
IN RE: NON-BINDING ARBITRATION PURSUANT TO THE FINAL SETTLEMENT STIPULATION, KANSAS v. NEBRASKA and COLORADO

No. 126 Original, U.S. Supreme Court

TRANSCRIPT OF ARBITRATION PROCEEDINGS

before

KARL J. DREHER, ARBITRATOR

Thursday, March 19, 2009
VOLUME IX

BE IT REMEMBERED that the above-entitled matter came on for Arbitration before KARL DREHER, Arbitrator, held at Byron Rogers Building, 1929 South Street, Room C-205, Denver, Colorado on the 19th day of March, 2009.

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I N D E X

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P R O C E E D I N G S

ARBITRATOR DREHER: Good morning.

This is day nine in the hearing for Nonbinding Arbitration pursuant to the Final Settlement Stipulation resulting from Kansas v. Colorado and Nebraska, No. 126, Original.

We stopped yesterday partway through the redirect of Dr. Ahlfeld and I presume that you are ready to continue.

MR. BLANKENAU: I believe it is the direct on rebuttal.

ARBITRATOR DREHER: I'm sorry, the direct on rebuttal.

MR. BLANKENAU: Just for clarity of the record, we closed with some hypotheticals posed by you, Mr. Dreher.

Dr. Ahlfeld has given consideration to the hypotheticals that you have posed to him and is prepared to explain how Nebraska's proposal would handle those situations.

DAVID AHLFELD,

having been previously duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. BLANKENAU:

Q Dr. Ahlfeld, do you recall the questions of yesterday?

A I believe so, yes.

Q Go ahead and respond.

A Okay.

So if I may, I'm going to stand up, I think I will feel more comfortable with that because I will be doing some drawing.

So what I would recall is that the interest was in a hypothetical two States and I'll just call them A and B so nobody's feathers get ruffled.

And the following situation with both A and B off the baseflow is a thousand -- this is a typical symbol we have been using -- with A on and B off, the baseflow is 100. With A off and B on, the baseflow is 800. And with both on, the baseflow is zero.

This is a stream-drying situation and the method comes into play. If there was not stream-drying, then our method would be identical to the current method and the CBCU calculations.

Now, I just want to mention that we have sort of approached this from the perspective of defining criteria and then deriving a method from

that, as we have discussed. We didn't set out to say we are going to take residuals and split them in a certain proportion. It turns out for the two-state case, or two-activity case, they do split evenly. For the third activity case, for example, they do not split evenly.

Okay. That being said, why does it work out that they split evenly? I would like to explain that. Take a bit of a different tact on this than we have used up to now. And ask this question of these numbers -- well, or make an observation.

If we look at these numbers and ask if B was not active at all, if B was not pumping, how much water would A take out of the stream? 1000 minus 100, 900 would be taken out of the stream.

So, if we can simply note that -- I will introduce a new term here and put it in quotes. I will say that A is "demanding" 900. In other words, in the absence of B, A would take 900.

If we do the same calculation in the other direction, if A was not active, what would B demand?

Okay. So I would put that in terms of B "demands" 200. This is kind of the reverse way of looking at it than the way we have been doing so far.

What is the sum of the demands? Well, if I just add those together, total is, of course, 1100. What is available? A thousand. So I have, if you will, an excess demand of 100.

Now, if we did this the other way around, that is CBCU and adding those up and looking at the virgin water supply metric, we would see that we have a residual of a hundred, so this is the same number.

So how do we proceed from here -- or let me ask this question first.

How is this demand met? We know the demand is actually met -- this 1100 is met. How is it met? A thousand is met by stream depletion, the extra 100, the exceed demand is met by storage depletion -- storage depletion.

Okay. So how do we assign a CBCU to this? We would say for our methods -- and again, this is the case of two activities only, could be thought of this way.

We are going to take what they demanded -- what they demanded and subtract the change in storage that was -- that was used to meet that demand. In other words, the demand -- the CBCU is that portion of A's demand that is met by streamflow

depletion, and that is as high as 900, but it's presumably somewhat less because some of that demand is met by storage depletion.

I can say the same thing about State B and that is going to be -- its demand is 200. And there is some change in storage -- there is some storage depletion it's drawing from.

Okay. Well, wouldn't it be great to know those numbers to change in storage associated with each State?

Well, there is really no way to do this, because it's not the individual State's storage that is being depleted in this particular subbasin; it's collective storage. It's the basin's storage or the subbasin's. Well, actually, the whole basin's storage because, in fact, the depletion of the storage basin could be happening in a different subbasin. Of course, they are all connected in the subsurface.

So using this kind of perspective, our method effectively says we are going to make the change in storage is -- the amount of water that is drawn from storage by A and by State B equal. There is the half and half.

And, of course -- running out of space

here -- but then this CBCU, A is going to go to 8, obviously half. And that means there is 50 each right -- what comes out of storage is a hundred, so we will assign 50 to each. So the CBCU, A will be 850 and the CBCU, B will be 150.

