

6-18-1981

## Trial Transcript, Vol. 81, Morning Session

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File 188  
No. 4439  
Box 12

Case # 4993

File # 188

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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:

PROCEEDINGS:

**ORIGINAL**



APPEARANCES

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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)

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CLERK TO THE  
SPECIAL MASTER:

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



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

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

5 MR. CLEAR: We have --

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

8 THE SPECIAL MASTER: Please do.

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

11 THE SPECIAL MASTER: Mr. Clear.

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

19 THE SPECIAL MASTER: Okay, it will be noted.

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



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

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

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

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

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

21 THE SPECIAL MASTER: All right, thank you.

22 RE-DIRECT EXAMINATION (RESUMED)

23 BY MR. CLEAR:

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

25 keene-direct-clear



- 1 which has been marked as United States Exhibit WRIR C-301.
- 2 Are there any corrections you wish to make in that report?
- 3 A Yes, there are.
- 4 Q Could you describe what those are?
- 5 A I would like you to turn to Page 9 of the report, please,
- 6 for the station named South Fork Owl Creek near Anchor.
- 7 Q It is the second station?
- 8 A That is correct. The drainage area in square miles should
- 9 read 85.5 instead of 87.
- 10 Q Is that 85.5 figure reflected in other places of your
- 11 report?
- 12 A Yes, it is. I reference you to Page 27 of the same report.
- 13 For the same station it is reported at 85.5.
- 14 Q Is there any other changes you would like to make to
- 15 that report?
- 16 A Yes, there is another one.
- 17 Q All right. Would you tell us what that change is?
- 18 A On Page 25 --
- 19 Q That's Table 7?
- 20 A Table 7. For additional Study Site No. 16, North Fork
- 21 Sage Creek, I had reported that flows were not quantified
- 22 at this particular point, and in communication with Mr.
- 23 Billstein there was a need for flow quantification, and
- 24 those have been quantified, and I can read those into the
- 25 keene-direct-clear





1 record if the Court desires.

2 THE SPECIAL MASTER: Okay.

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

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

7 Q Could you give us those figures, please?

8 A The average annual flow is 6,510.

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

10 A Starting with the month of October, 228.

11 Q Acre-feet?

12 A Acre-feet. November, 130.

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

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

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

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

20 THE SPECIAL MASTER: All right. Go ahead.

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

25 keene-direct-clear



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July, 1,172 acre-feet; August, 553 acre-feet;  
September, 326 acre-feet.

\* \* \* \* \*

keene-direct-clear

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2-1 V-1

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

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

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

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

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

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

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

21 THE SPECIAL MASTER: Was not in that group?

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

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

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



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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.



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

6 MR. WHITE: No objection, Your Honor.

7 THE SPECIAL MASTER: Okay.

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

10 THE SPECIAL MASTER: Non-gauging?

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

14 MR. WHITE: No objection, Your Honor.

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

18 THE SPECIAL MASTER: Okay.

19 MR. CLEAR: -- for illustrative purposes only.

20 MR. WHITE: No objection, Your Honor.

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

25 MR. WHITE: No objection, Your Honor.



1 THE SPECIAL MASTER: Okay.

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

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

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

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

13 THE SPECIAL MASTER: All right.

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

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

25 THE WITNESS: A synthetic stream flow was one



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

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

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

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

18 THE WITNESS: Yes, sir.

19 THE SPECIAL MASTER: Okay.

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

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

25 THE SPECIAL MASTER: All right.



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

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

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

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

9 THE SPECIAL MASTER: All right. Exhibits C-296,  
10 297, 298, 299, and 300, being the same and are hereby  
11 entered into evidence for the purpose offered.

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

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

16 THE SPECIAL MASTER: Sure.

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CROSS-EXAMINATION

1  
2 BY MR. WHITE:

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

8 A Yes, sir.

9 Q Which values are they?

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

13 Q Do you have those values with you?

14 A Yes, I do.

15 Q May I see them, please?

16 A Yes, sir.

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

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

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

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

25 keene-cross-white



1 they provided target flows for him. I do not remember  
 2 specific values in specific streams, if that was the case.  
 3 Once the information was available and turned over to Mr.  
 4 Billstein, it could have been routed to Mr. Toedter with-  
 5 out my knowledge.

