Mr. White, I think we can probably allow it if it's a general statement. If we don't, we'll get it asked and informed as to the question. So go ahead. Give me your first name, please, Mr. Toedter?

THE WITNESS: Okay. It's Robert.

THE SPECIAL MASTER: All right.

THE WITNESS: J.

THE SPECIAL MASTER: T-O-E-D-T-E-R?

THE WITNESS: That's correct.

THE SPECIAL MASTER: Thank you. All right?

Q Well, why don't we testify what a depletion analysis is, in your view?

A Okay. What I've attempted to do here and --

Q Could you just give a general view of what it is that your study scope was in this?

A Okay. What my study scope involved was merely trying to define the agricultural depletion as it relates to a specific gauge which Mr. Keene used in his further work. So we had to determine this on a month-by-month, year-by-year basis.

THE SPECIAL MASTER: For how many years?

THE WITNESS: Well, our period of record that -- Or the gross period of record that we selected was from 1918 through the present period. Now, in all cases we didn't use this. But that covers, you know, the gross period of record for all the study sites within the Basin.

Q Did you prepare a little graphic showing what a depletion analysis is or summarizing a depletion analysis?

A Yes, I did. And I think it would probably be beneficial to just hand out copies to everybody.

Q Well, let me do that. I'm handing you a copy of what has been marked as U.S. Exhibit WRIR C-287. Can you identify that?

A Yes. This is entitled "Typical Depletion Study, Water Budget Analysis."

Q Uh-huh.

A And it's just a sketch to show or pictorially depict what toedter-direct-clear

we were trying to do in this analysis.

Q Well, in relationship to -- In relation to C-287, there are several things shown there. What eventually are you trying to find out in your depletion analysis as depicted by this graph?

A Okay. The upshot is up on the right-hand -- upper, right-hand corner, there is an area identified as depletion. Now, this is comprised of crop consumptive use -- Or it would be the same as irrigation requirement -- and other consumptive uses which are non-beneficial type uses that come from phreatophytes.

Q You better spell "Phreatophyte" for the Reporter.

A Okay. It's P-H-R-E-A-T-O-P-H-Y-T-E-S. Anyway, the losses that are accounted for in this category are phreatophytes, deep aquifer storage, and hydrophytes in canals.

THE SPECIAL MASTER: The retent necessary to keep an alluvium alive as a source for wells is also served by this figure?

THE WITNESS: Not really. As I think of it, I was thinking of deep aquifer-type storage.

THE SPECIAL MASTER: How deep?

A You know, very deep. Like something that might go into the Madison Formation or something like that in the State of Wyoming. Not a shallow aquifer that one would

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think of that's two or three hundred feet deep.

THE SPECIAL MASTER: But you make no consideration on this exhibit, do you, or will you in your testimony regarding the depletion used by other than Reservation uses?

THE WITNESS: Okay. What we've tried to do is identify the hydrologic potential within the Basin. Of which Mike Keene will principally speak to. So he set forth -- Or through the work of Mr. Billstein as primary director and then Mr. Keene and myself, we decided upon the study area. So the principal study areas that we looked at --

Q You're going up to an exhibit. Can you give the exhibit number?

A Okay. The exhibit number is U.S. Exhibit WRIR C-288. And there's coverage outside of the Basin (indicating).

* * * * *

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Q (By Mr. Clear) What does that show?

A This exhibit shows the study areas, depletion study areas in the natural flow analysis of the Wind River Basin.

Q How are those study areas shown on that area there?

A They're depicted by these long dashed lines with intermediate dots.

THE SPECIAL MASTER: You say of the Wind River Basin. That's not of the Wind River Basin, it's a portion of it which encompasses the Wind River Basin. It seems to cut off at the dam.

THE WITNESS: The Reservation boundary line comes right through here, so we consider the upper Basin on west of there, on up towards Dubois.

THE SPECIAL MASTER: But did you consider the area of the Wind River, of the Big Horn Basin -- It is not Water Division 3, that's what I'm trying to say.

THE WITNESS: That's correct, it's just --

THE SPECIAL MASTER: Wind River Basin.

THE WITNESS: Upper portion of the Wind River Basin.

THE SPECIAL MASTER: All right, thank you.

A Okay. We studied the upper portion of the Little Wind Basin, that being the North Fork Little Wind, South Fork Little Wind and Trout Creek. Then we studied the North Fork of the Popo Agie, and further we did an analysis

of the Little Popo Agie.

Q (By Mr. Clear) Now, you didn't, your study areas do not include the entire Reservation, it basically includes, as I look at it, the western portion of the Reservation and some areas off the Reservation; is that correct?

A That's correct.

Q Why didn't you go and do the study on the entire Reservation?

A Okay. The reason for not doing that is because of the hydrologic potential within the Basin. See, for the most part you receive, the bulk of your water supply is derived in the upper portion of the Basin, and that's what we were interested in in this surface water analysis. So that was as far as we went.

Q What do the four-digit numbers that would appear in those study areas indicate?

A Okay. Those are abbreviations for the USGS gauging sites. They just include the last four digits on their code.

Now, down here in the left-hand corner of the exhibit we identify all the gauges by number that were used in this sutdy, and also indicate the USGS gauge. Now, there is one BIA gauge that was used in this analysis, and that was on Trout Creek and identified as BIA 6.

Q So now that you've determined the areas in the appropriate

study sites, how did you go about studying the depletions in the area?

A Okay. Going back to this typical depletion water budget figure --

Q What's the number on that?