So, in a nutshell and from a somewhat different perspective, that's how our method would operate for the two-activity case.

Another -- if I can continue to elaborate on this. Another way to look at this is, in the absence of B, A would have taken 900 -- A would have taken 900 from the stream. In the absence of A, B would have taken 200. And so making this storage assignment equal seems to be reasonable -- seems to us to be reasonable.

Again, we didn't derive the method to make this happen. It just works for the relatively simple two-activity case.

Three activities, it's much more complicated. South Fork is a great example of that and it doesn't divide even in this regard.

Q Can you elaborate a little bit on the three-state scenario.

A Well, it gets complicated. If we had three states, A, B, C, it might be the case that any

one of them acting alone would not deplete the stream, but suppose the numbers worked out so that A and B acting alone would deplete the stream. A and C acting alone would deplete the stream and, or B and C acting alone would deplete the stream.

Now, what is the logic behind separating out the storage in that case? It gets more complicated.

I will say that my recollection of the -- our process, Nebraska's process in all of this, at least since I was involved about a year ago, we had meetings and phone calls and such in, say, through spring and early summer, in particular, on -- well, we had meetings and phone calls for the last year, of course, but in early spring -- sorry, spring and early summer, we were working through why is this happening? Why is the virgin water supply metric not being met? That was question one. And exploring where other places it's not met.

And we were starting to think about how can we fix this. And we tossed about all sorts of ways to do that. And many of them have problems with logic or in the three-activity case, they just fall apart. They don't make sense. In other words, they become -- well, illogical.

Q So Nebraska attempted to create an unbiased solution to distribute the residual among the competing States because of the uncertainty as to who actually is responsible?

A Right.

MR. DRAPER: Excuse me, I would ask, Your Honor, that counsel not provide the answer to the witness by asking a leading question that sets it all out and he can say yes, absolutely. That is not what we need from testimony in this case. We need to hear the witness' opinion, not counsel's.

ARBITRATOR DREHER: Can you rephrase your question, please.

Q (BY MR. BLANKENAU) What does Nebraska's solution attempt to do, then?

A Well, as we say in the report, we go through all of the eight combinations. Of course, in a two-state case, that collapses down, as we also show in the record and Dr. Schreuder showed yesterday, but we look at all of the possible combinations of stresses and that eliminates the -- that takes care of the excess demand, that appropriately allocates the excess demand using this terminology or allocates residual if we look at it from the other direction.

And we believe it does so in the -- in the fairest way.

Q So going back, then, to Mr. Dreher's hypothetical where one State develops their pumping first followed by a second State some years later, how does the model deal with that?

A Yes, and I -- you asked about that, and I forgot to mention it. It was right here in my notes.

We could suppose, for example, that for this situation, State A has been pumping for a long, long time, longer than B. Or State B is further away, or State B is pumping less. Any of those things would produce an effect in the model because the model tracks the history of that State's activity and its impact on both the aquifer and the streams. The model would account for that.

So I think I have answered your question.

Q You can go ahead and have a seat.

MR. BLANKENAU: That's all the questions we have.

ARBITRATOR DREHER: So you are done with this witness?

MR. BLANKENAU: I am, yes.

ARBITRATOR DREHER: Do we know who is going to go first in terms of Kansas or Colorado?

MR. DRAPER: Kansas is going to go first and I need a Draper 5 before we start.

ARBITRATOR DREHER: That would be fine.

MR. AMPE: And five minutes to coordinate may shorten the process as well.

(Break was taken from 8:46 to 8:55.)

ARBITRATOR DREHER: All right, before you begin your cross, Mr. Draper, I do have one question. If somebody could flip that chart back.

In a system that is responding nonlinearly, how reasonable of an assumption is it to assume that the change in Storage A equals the change in Storage B?

THE WITNESS: I don't know. We don't know -- and I think it's probably unknowable, as a practical matter, what those Storage A and B -- change in Storage A and B terms are.

Again, it's -- the change -- there is a total change in storage, obviously, for the aquifer, which is affected in some complicated way by both States A and B. There are certainly other ways -- other assumptions you could make there.

The problem with taking other routes, I

think, is that you, I believe, would lose the sort of theoretical foundation of this. In other words, again, we didn't derive this to make this happen. We derived it from a set of principles and then it happens to work out this way for the two-state case.

So you could do it other ways.

ARBITRATOR DREHER: All right.

Mr. Draper, please

CROSS-EXAMINATION

BY MR. DRAPER:

Q Good morning, Professor.

A Good morning.

Q If I heard you correctly responding just now to the Arbitrator, you were saying, to put it differently, that your proposal is not unique.

Would you agree with that?

A Well, there are -- there are an infinite number of proposals that could be put forward. So, clearly, our proposal is not the only one.

What I have said and what I still believe is that if you start at the three criteria that we have stated -- that I stated on Tuesday and also in our report, given those three criteria, our method is unique, and it happens that this falls out of it, if you will.