6 Q What do you mean by "target flows"?

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

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

16 A No, because if the flows were turned over, and like I said,  
 17 I don't know a specific example at this time, but they  
 18 would not have been the final results at one of the  
 19 gauging stations that I have classified as an A.1 system.  
 20 So it may have been an intermediate hydrologic data transfer  
 21 similar to what I described in my earlier testimony.  
 22 But again, at this time I do not know for sure what he used in each one of his depletion  
 23 studies.  
 24

25 keene-cross-white



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

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

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

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

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

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

25 keene-cross-white



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

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

10 A That is correct.

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

13 THE SPECIAL MASTER: Water quality?

14 MR. WHITE: Quality.

15 THE WITNESS: I did not study water quality.

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

18 A Yes.

19 Q Excuse me, specifically the period of significant draught,  
20 1945 to '32.

21 THE SPECIAL MASTER: Since you have done so much  
22 to take care of the Special Master on the ones '35 to '45,  
23 '45 to '32.

24 THE WITNESS: I realize that there was some concern  
25 keene-cross-white



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

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



1 work paper that might show this variability that I  
2 described.

3 THE SPECIAL MASTER: One page?

4 THE WITNESS: One page.

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

7 MR. WHITE: Off the record, Your Honor.

8 (Off-the-record discussion.)

9 THE WITNESS: The work paper that I have here is  
10 what's called an annual stream flow variability plot.  
11 What I have color coded here is the deviation from the  
12 mean, and I'm working with Bull Lake Creek through Lenore.  
13 Now, if you can see it, there's a dashed line sort of  
14 centrally located, and the coloring on either side  
15 describes the deviation from that mean, and as you can see,  
16 starting back in 1918 as this plot shows, about 1918,  
17 1919 I was below the mean, and now I fluctuate above.  
18 Remember yesterday or the day before I was describing  
19 that the '20s were very surplus. You can see there's  
20 quite a block of coloring there that deviates from the  
21 long-term average flow.

22 THE SPECIAL MASTER: I appreciate that. That shows  
23 not using the '20s you didn't damage your objectivity  
24 professionally by omitting the '30s since they probably  
25 keene-cross-white



1 would have been a standoff anyway or washout?

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

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

12 (Whereupon, the Witness hands  
13 a document to Counsel.  
14  
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keene-cross-white



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

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

9 A Yes.

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

12 A That's correct.

13 Q Aren't those high fluctuations demonstrated by the sig-  
14 nificant movement above and below the mean shown on NK-2?

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

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

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

24 Q Isn't it true that to really show the representative nature,  
25 keene-cross-white





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

6 A. That is correct.

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

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

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

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

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

25 keene-cross-white



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

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

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

15 Q Why not?

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

19 Now, I did examine the stream flows for Bull Lake  
20 Creek Lenore on a more extensive statistical basis  
21 looking at different distribution possibilities, the  
22 normal distribution possibilities allowing more distri-  
23 bution and so forth, and in that case, I could start  
24 looking at different measures of central tendency, but

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

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

7 THE SPECIAL MASTER: Over the decades?

8 Q (By Mr. White) During the study period. I think it's  
9 1946 to '79. Was that the study period?

10 A. 1946 to '79 is the study period.

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

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

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

19 MR. CLEAR: Objection, Your Honor. Speculative.

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

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

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1 THE WITNESS: I do not --

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

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

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

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

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

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

24 A I did not have stream flow measurements back at the time  
25 keene-cross-white



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

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

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

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

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

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

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

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

3 MR. WHITE: I don't care.

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

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

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

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

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

14 THE SPECIAL MASTER: Central value?

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

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

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A. Yes.

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

\* \* \* \*



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

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

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

6 THE SPECIAL MASTER: No, no.

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

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

25 keene-cross-white





1 gauges in the Basin that have continuous record and so  
2 forth. The U.S. Bureau of Reclamation for their Wind  
3 Division Report several years ago used a very abbreviated  
4 period in the late '50s and early '60s to size some of  
5 the reservoir facilities. So there have been several  
6 studies done in our particular Basin that have used those  
7 years I have quoted, and in referencing back to Counsel's  
8 question, yes, I do know that there have been situations  
9 in the past where those particular flows have not panned  
10 out as history has passed on. But I feel confident with  
11 my results, and if the Court would allow, I do have these  
12 other techniques that I examined in substantiating the  
13 '46 to '79 period.