A That's U.S. Exhibit WRIR C-287. Over on the left-hand side in the middle there's identification of diversions, so what we attempted to do on a month-by-month, year-by-year basis is identify the quantity of diversion. We identify the crop use. Using irrigation efficiency we were able to identify that component that went to farm losses, the component that goes to conveyance efficiencies. Then we identified the component that went to other consumptive uses or that's the non-beneficial type uses. Then the balance of that is return flow.

THE SPECIAL MASTER: This Exhibit, C-287, Mr. Clear, is not a schematic, you don't mean to assert by it that the conveyance lost in acre-feet is possibly two and a half times that of crop use because of the size that you make these, these routes on here or is this just a schematic?

MR. CLEAR: This is just a general --

THE SPECIAL MASTER: It has no relationship --

MR. CLEAR: I don't think this is designed to show

the ratio.

THE SPECIAL MASTER: I wondered why you would use a, less than half an inch crop use route and over one inch for crop losses, but it has no relation to values, that's what I wanted to make clear.

MR. CLEAR: Not -- I don't think we could measure that and say if a return flow is two and a half inches wide and the other consumptive use is a quarter of an inch, that that's the exact relation in all of these sites.

THE SPECIAL MASTER: That's what I want to make sure of. Thank you.

One more question while I've interrupted your thought too. Were all gauging stations in existence, all since 1918 that is listed on C-288?

THE WITNESS: No. They're quite variable as you'll find later in Mike's -- Mr. Keene's testimony.

THE SPECIAL MASTER: Okay.

Q (By Mr. Clear) Well, how did you go about developing the methodology of your study in detail?

A Okay. I think probably this exhibit, which is Exhibit U.S. -- U.S. Exhibit WRIR C-289 pretty much represents what we've got.

If you'll just think of it generally in terms of this schematic here for a sec and then we'll get on into detail

on the diagram. As you go over to the dashed line portion here in the middle of Exhibit 289. All of this material pertains to the diversion portion.

Q Excuse me. Do you have another copy of that back there?

THE SPECIAL MASTER: You're welcome to this if you want it.

(Off-the-record discussion.

Q (By Mr. Clear) Okay. Would you continue on.

A Okay. Again, this portion about through the middle --

Q Why don't you draw a line there or something.

A I wonder if it would be worthwhile taking a colored pencil or something like that.

Thank you. Okay. This portion here relates to diversions. Then this portion over here --

Q You're drawing red circles on the exhibit.

A Right.-- relates to the entire right-hand side. It would consider return flow -- with one exception, crop use. It considers return flow and it considers other consumptive use within that portion of the analysis.

Q And when you said "Right-hand side", you were referring to the right-hand side of Exhibit 287, is that right?

A Yes. Okay. And the extreme right-hand side of Exhibit 287 was a technique that we build into our analysis to --

THE SPECIAL MASTER: Was a what that you build in?

THE WITNESS: It was a technique that we build into our analysis to check and see where the culmative sum of the return flows in one case or in many cases throughout the Reservation exceeded the historic gauged flow.

And the other technique that we had of checking in this analysis was where lands were actually below the gauging site we checked to see whether ideal diversion exceeded the natural flow.

THE SPECIAL MASTER: In arriving at your totals, did you consider the requirement for optimum fish habitat and to see if that was compatable with your request for irrigation?

THE WITNESS: Okay. We didn't get into this type of analysis at all. So what we were trying to look at is a historic situation out there.

MR. CLEAR: When he said "We", he's talking about himself, in his particular testimony.

THE SPECIAL MASTER: That's all I wanted to ask him about was himself and his exhibits. All right.

Q (By Mr. Clear) In your depletion analysis, are you considering depletions that would be caused to the stream by the future projects as testified to by Dr. Mesghinna or other lands which will come into irrigation if this water is awarded to the Indians?

A No, all my work relates to is just historic irrigation within the Basin.

THE SPECIAL MASTER: Historic and historic only?

THE WITNESS: Right, from 1979 back to 1918.

THE SPECIAL MASTER: 1918.

Q (By Mr. Clear) Does it consider any depletions other than agricultural depletions?

A No, it does not.

Q Going to Exhibit 287, I see your first boxes on the left-hand side are the, call for identifying the climatic zone and climatic data for zone.

THE SPECIAL MASTER: Where do you see that on 287?

MR. CLEAR: I think I said 289. If I said 287 I misspoke.

THE SPECIAL MASTER: All right.

MR. CLEAR: Actually my nine's look like a seven.

THE SPECIAL MASTER: Okay.

THE WITNESS: Okay. Yes. That, in terms of our depletion analysis, which was the first major component as far as the study effort that we had to do, was develop our climatic data first. Now, the climatic zones that we used were the same zones that Dr. Mesghinna testified to earlier. However, being that we were putting in this thing in a historic perspective rather than using average annual

data like he did, we derived month-by-month, year-by-year data from 1918 through the present. Now, this required, in some cases, extending the climatilogical data base that we had. The reason for that was the period of major record for both temperatures which we needed in our analysis and precipitation was too short. Now, there are two stations that have complete records, this was Riverton and Lander. Now, the other stations --

* * * * *

THE SPECIAL MASTER: Well, can you identify those as -- What gauge numbers would you call the rivers in Lander?

THE WITNESS: Okay. Now, I think in order to keep confusion down -- 'Cause we're talking about two different things here. Earlier I talked about gauges. Now, we're talking about --

THE SPECIAL MASTER: Climate?

THE WITNESS: -- weather stations.

Q. (By Mr. Clear) The weather stations shown on that map?

A. No. The weather stations aren't --

MR. CLEAR: Your Honor, these are the same weather stations that Dr. Mesghinna testified to on this climate matter.