Q And those are criteria that you set, correct?

A The three criteria that I just mentioned were reasonable, yes.

Q And you have done an example here on the butcher paper this morning, where two States are demanding water from the same tributary. One is at a 900 level and another is at a 200.

If we assume that in space and time those are equal -- in other words, those stresses got turned on by each State at the same time and they are -- those stresses are equal distance through uniform materials, it doesn't immediately appear to me as to why the States should be held equally responsible for depletions of storage.

A Well, my hypothetical was not -- or actually, it's Mr. Dreher's hypothetical, what I understood him to say. I didn't conceive of a particular basin, of course, or a particular rate of pumping, so I'm not sure what to do with that part of your question, which seems to be a premise.

So essentially, you are adding the hypothetical, I think.

Q I'm trying to simplify it by making some very simple assumptions that you didn't mention, so

that we can just focus on the numbers.

You had -- Mr. Dreher asked about changes in time and differences in location. If we assume that those are equal -- just looking at your numbers here, why does it appear appropriate to require the State with the demand of 200 to be held equally responsible for depletion of storage with the State that demands 900?

A Well, if I heard your premises correctly, my numbers would no longer work because you are saying the two States are pumping at the same rates at the same times in comparable locations or --

Q Not at the same rate; just at the same time.

A Well, not at the same right --

Q Time and equal distance locations through uniform materials.

A Okay. So that would be -- one possible way that A's demand would exceed B. So, obviously, A is the big pumper here in your -- in your conception of this.

As I just said, you could conceive of other ways to divide up that excess demand -- that storage. Who gets credit, if you will, for that storage.

I don't know of a way to do that that is not -- that directly uses the model -- let me back up.

You could -- you could certainly look at the change of storage in the aquifer, I mean that is computed by the model. But who created that change in storage because storage is dropping all the time. You could use some other scheme than the one that falls out of our method, but the challenges -- and we thought about this, and we tried to work it through -- what happens when you have three activities? It falls apart, in my opinion, and my recollection.

We went through many, many, alternate ways to do this before -- let me come back to the history of this, which, I think, helps with answering your question.

We started out in sort of a mode of, Well, is there some principle we could use for just dividing up this residual? Once we recognized that the virgin water metric failed in these various subbasins, is there some logic we can use for dividing up the residual? How about in proportion to the pumping that each State has in that subbasin?

First glance, that sounds reasonable,

but, in fact, the depletion in the stream could result from pumping in a different subbasin, of course. So that doesn't really work.

Okay. So we looked at many -- in a brainstorm, I would say, of many things, and I don't have a recollection of everything we thought of. This was, as I said, spring and early summer, as I recall.

But for one reason or another, we said, You know, there is a logical flaw in that where it doesn't work when you have three activities. It just doesn't work, or four activities.

And then midsummer, I think it was, we said, Well, we are kind of thinking about this the wrong way, let's start with the fundamental criteria.

We devised the three criteria that I have described and the method follows from that. It results in this. And that's our method.

Q What if, in your example, the total demand was 1100, but let's say State B's demand was 10 and State A's was 1090, would you still divide the change in storage equally?

A Let's see. That's a little tricky because you are saying that A demands more than is in the stream. You are saying A demands -- I better

write that down. You just asked B demands --

Q If B demands only 10 --

A Okay.

Q -- and A demands 1090 --

A 1090.

Q -- so the total demand is the same?

A Okay.

Q Your method, how would the storage be split between the two States under that circumstance?

A A cannot be charged more than is actually in the stream, obviously. In other words -- and this, of course, is happening all over the subbasin -- all over the basin. These demands, as I'm calling them, in some cases, far exceed what is in the stream, and you cannot be charged for that.

The Compact only looks at the streamflow. It does not look at the storage depletion that is occurring.

Now, of course, the storage depletion is mapped through time in the model. And the impacts of every State's activity through time is kept track of by the model through storage depletion. And that, of course, has an effect on streamflow, but ultimately the Compact only cares about streamflow.

So, if, in the case you are talking

about, there is only a thousand available in the stream, A is demanding 1090, A would be charge no more than a thousand because that is all that is there.

Is that making sense? Is that answering your question?

Q I'm focusing -- you have introduced the change in storage --

A Uh-huh.

Q -- and you have said in your methods when there are two States, the effect of your method is to assign that change in storage and charge each State for that component equal; is that right?

A Yeah, that's correct. So here is what we would do in that case.

Q So you would still charge each State 50 --

A You know, I'm hesitating here because this is not the way we have been thinking about it, so . . . We were asked to think about it in a different way and I don't want to give you an incorrect answer and you have asked -- give me a chance to work this out.

Q Okay.

A Yeah. Okay, our logic would say -- the

logic I laid out just now would say if B didn't exist, A would have taken all of the water in the stream. And this is your example, now.