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

16 THE WITNESS: I'm working on it.

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

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

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

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



1 the period around 1968 was a period of relative draught?  
2 A I listened to the deposition and briefed some of the  
3 material, but that does not particularly concern me  
4 because the purpose of my study selection, the data base  
5 period that is representative over long-term conditions,  
6 and the movement of my flows to a specific year, is not  
7 my intent, my intent is to establish flows that are  
8 representative of long-term conditions, and I feel that I  
9 have done that.

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

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

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

23 A In general, that is correct.

24 Q Isn't it true, however, that part of your study did not  
25 keene-cross-white



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

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

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

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

11 Q How did you include them?

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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1 natural flow estimates.

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

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

9 THE SPECIAL MASTER: Go ahead.

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

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

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

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

23 MR. WHITE: I think he can answer it.

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

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

12 Q I will try it again.

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

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

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



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

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

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

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

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

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

20 What does that mean?

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

24 As I have indicated, the results of my study will

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

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

10 There's also the representative yield per unit  
11 area. That's a faction that we have commonly con-  
12 sidered in hydrology.

13 You look at basin characteristics, and if they  
14 can be said to be similar hydrologically, you want  
15 your runoff per unit area to be representative of  
16 those similarities as well, so there are several  
17 things that go into establishing and preserving those  
18 hydrologic characteristics in this statistical exer-  
19 cise.

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

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



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

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

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

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

16 A The B.2 site.

17 Q -- the B.2 site and ask you to identify that and des-  
18 cribe your methodology for that as well at the same  
19 time.

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

25 keene-cross-white



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

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

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

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

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

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

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

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1 THE SPECIAL MASTER: Hold it a half a second.

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

4 THE SPECIAL MASTER: Yes.

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

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

10 THE WITNESS: And on the flip side are the addi-  
11 tional sites under that classification. That will give  
12 you an idea of the number of sites studied on this, and  
13 also the most right column is the average annual natural  
14 flow for those which I estimated. There's a footnote there  
15 --

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

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

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

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



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

5 THE SPECIAL MASTER: Which exhibit?

6 THE WITNESS: NK-3.

7 THE SPECIAL MASTER: Thank you.

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

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

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

6 THE SPECIAL MASTER: Right.

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

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

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

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

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

16 A It appears to be correct.

17 MR. WHITE: Did you have a question?

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

20 MR. WHITE: Yes.

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

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

6 A Not in all cases.

7 THE REPORTER: What was your answer?

8 THE WITNESS: Not in all cases.

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

11 THE WITNESS: No, I'm fine.

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

13 THE SPECIAL MASTER: Okay, let's go.

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

19 (Brief pause.)

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

25 keene-cross-white



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

6 A That is not correct.

7 Q What is correct?

8 A I did not have my agricultural depletion estimate.

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

11 A That is correct.

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

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

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

25 keene-cross-white



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

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

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

8 A That is correct.

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

12 A Yes.

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

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

25 keene-cross-white



1 have approximately 950,000 acre-feet already determined  
2 at this point. I have a combination of 87,802 tributaries  
3 of the Little Wind River combining to approximately  
4 170,000 acre-feet. I can keep going, but the point is the  
5 A.1 studies have determined the monthly distribution  
6 of flows in this system as well as the total quantity of  
7 flows, but it was still necessary to continue my book-  
8 keeping looking at in-flows and out-flows -- I explained  
9 my simple water budget the other day -- to keep  
10 proceeding down the Basin, but I did not perform a  
11 detailed agricultural depletion analysis instream as  
12 directed by the project manager, Mr. Billstein.

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

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

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

24 Is what you are telling us, your assignment in this  
25 keene-cross-white



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

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

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

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

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

25 keene-cross-white



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

A Yes.