THE SPECIAL MASTER: Very well.

Q. (By Mr. Clear) Which --

THE SPECIAL MASTER: Very well.

A. Okay. Now, those climatic stations that we had to extend were for the Washakie, Diversion Dam, Burris and Dubois. And Mr. Keene's group did this for me. And they used correlation techniques to extend this data.

MR. CLEAR: Okay. Mr. Keene will testify on that, Your Honor.

A. Okay. Once we arrived at our climatic data base, the

next necessary component --

Q. (By Mr. Clear) Well, when you -- What climate base did you have? Is that a climate base for the entire Reservation or for what?

A. Well, it was developed for each weather station for each climatic zone.

Q. Okay.

A. And specifically related to our study areas or our areas of interest that were pointed out here on U.S. Exhibit 288.

Q. Okay.

A. Now, once we had all the climatic data that we needed, we went through an analysis to determine the growing season. Now, since this was a historic-type thing and we realized, you know, that there will be some variability within the thing, we used some recommendations that Soil Conservation Service presents in a publication they call"Technical Release 21". There they identify planting dates and harvest dates.

Now, your planting dates will be the same as Dr. Mesghinna talked about, or emergence-type dates for some crops or actual plant for others. And your harvest dates relate to, like, killing frost or when the mean temperature gets so low that the crops discontinue or consumptively use moisture. In this analysis, they identify

mean temperatures for the planting date, and they identify either frost kill dates or mean temperatures for the harvest dates.

Q When you say "mean temperatures", is that an average mean for the whole period or what?

A. What it is, it's average mean daily temperature. So the way we analyzed it in our analysis is we had mean monthly temperatures. That's what we developed. And chances are this temperature for emergence wouldn't fall on that same date for the average monthly temperature, so we assumed that the average monthly temperature occurred in the middle of the month. So we interpolated from month to month to determine on what day that emergence occurred.

Now, for frost kill dates, that data is published within the Weather Bureau records. So we were able to utilize the published data for that.

Q Now, you have described the method, I guess, where you identified the growing season. What's the next step on your depletion flow chart, Exhibit 289?

A. Okay. The next thing that we did was we determined the irrigation requirement for each crop that we had identified in the cropping pattern. I'll get into cropping pattern a little bit later here in my testimony. So we -- In order to do that, we used the Jensen-Haise

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equation, which is the same equation, and we used the same technique of analysis exactly as what Dr. Mesghinna did in his analysis. And we calculated effective precipitation the same way Dr. Mesghinna did, using TR-21 techniques for effective precipitation. So that enabled us to come up with a total irrigation requirement.

Now, one of the things, though, that we felt that was necessary in our analysis that wasn't necessary in his was to look at the fix of carryover soil moisture.

Q Can you define what "carryover soil moisture" is?

A. Yes. Generally, effective precipitation exceeds consumptive use in the winter months. Therefore, in the soil root zone, it has some capability to store soil moisture. So consequently, what we looked at is that quantity of effective precipitation that could be stored during the winter months. Now, in order to do this, we used the ETP potential --

Q Well, what --

A. -- from the Jensen-Haise --

Q Say what ETP is.

A. Okay. The way it's derived is by using --

Q Well, what does ETP stand for, first of all?

A. Okay. It stands for "Evapotranspiration Potential", and it's based on a reference crop, alfalfa, which is 18

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inches high and would be capable of utilizing that maximum potential.

THE SPECIAL MASTER: The root zone that high or the plant that high?

THE WITNESS: The plant that high.

THE SPECIAL MASTER: How thick is the root zone?

THE WITNESS: Okay. Generally, we thought of the root zone as being about 4 feet deep in that analysis. And the reason for that is we were dealing with alfalfa and small grains and pasture. Now, what we did on this carryover was we used 2 1/2 inches as an upper limit for carryover soil moisture. In other words, anything greater than that would have been zeroed out in the program and not considered in our analysis. So, therefore, that allows us some leeway in terms of far root zone. If we were to use a higher figure than the 2 1/2, then, you know, our root zone would have definitely had to have been the 4-foot depth.

As a consequence, you know, we were conservative, and you're probably dealing with a 3-foot weighted average root zone or something like that.

* * * * *

A (Continued) Okay. One of the other things that I might point out is in terms of our crop co-efficient, we used two tenths for our K factor in this analysis.

Q You used two tenths in the K factor for what purpose?

A That was to determine what the evapo crop, evapotranspiration is. That, coincidentially, is about the same level that Dr. Mesghinna, in considering his consumptive use, started out at.

Q Let's back up a minute. The Jensen-Haise, as you testified, gives you a potential evapotranspiration for a reference crop; is that correct?

A That's right.

Q How do you -- Then what do you do with that potential evapotranspiration for a reference crop to get it down to the actual crops?

A Okay. What one does is you use the K factor --

Q Is that also called crop coefficient?

A That's called crop coefficient.

MR. WHITE: I wonder if I might have an objection to this line of questioning. It's an area that was covered in great detail by Dr. Mesghinna. Perhaps the way to save time and get this case moving would be for Mr. Clear simply to ask Mr. Toedter whether or not concepts of reference crop, crop coefficient, ETP and similar

terminology have the same meaning in his work as Dr. Mesghinna explained to us all that it had in his work.

THE SPECIAL MASTER: Did it, Mr. Clear? And that might save us some time.

Q (By Mr. Clear) When we're talking about these things, are we talking about the same thing that Mr. --

A Yes, we are.

THE SPECIAL MASTER: Same values?

THE WITNESS: Not the same values, but the same relationships.