So, in fact, we would say, in your case, A demands 1000 -- it demands the whole stream. And if A didn't exist and only B was pumping, we would say B demands 10. So, in fact, we would say that the total demand on the stream is 100 -- 1010. And so the excess demand would then be 10, divide that in half.

So the CBCU -- for your case, the CBCU used for A would be 995. And the CBCU for B would be 5.

I don't know if you followed that. I might have to write it on the sheet for you.

Q Let me adjust this a little bit so I think, at least in your thinking, it introduces a complication that I didn't want to introduce.

A Uh-huh.

Q Let's assume that the pumping, the total demands are equal to the baseflow, and that one State is 890 and the other State is 10 -- or 990, I guess I should say -- 990 for one State and 10 for the other.

A So you are saying if B did not exist, A would take -- could you say the number again? 990, I

think?

Q Yes. These are impacts on the stream, on the baseflow, 990.

A Yes. If A did not exist, B would demand -- or would take 10. I want to be clear, when I say "demand," it's a shorthand way of saying -- in the first case, I will just point back to my chart here.

If B did not exist, A would, in fact, take 900. So we are calling that its "demand," if you will. In the second case, if A did not exist, B, would, in fact, take 200 from the stream. So in your case A is demanding 990 and B is demanding 10. Okay.

So the total demand is 1000. So there is no excess demand; they both get what they want.

Q Okay, let's go back --

A And the CBCU by our method would give the same -- the same value as the current method.

Q No matter what the stress is of these two States on the stream, you split any change in storage evenly between the two States?

A If it's a two-state case, our method happens to work out that way. It wasn't designed.

Q And if the ratio is very lopsided in terms of what their demands are, you still divide it 50/50?

A That's correct.

Q Even if it's an extreme, as I was trying to posit an example.

A That's correct.

Q Now, in your example here as you put it, how does the evapotranspiration by phreatophytes, which is a major element on Beaver Creek, for instance, how does that figure into this?

A Sure. So there is some basin -- some subbasin is not one of those ones in our -- but it still has got ET.

Q Well --

A No, no, I mean I don't want to get -- well, if you want to talk about Beaver Creek, actually, we could run through the numbers because you can do all of this with Beaver Creek. In fact, all of the numbers to do this are in our report.

We didn't lay it out quite this way, but, of course, you don't get nice, round numbers.

So sticking with this and answering your question, each of the numbers on the left chart, theta equals a thousand, A is a hundred, A 800, A/B is zero, those are computed by the model.

So A, for example, says run the model from 1918 to present, or whatever year this is we are

talking about, of course, we are looking at particular year for this subbasin. Run the model up to the target year and include all of the effects of pumping by A, all of the effects of depletion by A, all of the effects of evapotranspiration, recharge, everything is in there, it's just a model number, Similarly, for B and theta and A/B. So it's all there.

Q I think one of your starting points in your report and your testimony is that the model -- Modeling Committee must have intended that the individual impacts of the four stresses must add up to the all-on or all-off difference, correct?

A I don't believe that's what we said. I think what we said was it follows from the Compact definition of virgin water supply and from the way it's practically calculated -- or the way it's calculated, as described in the FSS, Appendix C. Putting those two things together, it follows that the individual impacts should add up to the best estimate we have of the virgin water supply.

And, of course, we think the best estimate is the all-off minus all-on, and that's the basis of our analysis and the basis of our proposed method.

Q Did you investigate the extent to which the Modeling Committee had addressed this issue?

A No. I -- I -- I guess I should qualify that by saying I had anecdotal conversations with Mike McDonald and Jim Williams, I think, who is maybe part -- I forget, but some other folks who were from DNR, you know: What happens? Whatever.

I made no investigation. I don't really know what they were -- what the Modeling Committee was doing, other than as several of the members were there I described, creating a model that was a reasonable tool for estimating baseflows under the various stresses that are imposed upon.

Q In fact, there were situations that the Modeling Committee had before it which exhibited quite clearly the nonlinear aspects of the groundwater model; isn't that right?

MR. BLANKENAU: I'm going to object. The witness has already answered he doesn't know what the Modeling Committee considered. Sounds like counsel is attempting to testify.

Q (BY MR. DRAPER) Okay, let's try it a different way.

Did you look at this report, the one that is the Final Report of the Special Master with

Certificate of Adoption of RRCA Groundwater Model?

A Yes, I did.

Q In the back of it there is a DVD, right?

A Well, I downloaded a copy from the Internet of the report. So I don't know about the DVD.

Q It's an official part of this volume, isn't it?

A I don't know.

Q You don't know?

A Before this week, I didn't realize there was an official -- I mean, the bound volume I have never seen before. In other words, I just downloaded a copy from the Internet of the report.

Q I might, just for the record, mention what I am holding here is a copy of Final Report of the Special Master with Certificate of Adoption of RRCA Groundwater Model, which is on file with the United States Supreme Court as part of this -- part of the Decree entered in this case.