\* \* \* \* \*

keene-cross-white





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

5 A. Correct.

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

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

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

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

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

25 keene-cross-white



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

3 With respect to the other grounds, it's one of  
4 materiality or perhaps probative value, in that since  
5 the detailed analysis which comprises a portion of  
6 Mr. Keene's work is applicable to only a portion of  
7 the river system, and since his remaining work, essen-  
8 tially the downstream portion of the river system  
9 is based on mere prediction analysis, and since there's  
10 been no showing that there's been a verification of  
11 either the predictions or the calculated natural flows  
12 based on gauges and depletion, we would object on the  
13 second ground in addition to relevancy or materiality  
14 or lack of probative value.

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

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

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

22 THE SPECIAL MASTER: Since one stems from the other.

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

25 MR. CLEAR: Would you repeat what they are?



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

4 THE SPECIAL MASTER: On Bull Creek?

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

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

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

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

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

19 MR. CLEAR: Yes, sir.

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

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

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

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



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

3 THE SPECIAL MASTER: All right.

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

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

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

9 THE SPECIAL MASTER: Are you going to take excep-  
10 tion to them?

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

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

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

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

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



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

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

6 THE SPECIAL MASTER: Mr. Perry?

7 MR. PERRY: No.

8 THE SPECIAL MASTER: Mr. Thomson?

9 MR. THOMSON: No.

10 THE SPECIAL MASTER: Mr. White?

11 MR. WHITE: No.

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

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

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

19 Do you want a little break?

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

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

24 Let's take a ten-minute break.

25 (Recess.



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

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

18 (Whereupon, a short recess  
19 was taken.)

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

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

23 MR. PERRY: Sure.

24 THE SPECIAL MASTER: All right.

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



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

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



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

4 MR. WHITE: Your Honor, I --

5 THE SPECIAL MASTER: Go ahead, Mr. White.

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

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

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





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

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

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

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

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

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

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

15 THE SPECIAL MASTER: Yes, Mr. White.

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



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

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

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

20  
21 \* \* \* \* \*



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

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

14 MR. ECHOHAWK: We are talking about approximately  
15 17,000 acres, and that's our point exactly.

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

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

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



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

5 THE SPECIAL MASTER: No problem.

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

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

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

17 THE SPECIAL MASTER: Let's proceed. I wish that  
18 were the only problem I had to dispose of in this law-  
19 suit.

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



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

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

7 THE SPECIAL MASTER: Do you have copies of that?

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

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

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



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

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

12 MR. ECHOHAWK: That's correct.

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

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

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

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

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



1 I have no question. I'm sorry.

2 Go ahead, Mr. Echohawk, with your case.

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

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

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

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

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

14 MR. WHITE: I object.

15 THE SPECIAL MASTER: The objection has already been  
16 made.

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

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

21 MR. ECHOHAWK: No, Your Honor.

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

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



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

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

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

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

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

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

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

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

24 MR. BILLSTEIN: Okay.

25 \* \* \* \* \*





1 THE SPECIAL MASTER: All right, Mr. Echohawk.

2 RONALD BILLSTEIN

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

6 DIRECT EXAMINATION

7 BY MR. ECHOHAWK:

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

9 A My name is Ronald E. Billstein.

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

12 A That is correct.

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

15 A Yes.

16 Q Do you recall what area you were qualified in?

17 A It was water resource planner.

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

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

24 Q Mr. Billstein, in this case, this particular instance,  
25 billstein-direct-echohawk



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

4 A Yes, I have.

5 Q And in what areas did you analyze?

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

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

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

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

25 billstein-direct-echohawk



1 Would you please identify that exhibit for us?

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

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

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

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

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

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

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

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

9 THE SPECIAL MASTER: I see.

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

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

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

19 THE SPECIAL MASTER: Mr. White.

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

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

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

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

13 A The triangle would control.

14 Q All right. Please continue.

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

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



1 litigation as historically irrigated, historically in  
2 use?

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

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

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

9 Q Excuse me, did you say adjudicated or unadjudicated?

10 A Unadjudicated lands in a Type VII category.

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

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

14 Q Okay.

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

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

23 THE SPECIAL MASTER: Pentagon.

24 THE WITNESS: -- pentagon insignia within those  
25 billstein-direct-echohawk



1 colored areas.