Q (By Mr. Clear) Well, tell us what different values you used then. Tell us how your values differed from Dr. Mesghinna's.

A Okay. He used a crop curve type analysis which had a number of different K factors depending upon the point within the growing season. Now, what I did is I've used one K factor for all the crops and held it constant throughout the non-growing season. Once the growing season started I used the same exact data Mr. Mesghinna used.

THE SPECIAL MASTER: Why did you make that variance?

THE WITNESS: Now, as I pointed out earlier, we felt that a carry-over of some moisture was an important factor in our analysis, and so consequently we had to have

some means of deriving this, so this is the technique that we used.

THE SPECIAL MASTER: Go ahead, Mr. Clear.

Q (By Mr. Clear) Dr. Mesghinna testified that he applied the Jensen-Haise formula to his cropping pattern to come up with a net irrigation requirement. Is that basically what you do now?

A Yes, that's what we did.

Q All right.

A Now, the only difference is Dr. Mesghinna applied it on a seasonal basis for long-term averages. We applied it on an annual basis, month-by-month, year-by-year throughout the period of interest.

Q Did you use the same crop pattern as Dr. Mesghinna used?

A No, we did not.

Q Why did you use a different cropping pattern?

A Okay. The difference was because of sites that were involved.

THE SPECIAL MASTER: Difference of because of what was involved?

THE WITNESS: The difference in study sites. See, we were looking, again, principally at the upper Basin, higher climatic areas. So our crops were more limited in the nature of the number of crops that can be grown.

You're principally limited to alfalfa, pasture and small grains in those areas.

Now, what we attempted to do with our cropping patterns outside the Reservation, that's above the Reservation boundary on the Main Stem of the Wind, I made a field trip last summer on some air photos which are hydrographic survey maps which we'll introduce later. I wrote down what crops were grown in each block of land.

Therefore, that allowed me, after finishing my field work, to come back and sum all the crops of a particular variety, knowing, you know, the acreage that was there, to identify the particular weighted cropping pattern as it related to each one of the -- of these gauging sites or points of interest.

Q So you don't have one overall cropping pattern for your -- for your study areas?

A No, they varied from study area to study area.

Now, within the Reservation, those study areas, I relied on our hydrographic or hydrographic survey people under the direction of Mr. Billstein in order to provide me with that information.

It was a similar type of analysis.

Q Now, you've got the cropping pattern in the Jensen-Haise formula figured out. What does that, what result does

that give you with relation to your study?

A Okay. Going back to the flow chart, which is Exhibit C-289 again, that allowed me to calculate a weighted irrigation requirement. Now, what that difference is is, see, using the Jensen-Haise analysis, that allowed me to calculate an irrigation requirement crop by crop. Then if I used a weight cropping pattern I can take the weighted percentage times the irrigation requirement for each crop and come up with a weighted irrigation requirement.

Q Okay. So --

A So then --

Q Is it a weighted cropping pattern -- weighted irrigation requirement, is that again by each study area as identified by the gauged sites?

A Yes.

Q So different ones for each study area?

A Uh-hum.

Q Did that change, does that vary at all from year to year or month-by-month?

A Okay. It only varied in one case, and that was because we had some field data which BIA had taken on the Upper Wind Unit. So that allowed us to use the exact year-by-year data in that area. Other than that, because of similar limitations that are present out there and also

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because of your relative consumptive use requirements being the same, your forage is displayed as similar crop consumptive use requirement. We did, you know, use year-by-year data.

Q Let's go on and discuss your depletion flow chart.

A Okay. The next item that was important to us was acreage. Now, this required some definition to start out with, as it pertained to each study site. In some cases out there there is diversion present above the gauge that delivers water to the lands that actually lie below the gauging site.

* * * * *

Q. Excuse me. When you're talking about "acreage" now, you're talking about "historically irrigated acreage? You're not just talking about all the acreage in the study site?

A. Okay. What I'm talking about is historic acreage 1918 through the present, both fee and trust lands.

THE SPECIAL MASTER: But if fee land, it's Indian fee land? Or did you distinguish between non-Indian and Indian fee land?

THE WITNESS: Okay. Well, it didn't make any difference to us. An irrigated acre was an irrigated acre. In this analysis what I'm trying to say is, you know, we made no distinguishment what, you know, category it fell into.

THE SPECIAL MASTER: Adjudicated or unadjudicated, idle or in-use, those factors didn't crank into your --

THE WITNESS: No.

THE SPECIAL MASTER: Okay.

THE WITNESS: It was either irrigated --

THE SPECIAL MASTER: All right.

THE WITNESS:--with a full service supply or a partial service supply, or also it fell into a Type V category.

THE SPECIAL MASTER: Okay. All right.

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Q (By Mr. Clear) But you're not distinguishing at this point or at any point in your depletion analysis between Indian-owned land, trust lands, or land owned by fee?

A. No.

Q We're just talking about --

A. Irrigated acres.

Q -- irrigated land? Let's continue on with your determination of the irrigated acreages.

A. Okay. Again, in this analysis I relied upon the people under Mr. Billstein's direction. And what they did is they provided me with totals out in each one of the study areas shown on this map (indicating). Now, what we did was we had 1980 air photos which are of the... Well, they're the same as those that have already been presented in court so far. And, of course, they'd extended outside of the Reservation.

Something else that we relied upon is the SCS did a full set of 1969 photos. Then we used 1954 photos which had a survey done on them for the SCS, Wind, Big Horn and Clarks Fork River basins, Type IV report. Now, this was a joint venture between the State and the SCS in terms of the work effort that was involved there. And they went through and they typed most of the area according to the same basic types that our people used in their --

Q Let's back up a little minute. Since we're talking of the period of time here from 1918 to 1979, wouldn't there be changes in the acreage which is irrigated? Does it change as time went on? How did you account for that?