I would like to take this part of that volume and display it on the sheets on the wall, if I may?

MR. BLANKENAU: I would ask counsel the purpose.

MR. DRAPER: So that we can cross-examine the witness.

MR. BLANKENAU: Well, this is going toward the argument a deal is the deal. I think the Arbitrator has already ruled on that.

MR. DRAPER: It's not what the purpose is.

MR. BLANKENAU: Okay. I guess I would just remind counsel that the witness has already stated he's not aware of this. I'm not sure what cross-examination can be had here.

MR. DRAPER: Okay. Thank you very much.

Q (BY MR. DRAPER) You downloaded the information from this volume from the Internet, Dr. Ahlfeld?

A Well, what I'm remembering is that the -- there is a website RRCA -- or Republican River Administration, Compact Administration.org, or something like that, and the Special Master Report is there is a PDF. And there are a whole bunch of other things on that website that I think are the groundwater model itself, the input files. I suppose the output files from the model. As I'm recalling, they post updates to the model as new data comes in, and that sort of thing.

So I have -- I have downloaded the report, the paper copy you have noted, and reviewed that and sort of skimmed through the website for other items.

Q And that contains, for instance, the code of the model and representative input and output?

A I -- I believe that someone can go onto that website and download the whole model and run it. And people have done that, researchers have done that.

So I haven't done that myself, but I assume it's all there.

Q But the actual hard copy that I'm holding is not something that your counsel has shown you?

A Well, I was -- when I first started on the project, I, of course, had a lot of questions and one of the first pieces of information, in fact, probably the very first one, was describing this website and there are a few documents there you might want to look at. I'm sure that was one document that I looked at right off the bat.

Did I know it was bound in that nice olive-colored binding? No, I didn't. I have not

seen that format for its presentation.

I do most of my things with paperless now, right? PDFs and such.

Q Much more efficient.

A Yes, less to carry around.

Q From your review of the electronic copy of this, you would know, then, that Appendix A to this volume is the DVD, right?

A I didn't -- I'm not -- I -- if you would ask me what is Appendix A, I wouldn't recall that. You have just reminded.

Q But I would suggest to you that it is, if you would accept that.

A Okay. Okay.

Q And if one inserts this DVD in a computer, as we are doing here, the -- once you click on the Index, you come up with the sheet that is shown now, and we actually have a paper printout of this sheet. It's actually a printout on two pages and we have labeled that as Kansas Exhibit 72.

And this starts off by listing the person who participated in the Technical Groundwater Modeling Committee meetings.

Do you see that?

A I do.

Q Colorado, for instance, we see Mr. Schreuder; Mr. Slattery for Kansas; we see Mr. Barfield, Mr. Book, Mr. Larson and for Nebraska. Among those, I guess that is what Mr. Schreuder referred to as the "slew" of people; but we do see Mr. McDonald, your coauthor; Mr. Morrissey; Mr. Spalding, his partners; is that right?

A Those -- those names are on that list, yes.

Q All right. Now, if we look a little further down, we can see there are tabs that can be clicked on to get to different parts of this.

If we click on the Baseflow Predictions tab, through that we are able, then, to go to the next exhibit that we have printed out, which is a graph for Beaver Creek. We have labeled this exhibit Kansas Exhibit 71 in its hard copy.

This shows the impacts calculated by the model for Beaver Creek starting in 1918 and running through the year 2000, correct?

A Well, I -- I'm seeing this for the first time. It looks like it's a plot of baseflow versus time. I'm not quite clear on the colors, what those imply.

Q Well, the different colors are noted in

the upper left-hand corner of the graph regarding various State's well-pumping.

We can see, if we look at the years around 1990, that that is an example of the type of situation, I believe, that you are trying to address with your proposal, where the baseflow essentially went to zero and you had a nonlinear situation under those conditions.

Do you see that?

A Well, I see the lines going to or near zero around 1990, but I'm still puzzled as to what the lines are because there are two of them.

Is this the -- the -- the historic baseflow? Or I'm not sure what -- and the title is "Beaver: Confluence: Change." So I'm puzzled as to what actually this graph is actually graphing.

Q If these are the impacts of pumping by the denominated States on baseflows, we can see that those went to zero in that period around 1990, can't we?

A Well, what I'm understanding from your question is you are presuming that those lines are impacts of each State. I guess, green is -- is that Kansas impacts? Or I'm not sure. Impacts is different than baseflow, so I'm still puzzled as to

what the lines are.

Q When the baseflow goes to zero, the impact goes to zero because there is nothing to deplete; isn't that right?

A Well, the baseflow -- I think the source of my puzzlement here is what is the -- for one of these lines, what is the pumping condition? In other words, who's pumping and who's not?

I would not agree with the premise you just stated because it depends who is pumping and who is not. That is the point of our method -- not the whole point, but that is a piece of our method.

Q Well, the pumping is on for the whole time over this period.

A I'm sorry, is that a question?

Q No. That's a statement.