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

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

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

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

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

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

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

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1 THE SPECIAL MASTER: Do what?

2 MR. ECHOHAWK: May I have one moment?

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

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

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

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

13 MR. ECHOHAWK: Laying foundation, Your Honor.

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

17 THE WITNESS: Yes, it was.

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

24 MR. ECHOHAWK: Essentially, Your Honor, I'm laying  
25 billstein-direct-echohawk





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

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

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

7 A Yes, it was.

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

11 A That's correct.

12 Q That was all done under your supervision?

13 A That's correct.

14 THE SPECIAL MASTER: Let me ask a question.

15 MR. WHITE: I'm going --

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

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

21 THE WITNESS: Not in all cases, Your Honor. Of  
22 course, that acreage is impacted by a number of things.  
23 Fractionated ownership, for example, you may have a  
24 certificate of record that covers both fee and trust lands.

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

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

6 THE WITNESS: That's correct, Your Honor.

7 THE SPECIAL MASTER: Go ahead, Mr. White.

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

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

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

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

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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.

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THE SPECIAL MASTER: Overruled. In Billings? Over-  
ruled.  
Q (By Mr. Echohawk) Did you make inquiry regarding that in-  
formation?  
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 testi-  
mony 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  
billstein - direct - echohawk



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

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

8 MR. ECHOHAWK: Just to clarify and to assure everyone  
9 that all phases will be covered, when we reconvene in July,  
10 the United States will offer, in fact, certified copies  
11 of all township title plats and, in addition, title owner-  
12 ship records for each individual portion of the reservation  
13 dating from date of decree, including all the title trans-  
14 actions that have occurred in relation to all particular  
15 tracts on the reservation.

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

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

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

24 A That's correct.

25 billstein - direct - echohawk



1 Q Using records from the State Engineer's office?

2 A That was the basis.

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

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

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

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

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

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

20 THE SPECIAL MASTER: All right.

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

25 billstein - direct - echohawk



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

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

8           Would you please explain the significance of those?

9 A   Certainly. The circles are control points, and those con-  
10 trol points are utilized to operate the system in the up-  
11 stream to the downstream direction.

12           The control points reflect the fact that there are  
13 certain physical occurrences taking place at those loca-  
14 tions. Those physical activities could be from the stand-  
15 point of diversions accumulating return flows, accumulating  
16 storage, releasing storage, reviewing desired flows in the  
17 stream, this type of basis.

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

23 Q   Mr. Billstein, you have mentioned in regard to those circles,  
24 the red circles and the green circles -- and you call them  
25 billstein - direct - echohawk





1 control points on nodes -- are those terms used inter-  
2 changeably throughout your discussion?

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

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

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

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

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

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

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

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

24 A Yes, it was.

25 billstein - direct - echohawk



1 Q Would you please describe generally what those were?

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

4 The second component was the Little Wind operational  
5 study.

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

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

13 Q You said it wasn't productive. You mean not really neces-  
14 sary?

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

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

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

24 THE SPECIAL MASTER: Are those the only places you  
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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.

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billstein - direct - echohawk



1 Q (By Mr. Echohawk) All right. That covers four general  
2 descriptions. What's the fifth area that you conducted  
3 some sort of analysis?  
4 A That was up in the Owl Creek watershed, and in the Owl  
5 Creek watershed, we reviewed the claims of the United  
6 States lying south of the Owl Creek system, whether  
7 it be South Fork of Owl Creek or the mainstem of Owl  
8 Creek as it forms the reservation boundary. In this  
9 type of analysis we took a look at the available flow  
10 in terms of recurrence interval and compared that against  
11 the demand of the claims.

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

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

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

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

25 billstein-direct-echohawk



1 Q And all necessary information that you needed to con-  
2 duct your water availability study was supplied by  
3 Mr. Keene?

4 A That's correct.

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

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

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

25 billstein-direct-echohawk



1 A. Yes, I have.

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

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

11 THE SPECIAL MASTER: Yeah, very good.

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

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

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

19 MR. ECHOHAWK: We are just --

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

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

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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.)

\* \* \* \* \*