A. Yes. We reviewed that. Now, there was photographic coverage done... present for 1954. It's only partial coverage. Okay. That '54 I'm answering previously. '54, 1958 through '50, 1939, which -- These were just within the Reservation, and the 1939s are pretty good. And then 1946. So what we attempted to do was we went back through with the '39s mainly for a sensitivity analysis and compared those against our average present levels. Now, we detected some difference in the Dinwoody drainage here (indicating). There was some difference present in Meadow Creek (indicating). And there was some difference present down on the South Fork of the Wind (indicating). The rest of the areas were approximately the same. We didn't detect any significant --

Q What do you mean by the rest of the areas are approximately the same? There wasn't any great change --

A. Yeah, no great change. You know, maybe 2 or 3 percent difference, and it went both ways.

Q So after you did this analysis of the aerial photos showing at that time what land was in irrigation and what

wasn't, what did you conclude with that with respect to changing your acreage each year for the study period?

A. Okay. We decided just to use the same acreage throughout history, and that was based on the sensitivity analysis and the overall impact that it would have on Mr. Keene's natural flow results.

THE SPECIAL MASTER: Does that bring you to your determination of a total net irrigation requirement?

THE WITNESS: Okay. Yeah, that allows us to determine a total net irrigation requirement for the acreage that we're interested in.

Now, one other thing I'd like to discuss here before we get off this subject, and that was how we handled the types in this analysis. We combined types --

Q. (By Mr. Clear) Can you define the types just to refresh everyone's memory on the types?

A. Okay. Type I was defined as an intensively-irrigated cropland. Usually has an adequate or nearly adequate water supply generally devoted to raising row --

Q. What are you reading from? Can you briefly discuss -- Just to refresh our memory of what the types are. You don't have to read the whole thing.

A. Okay. What this is, it was Table 1 extracted from Mr. Billstein's report.

Q. All right. So how did you use the types then with relation to this study?

A. Okay. What we did was we put -- or categorized Types I, II and III together as full service irrigation. Then --

THE SPECIAL MASTER: May I see it, Mr. Clear? Can I have the witness show me this?

MR. CLEAR: Yes.

(Paper handed to the Special (Master by the witness.

THE SPECIAL MASTER: (Looking). All right. Thank you.

(Paper handed to the witness by (the Special Master.

Q. (By Mr. Clear) You think this was in the --

MR. CLEAR: The types were -- HB-78 was the exhibit. As you recall, there was some discussion -- a lot of discussion, about the types, I guess, about the irrigation.

A. Okay. So, again, we combined I, II and III as full service irrigation. Then we combined IVs and VIs as partial service irrigation receiving, you know, just a partial water supply. And we set a consumptive use level on those lands about .3 of total irrigation requirement.

THE SPECIAL MASTER: That sounds like there's something a little arbitrary about that. You said the

service irrigation requirements for the partials for IVs and VIs at .3 of the IVs, is that right?

THE WITNESS: Yeah.

THE SPECIAL MASTER: What's the basis for that?

THE WITNESS: Well, it was arbitrary. We just, you know, discussed it as a group and, you know, we had no technical foundation upon which to arrive at an answer. But we knew they weren't full service. And they received, you know, like one shot of water in the spring and another one later on. And so, you know, we figured that .3 was a reasonable figure for it. Now, it could have been higher than that, but, you know, we felt that .3 was a reasonable estimate.

Now, Type Vs, being that this analysis ultimately results in diversion requirement, we just handled that as a portion of our irrecoverable losses over here (indicating) in our return flow.

MR. CLEAR: Your Honor, it's been about an hour. Should we take a break?

THE SPECIAL MASTER: What did you ask me, Mr. Clear?

MR. CLEAR: Your Honor, we have gone for about an hour. Should we have a short break?

THE SPECIAL MASTER: Sure. You want to take a five-minute break? We'll do that,

(Brief recess taken.

END

Q (By Mr. Clear) Mr. Toedter, in relation to your discussion on the acreage, irrigated acreage, you discussed the hydrographs. Can you tell us what the hydrograph study was?

A Yes. That was a study performed by people at HKM under the direction of Mr. Billstein, where we -- We had a couple purposes in mind. One thing was to identify all the historically irrigated lands that relate, related to this depletion analysis as it relates to historic and natural flow in the Basin. And also they used it on trust lands within the Reservation to identify the present level of irrigation activity.

Q Your use of the hydrographs was what?

A My use was strictly look at it from a consumptive use standpoint and combine these different items within the categories that I mentioned just before we broke. The 1's, 2's and 3's is full-service, 4's and 6's are partial service and then the 5's is irrecoverable losses. I didn't consider the 7's or the latter categories, the reason being is the 7's were identified as being idle lands and so they just weren't necessary to use within the context of my study.

Q And your interest in the hydrographs was to determine the only historically irrigated acres?

A Just the historically irrigated acres as they pertained to either each point of interest that we set up out there or each gauging site, and this all pertains to Mr. Keene's hydrology work.

Q How does it pertain to his hydrology?

A Okay. He used the results or the depletions that I came up with. I combined that with historic flow on a month-by-month, year-by-year basis to determine what natural flow would have been if man hadn't moved in and started irrigating in the Basin.

Q And the whole purpose of your study is to provide that information to Mr. Keene; is that right?

A Yes. Those depletion results to Mr. Keene.