A Okay.

Q So you can see that the committee was looking at a situation where the impacts on the surface flows in the period around 1990 went to zero. And that would be because the streamflows went to zero and there is nothing in the stream to deplete; isn't that right?

A I'm hearing the same question from you, sir, and I have to give the same answer. I don't

know what these lines mean, I'm sorry. There is not enough information for me to know what these lines mean.

Q Well, just assume that they mean what I say they mean, if you would for this purpose.

A Okay. Could you clearly state what you think they mean, or what you are asking me to assume they mean.

Q These are the streamflow impacts as shown in the upper left-hand corner of the legend of the States of Kansas and Nebraska on Beaver Creek over the period shown, these are results from the RRCA groundwater model for this period.

A Okay. So I will -- I will go along with you here. Let's just look at the green line, to simplify it a little bit.

So what I hear you saying is that the green line is the impact of Kansas wells in each year?

Q That's right.

A Okay.

Q And the blue line is the impact of Nebraska wells?

A Okay. And impact implies at least one difference from one baseflow condition to another

baseflow condition -- in other words, you could be going from all-off to turn on Kansas, for example. So if this is an impact or a difference in baseflows, it's not clear what the two cases are. I mean, we -- obviously, there are many possibilities.

Q Yes, there are, but I think it's pretty clear. Just take a look here.

The Kansas wells are shown in the upper left-hand corner as a decrease of 5938 acre-feet per year. That corresponds to turning off the Kansas wells and comparing it to a run with everybody on.

The one just below it for the Nebraska wells, the blue lines, is just turning off Nebraska, leaving everybody else on and taking the difference between those two runs.

That's how you get the impacts under the current accounting procedure in the use of the RRCA groundwater model, isn't it?

A Okay. You have clarified the plot. Thank you.

So this is a -- from what you said, this is a calculation of all-on minus either Kansas or Nebraska off and the associated impacts and the difference, rather?

Q Right.

A Okay, now I understand the graph. Thank you.

Q You are welcome.

Now, let's look at the area in the timeline here that we have and in the period around 1990, we can see that we had some years in which the impacts went to zero?

A Right, apparently. It's kind of hard to make out, but certainly close to zero, if not zero, using -- using the method you just described. It's essentially the current method.

Q Now, if we could look at the flip chart, I would like to --

A Oh, it's right here.

MR. WILMOTH: While we are taking a break, John, before we progress, can we get to this issue of time.

We have Nebraska's rebuttal, one, one, and one; it's one hour for our direct, one hour for your cross and one hour for our redirect. Can we agree on that? And your cross is split with Colorado.

MR. DRAPER: Well, we did have some discussions under the assumption that if we were not able to get all of the trial done within the ten days

that we allocated, that we would have to have a way of allocating that in order to maintain fairness among the parties.

We did not discuss it in -- as being something that could be used by one State to cut off cross-examination of its witness in the middle when there is turning out to be ample time within our schedule.

MR. WILMOTH: I'm not suggesting that you cut your cross-examination short. I just want to make sure that our rebuttal case doesn't turn into an opportunity for Kansas and Colorado to present additional evidence and essentially shove our time aside. That is my only point.

MR. DRAPER: I don't think we are in much danger of shoving Nebraska's time aside. We needed to have more than a day and half --

MR. WILMOTH: Yeah, but that is not an appropriate use of rebuttal, John. That was clearly not the agreement, nor the understanding, to drag this issue out for another day and a half. It's simply not consistent with what our agreement was, if that is what you are alluding to.

MR. DRAPER: I guess maybe I have said all that I can. If the Arbitrator agrees with you

that this should be curtailed, I guess that is what we will agree to.

MR. WILMOTH: Well, it's not curtailed.

MR. DRAPER: But I think it's, from our point of view, an attempt to cut off cross-examination here in the middle to interrupt and distract from the real issues we have before us.

MR. BLANKENAU: That just isn't correct.

We have all tried to tailor our time to our agreements, and that's -- we did that with respect to your case and we would expect you to honor our time, as well.

MR. DRAPER: We have been on cross-examination for, what, 15 minutes?

MR. WILMOTH: No. You have been on, by our count, for 40 minutes and I'm not suggesting you cut it off. I'm just saying I hope we are going to live up to what, you know, we originally talked about. We just want to make sure we don't run this thing out for the rest of the day and convert our rebuttal case into a retry of this issue.

That would not be an appropriate use of rebuttal time.

ARBITRATOR DREHER: Let me offer my perspective here.

I recognize that Dr. Ahlfeld was not part of the Modeling Committee and has no way of knowing what the Modeling Committee did or didn't consider. However, I do think it's pertinent to explore his views of what -- his opinion of what the Modeling Committee did or didn't do, or did or didn't consider in regards to this nonlinear response.

And I don't know any other way to get to that but through cross on this rebuttal, because I don't see any -- I don't -- I'm not sure what the opportunity was to ask those kind of questions. I suppose during cross of the direct testimony, they could have been asked.