THE SPECIAL MASTER: These matters computed on tables and graphs that are to come into evidence, Mr. Clear?

MR. CLEAR: Yes, Your Honor. The ultimate results of his study and his testimony is basically a computer printout.

THE SPECIAL MASTER: I see.

MR. CLEAR: At each of the gauging stations.

THE SPECIAL MASTER: I see.

MR. CLEAR: So the depletions, that is this sum of water here, month-by-month each of the points of interest, that is the gauging stations on that map --

THE SPECIAL MASTER: I see.

MR. CLEAR: On map 288.

THE SPECIAL MASTER: All right, very good.

Q (By Mr. Clear) Now, the hydrographs --

THE SPECIAL MASTER: Mr. White had a copy of that printout?

MR. CLEAR: He does, Your Honor. That is a sum of his work. Instead of a report we're just using a computer printout because that's really all he's testifying to is that computer printout showing the depletions, historic depletions.

THE SPECIAL MASTER: Okay.

Q (By Mr. Clear) Now, we've discussed the hydrographs and you mentioned Mr. Billstein. Now, the hydrographs you mentioned, are those the hydrographs which have already been put in evidence by Mr. Billstein?

A Okay. A portion of the hydrographs which I relied upon have previously been admitted as evidence. However, some of those outside the Reservation and a few within the Reservation weren't required within Mr. Billstein's testimony so consequently we want to take and admit them at this point in time as evidence.

(Brief pause.

MR. CLEAR: Your Honor, I'm sorry we don't have

extra copies of these. We have provided copies to Mr. White.

THE SPECIAL MASTER: These are --

MR. CLEAR: Your Honor, I will identify these as U.S. Exhibit WRIR C-295-1 through C-295-31.

THE SPECIAL MASTER: These are 31 photos, are they?

MR. CLEAR: Yes, Your Honor.

I think the terms being used is hydrographs or hydrographic photos, is that the correct term? Hydrographic photos.

THE SPECIAL MASTER: All taken in January?

Q (By Mr. Clear) Do you know when those were taken, Mr. Toedter?

A I'd have to review the photos in order to --

MR. WHITE: Are these being offered at this time?

MR. CLEAR: We're having them identified.

THE SPECIAL MASTER: They're being identified, are they? I was about half facetious when I --

THE WITNESS: The --

THE SPECIAL MASTER: I think the date is June 25th, this top one here. How do you account for the whiteness in the picture of this kind in June?

THE WITNESS: That was because of --

THE SPECIAL MASTER: I guess I better not ask --

MR. WHITE: I'd be glad to answer it for you.

THE WITNESS: -- reproduction.

THE SPECIAL MASTER: After yesterday I think I know what it is so please strike that. Taken in June.

Q (By Mr. Clear) Explain the whiteness, Mr. Toedter.

A Okay. The reason for the whiteness is because of the reproduction process.

THE SPECIAL MASTER: Because of what?

THE WITNESS: The reproduction process. The originals are nice and clear.

THE SPECIAL MASTER: What purpose is an exhibit of this kind, that you now identified, is going to serve if question mark?

MR. CLEAR: Well, Your Honor, I think there was some discussion back relating to the arable land base on what these, what the determinations of the arable land base relating to the trust lands. The claims being made for irrigable acres by the Indians were, and that's when Mr. Billstein brought the hydrographs into evidence with regard to that testimony. Here again we are -- we are using this as a foundation. This is the material that Mr. Toedter viewed to determine the acreage, historically irrigated acreage and the types.

THE SPECIAL MASTER: Was --

MR. CLEAR: Trust and nontrust.

THE SPECIAL MASTER: Was that not determinable by the original Exhibit 295? Aren't these in fact copies of identical hydrographic photos that are already in evidence?

MR. CLEAR: No, Your Honor.

THE SPECIAL MASTER: They're not.

MR. CLEAR: These are -- Mr. Billstein's hydrographs were limited to lands within the Reservation boundaries because all we were doing there is establishing the claim for irrigable lands in trust within the Reservation boundaries.

These hydrographs are hydrographs of the areas outside the Reservation boundary which are not relevant to Mr. Billstein's previous testimony.

Mr. Toedter has indicated that the reason he had to study the areas outside the Reservation boundary as shown on Exhibit C-288 is that the, that's in the eastern portion, there are, within the Basin, there had been within the Basin depletions in this area or agricultural activities in the area up here (indicating).

THE SPECIAL MASTER: I'm slightly confused, more than ordinarily confused that is to say. I think when he runs his line down where you did and call that

boundary, you're talking about Wind River Meridian, are you not, not the Reservation boundary?

Q (By Mr. Clear) Well, would you identify that line?

A The boundary line is right through here on the west side.

THE SPECIAL MASTER: Boundary of what?

THE WITNESS: Of the Reservation.

MR. ROGERS: Your Honor --

THE SPECIAL MASTER: Just a second, please.

MR. ROGERS: I think Mr. Clear, when he referred to that area he said the "eastern portion" and he actually meant the western portion. That's part of the confusion.

THE SPECIAL MASTER: Let's have a look at what you're talking about.

(Off-the-record discussion.

THE SPECIAL MASTER: These matters to be identified now pertain to lands to the west of the, and off of the Reservation, Mr. Clear?

(No response.

THE SPECIAL MASTER: You want to read that question, Merissa, please.

(Thereupon the following
(question was read back as
(follows: "THE SPECIAL
(MASTER: These matters --

THE SPECIAL MASTER: These maps, excuse me.

(Thereupon the following
(question was read back as
(follows: "THE SPECIAL MASTER:
(These maps to be identified
(now pertain to lands,to the
(west of the, and off of the
(Reservation, Mr. Clear?"