MR. WILMOTH: Exactly. That's my point and we could have prepared some responses in our rebuttal case, rather than dealing with it for the first time now.

ARBITRATOR DREHER: But some of this, I believe, was triggered by my questions yesterday and so Kansas, perhaps, wasn't in a position to cross on these issues. But be that as it may, I mean, I certainly -- I do not want to do anything that would disadvantage one State over another; that is not the point of this.

But I am interested in Dr. Ahlfeld's

opinion about what the Modeling Committee did or did not consider. Under the extent that this line of questioning can get to that, then I would like to proceed. But we will monitor it, and if it appears to be an attempt to introduce additional -- I'm not sure what it would be, but we will monitor it and keep it in check.

MR. WILMOTH: Thank you.

ARBITRATOR DREHER: You may proceed.

MR. DRAPER: Thank you.

Now, I don't know if Mr. Ampe may have a copy of one of those volumes that we were using at some point, but one of those was this modeling documentation from which the DVD comes. And if he might have that available -- this is the one whose name starts with the words "Final Report."

Okay, I think we have located one, Pete. Thank you.

THE WITNESS: Thank you.

Q (BY MR. DRAPER) All right, Doctor, I would like to turn in the back of that volume, almost to the back, it's Appendix U, which is entitled "RRCA Model Impacts."

A Okay.

Q There are three fold-out sheets there.

A Yes.

Q The first one is for Colorado. The second one is for Kansas and the third -- third one is for Nebraska, and then the fourth is for the imports.

A Okay.

Q If we look at the second one, which is the impact of Kansas pumping, it's labeled page U2.

A Yes.

Q We can see there is a column there that -- the third column from the left for Beaver Creek, correct?

A Yes.

Q And we can look at the year 1990, for instance, and what does it show the impact is there?

A For Beaver Creek 1990, 1150.

Q Now, I would like to ask Mr. Larson to fill that in on the flip chart we have here, if you could turn that a little bit so Dr. Ahlfeld can see that.

MR. BLANKENAU: Not quite so much, if you please. Thank you.

THE WITNESS: I will move over.

Q (BY MR. DRAPER) This flip chart, which in order to expedite things, we have prepared for

the years 1990, '91 and '92.

We are showing here, first, in the first column on the flip chart the total impact -- that is, the all-on versus all-off condition -- that is produced by the model for those years for Beaver Creek. And Mr. Larson has just filled in the number we found on page U2 of 1150 under the "Kansas Impact"?

ARBITRATOR DREHER: Excuse me, Mr. Draper. Where do the numbers come from for the all-on/all-off?

MR. DRAPER: Those were calculated by our experts using the RRCA Groundwater Model.

ARBITRATOR DREHER: But it's not documented in this volume anywhere?

MR. DRAPER: That's right, because that was -- that was not an output that was provided, meant to be provided by the Modeling Committee for accounting purposes. It was not an important output for them, but it is possible to derive that, as Nebraska has done for its proposal and we have done the same thing.

MR. BLANKENAU: Just for clarity, if you could somehow designate which figures were calculated on the chart itself, circle or put an asterisk by

them or something.

MR. DRAPER: Well, all of these numbers are calculated.

MR. BLANKENAU: Some are pulled directly from the charts here.

MR. DRAPER: All of the numbers are calculated. Some are from the pages we are pulling out of the back of the Final Report volume and some were separately calculated.

MR. BLANKENAU: And I guess it's what's separately calculated by Kansas that I would like to see designated.

MR. DRAPER: All right. Yes, let's -- when we are finished, let's put an asterisk on the total impact and have a definition of that asterisk at the bottom which says, "As calculated by Kansas."

MR. BLANKENAU: That would be fine.

ARBITRATOR DREHER: Let's put the asterisks by the number now before we get too far down the road.

MR. DRAPER: Okay.

ARBITRATOR DREHER: You don't have to write that for now, you can add that later; but before we add more numbers, I just wanted to make it clear which ones were calculated by Kansas.

Please proceed.

MR. DRAPER: Thank you.

Q (BY MR. DRAPER) And again, on that particular issue those are the total impact numbers that Mr. Larson has designated by asterisks and that is the all-on versus all-off condition.

All right, we have just determined that 1150 acre-feet is calculated by the model as shown on page U2 for 1990.

Let's look at 1991 and 1992, if you would, Dr. Ahlfeld.

A Again, for Kansas, that would be 1223 and 2904 respectively, 1223 and 2904.

Q Thank you.

Now, if we open the next fold-out page, page U3, we can see the Nebraska pumping impacts for those three years on Beaver Creek, can't we?

A Yes.

Q What are those numbers, starting with 1990?

A Right. 1990 would be 1119. 1991 would be 1446. 1992 would be 3120.