* * * * *

MR. CLEAR: Yes, Your Honor.

THE SPECIAL MASTER: Okay. Go ahead.

THE WITNESS: I don't think that statement's entirely accurate, though, because some of the lands do lie within the Reservation.

MR. CLEAR: All right.

THE SPECIAL MASTER: Explain why?

MR. CLEAR: Some of the maps that we used here in the Reservation were not relevant there. I think there are two aerial photos in the Reservation that were just not introduced in Mr. Billstein's testimony 'cause he was not concerned with them. Basically, I think the maps within the reservation, the aerial photos within the reservation we're using here, just contain non-trust acreage which is irrigated. And that, of course, concerns Mr. Billstein -- or Mr. Toedter's work.

THE SPECIAL MASTER: Yeah.

MR. CLEAR: Did not concern Mr. Billstein's.

THE SPECIAL MASTER: All right. Let's proceed, Mr. Clear.

THE WITNESS: Okay. I think one other thing we should point out is there are several photos that are present with the Popo Aggie drainage (indicating) which are more down to the south or southwest --

Q. Would you like to identify each of the photos for us

to --

THE SPECIAL MASTER: That won't be necessary unless you're going to introduce it later with his testimony. Go ahead with what you're saying.

Q. Just the ones -- Discuss the --

THE SPECIAL MASTER: The Popo Aggie.

A. Okay. There's some photos located within the Popo Aggie drainages. Several in the North Fork area (indicating). And there are four or five of them that are located in the Little Popo Aggie area (indicating), too.

Q. Now, how did you use these hydrographs, then, of both Mr. Billstein's and these hydrographs?

A. Okay. The context in which they were used was, first of all, we identified the irrigated acreage by ditch system on each photo. Then we assigned an acreage figure to those lands that were identified as being irrigated. Then thirdly, we assigned Types I, II, III, IV, V, and VI.

THE SPECIAL MASTER: If all of this was done by HKM for the purposes of asserting a claim for water for the historic land, why did you have to duplicate all this work? Why didn't you just use their figures?

THE WITNESS: Okay. The purpose that this was done for, Your Honor, was for a depletion study. In other

words, to try to get the flow levels back at the natural basis which they had existed prior to the time that man started irrigating out there in the basin. The only technique that we had to do this was to develop a depletion study.

Now, what you'll find in a depletion study, the way it influences your natural flows, is the diversion is much greater than what your return flow is during the summer months. So it's going to reduce the flow in your stream. So consequently, your historic flow measurements in the summer months are more than what they would have been under natural conditions if man had never gone out there.

Now, let's take a look at the winter months, what happens to us. You've got no diversions, but you've got subsequent return flows coming in. So consequently, the level of historic flows are higher than what the natural flows would have been because of this return flow coming in.

So this is the reason why we did this analysis is to try to get a feel for what the natural level of flow would have been out there in that basin prior to the time man coming in and developing this historic irrigation.

Q Does your study have anything to do with making a water

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duty claim?

A. No, it has nothing to do with a claim at all.

THE SPECIAL MASTER: All right. Thank you.

A. We just used the same techniques of approach.

THE SPECIAL MASTER: Okay.

Q. Well, why don't we go back to my question. How did you use these hydrographs, then?

A. Okay. Once we got to the point where we had given irrigation types to each of the lands out there, then what we did is we identified all those lands receiving water either above or below a gauge or a point of interest -- Which we'll get on into a little bit later on. They're basically the same sort of thing -- and numerically added the things up, accumulated the total. Then identified those lands relative to the point of interest that received a full service water supply, a partial service water supply, and then the Type V's which are just incidentally irrigated.

Q. Now, we've been talking about these types before when we were talking about types with relationship to the Indian trust land.

A. Right.

Q. Are you limiting your discussion of those -- of the types to those lands?

A. No. My types include everything. Everything out there in the basin.

Q. Did you use the hydrographs for any other purpose?

A. No, we didn't.

MR. WHITE: Can we find out what you mean by the word "hydrograph"? It's not a chart. It's --

MR. CLEAR: I'm sorry. I've heard the term "hydrograph photos". Is that the term? It is an aerial photo.

MR. WHITE: So you're not talking about discharge versus time?

MR. CLEAR: We're not talking about a hydrograph as in a graph. I think we're talking about the term as has been used in this trial with respect to the photos and the photos of Mr. Billstein.

MR. WHITE: Thank you.

(Pause.

Q. All right. Now, you've determined your -- the historically irrigated agriculture and the types. What did you do next, now?

A. Okay. Once that analysis was complete, that enabled us to determine what the total net irrigation requirement was.

Actually, let me back up one step. What we did was

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we determined what the irrigation requirement was for those lands lying geographically above the gauging site (indicating) and then geographically below the gauging site. Then combined those totals to arrive at a total net diversion requirement.

Q. Now, what do you mean by lands above and below the gauging site?

A. What we did is using USGS quad sheets on this thing we located our gauging sites or our points of interest. And then drew a line which is normal, or perpendicular, to the topographic contour lines to identify those lands that lie above a gauge and those lands that lie below a gauge. That was the manner in which we used to define. Then we developed an acreage in the same manner as presented earlier.

Thus, that allowed us to go on ahead and develop the total irrigation requirement above and below the gauge. Then in order to determine total diversion, which is what we're trying to focus in on here, we combined those two to come up with a total net irrigation requirement.

Then the next step in our study effort here was to determine efficiencies. We had to assign a value for conveyance efficiencies and one for on-farm. Now, the key point that we want to keep in mind here is toedter-direct-clear

we're not talking about claims. We're talking about a historic situation that's occurred out there in the past. And this has occurred for a long period of time. It's not something that's, you know, occurring out there today. So we analyzed several private ditches in the area and arrived at over-all efficiencies of about twenty-three percent.

Then one of the other texts that's available is an SCS text entitled, "Crop Consumptive Irrigation Requirements and Irrigation Efficiency Coefficients for the United States". In there the over-all efficiency is twenty-three percent. They've identified on-farm efficiency as being thirty-nine percent and conveyance efficiency as being fifty-nine percent.

* * * * *

THE SPECIAL MASTER: In that volume or your work?

THE WITNESS: In that volume.

THE SPECIAL MASTER: Okay.

THE WITNESS: And then our work agree with that. So professionally we thought, you know, that that data is good and we used it.

THE SPECIAL MASTER: All right.

THE WITNESS: So what we did here is knowing what the total irrigation requirements were, we divided that by the conveyance efficiency and the on-farm efficiency to determine what the total diversion requirement was for all lands, both above and below the gauge.

Q (By Mr. Clear) Now, you have an ideal diversion requirement for all lands. Is that for each point of interest or each gauging station?

A Okay. One thing I might point out is in the context of the study, in the way our computer analysis was set up, we could only look at on the basis of climatic zones. So, for instance, if we had two climatic zones that related to one gauging site, it required two sets of analysis, and then combining the results from the two sets of analysis to derive the total. So actually this whole package just relates to one climatic zone at a time. We make a run with one climatic zone then follow up with

other climatic zones if necessary.

Q Now, do you have a ideal diversion requirement for each month of your historic period, is that right?

A Yes, it was done on a month-by-month, year-by-year basis.

Q So in order to reach the depletions you have to determine -- in other words, to determine the depletion, how much water was depleted in 1980 -- 1918, you had to determine how much diversions there were in that month, is that basically right?

A Yes, that's right. In other words, diversions is just one of the components of the depletion study.

Q Now, I have on your depletion flow chart, Exhibit 289, the next box appears to be canal capacity if appropriated -- if appropriate. What does that mean?

A Okay. When we first structured this program, we did it before we really got into the study effort, and so we thought that it would be appropriate to put some kind of a statement in there to check and see if there was just a single canal diverted pertinent to our gauging site, to check the canal back against -- the capacity of the canal back against out ideal diversion requirement, if there was some constraints from a standpoint of the flow that you could run through the canal, then we'd use that constraint rather than the ideal diversion.

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Now, as it turned out in the study there weren't any situations that we could use this.

Now, moving on, one of the other test cases that we set up in our program, our comparison of actual diversions to ideal diversions, and we did use this again in one instance which was the Upper Wind Unit. We had BIA data which showed diversions from 1937 through 1957, so we used the actual diversion figures for that unit during that period of time.

Q Now, does that basically conclude the diversion requirement portion of your analysis?

A Okay. Yes, that would include the diversion portion --

Q What are you referring to there?

A -- analysis.

This is the U.S. Exhibit 287, it's shown on U.S. Exhibit 287.

Q So we've completed what now?

A Okay. We've identified the diversions and also as a result of the Jensen-Haise, or its taken on farther than that where we determine total net irrigation requirement for the acreage, we've determined the crop use portion of the depletion too.

THE SPECIAL MASTER: So we've done everything that goes up on your Exhibit 287, leaving for consideration

now farm loss, conveyance loss and return flow as a part of your other return flow consumptive uses; is that right?

THE WITNESS: Okay. And we haven't considered other consumptive uses yet.

THE SPECIAL MASTER: I see.

THE WITNESS: But that's the only thing.

MR. CLEAR: Your Honor, since he's come to a natural break in the study, should we break for lunch?

MR. WHITE: I want to ask one question, Your Honor, that is how much longer the direct of Mr. Toedter was going to go.

THE SPECIAL MASTER: That's a good question too. Do you think most of the afternoon or another hour or two of direct?

MR. CLEAR: I think we'll finish this afternoon, we're through with the more complicated part of this chart. What we want to do is run through the chart and then --

THE SPECIAL MASTER: The consumptive uses?

MR. CLEAR: Give a -- This is just how the study was organized, and then we have two more exhibits which show how in fact the studies were done in the study areas.

THE SPECIAL MASTER: At the gauging stations?

MR. CLEAR: Yes, but that will not, there's -- because the way these -- We don't intend to run through

and say this is the consumptive use of 1918 at one gauging station. All we're going to show is how he applied this study to the gauging station systems, and I don't think that will be -- I think we can be done on direct at mid-afternoon.

MR. WHITE: Well, from what I've heard so far, Your Honor, we don't anticipate a great deal of cross, and the reason I raised it is it might be a good idea if the United States was to have their next witness ready to go.

THE SPECIAL MASTER: That's a good thought. You might be ready.

MR. ECHOHAWK: Have him ready this afternoon?

MR. WHITE: I don't think we'll have much cross unless something else comes up.

THE SPECIAL MASTER: We might get --

MR. CLEAR: He's back at the hotel.

THE SPECIAL MASTER: We might get to him by three o'clock or so.

MR. ECHOHAWK: I'll make sure he's here this afternoon.

THE SPECIAL MASTER: Mr. Keene?

MR. ECHOHAWK: Yes.

THE SPECIAL MASTER: He was here this morning.

MR. CLEAR: Yes.

THE SPECIAL MASTER: Let's take a break for lunch and

convene at 1:30.

(Thereupon a lunch recess was
(taken at 12:05 p.m.

* * * * *