Q All right. Now, in the lower part of the graph for those three years, since I couldn't extend it out to the right -- got the extension here

below, we have the sum of Kansas and Nebraska impacts. And here, I would like to place the sum of the two numbers we have derived -- or read from the Final Report, as you did in your examples, for 1990 by sum, with a little bit of help, is 2269.

Does that look correct?

A I will doublecheck your arithmetic.

ARBITRATOR DREHER: I have a calculator, if you would like.

THE WITNESS: Thank you. I think I will try it this way. I have one, too.

MR. WILMOTH: Something tells me with all these consultants, John, you didn't do that math yourself.

MR. DRAPER: I suffer from lawyer's math; it's a genetic problem.

THE WITNESS: I agree with your division.

Q (BY MR. DRAPER) And that would be the sum of the numbers 1150 and 1119, correct?

A Correct.

Q If we do the same for 1991, the sum of 1223 and 1446, would that be 2669?

A That's what I'm getting, yes.

Q And for 1992, with the sum of 2904 for

Kansas and 3120 for Nebraska, sum 6024.

A I'm getting that too.

Q In line with how you have analyzed Beaver Creek for other years, let's take the difference between the total impact. Those are the numbers with the asterisks next to them. That is the all-on versus all-off difference?

A Correct.

Q Take the difference between that and the sum of the individual impacts of the Kansas and Nebraska pumping. And if we do that for 1990, again with some help, I get 4661.

Does that look correct?

A I believe that's correct, yes.

Q And for 1991, that difference we calculate to be 4938.

Does that look correct?

A I believe that's correct, also.

Q And in 1992, we calculate that sum as 3304?

A And, again, that looks like you have done all of your arithmetic correctly. So we are all set.

Q Now, if we compare this example that is derived from the model documentations with, for

instance, your Table 12 on page 53 of your report -- just for the record, that is Nebraska Exhibit 30 -- we can see -- this is your example from 2003.

A Just a second. Table 12, you said?

Q Yes, page 53.

A Okay.

Q We can see there that you have calculated for 2003 a total impact of 6445 and this difference of 5395 for Beaver Creek; isn't that right?

A That is correct.

Q So we have here on the flip chart a example based on the tables in the model documentation and the graphs that we projected from the model documentation DVD, a situation that, in all important respects, is similar to your demonstration with respect to 2003 on Beaver Creek; isn't that right?

A It is somewhat similar, yes.

Q It has total impacts in something of the same range -- you had 6445 showing up in that year. These are in the range of 69,000, just in rough numbers, and the difference, which is -- that is what you are calling the residual, is in the range, for these years on the flip chart, in the 3- to 4000

range, generally speaking, correct?

A Yes, I would say this is correct.

Q So this information was part of the condition that you are addressing in your proposal is part of the conditions that were before the Modeling Committee and that they chose to include in their model documentation; isn't that right?

A Well, just to clarify the asterisks, am I correct in assuming that all of the numbers on the bottom -- the six numbers on the bottom that Mr. Larson wrote down should have asterisks by them?

Q No. Those are ones we calculated together. The numbers that we started with were either from pages U2 and U3 or they were the asterisk numbers there for the total impact. Since the Modeling Committee did not choose to document that, we derived that, just the way you did.

A I guess what I just want to clarify is the -- the Table you -- the U Table that we were just referring to had the six numbers in the upper right of your chart. This document -- I'm pointing at the Final Report, Special Master document from which Table U comes from, I believe did not include the numbers on the bottom. So maybe they should get two asterisks or something, for example, if we are trying

to keep track of --

Q Yes.

A Yes. But I don't disagree with the value. I'm not -- I'm just saying we calculated them here today, yes.

Q Right. And we calculated, in part, based on the ones, the three values that are presently asterisked?

A That's correct.

Q Now, in addition to the example of 2003 that we see on page 53 of your report, you also analyzed 1965, didn't you?

A We did.

Q And that shows up, if I recall, earlier in your report?

A Yes. It's around page 18, Tables 1 and -- yes, Tables 1 and 2.

Q Tables 1 and 2.

And in 1965, as we can see by looking back at Kansas Exhibit 71 the graph of impacts, was a year in which we would --

A This one?

Q Yes.

A I just want to be sure I'm looking at the right one.

Q It should be marked Kansas Exhibit 71.

A It's already marked. Thank you.

Q We can look on that chart for 1965 and we can see there that that is a year where it did not have the impacts going to zero and, therefore, has streamflows deplete and acted in a generally linear way; isn't that right?

A I believe that's correct, but I don't believe that can necessarily be derived from Exhibit 71, because this looks like individual impacts, not combined impacts, which is what is causing the stream drying.

Q But Exhibit 71 is consistent with your analysis of Tables 1 and 2 of your report where you were showing an example that was also before the Modeling Committee where the behavior of Beaver Creek was essentially linear; isn't that right?

A Well, I'm making the point that we chose 1965 intentionally because the behavior is linear, as we say in the report. And the stream -- as I'm recalling, the stream is dry -- I mean the stream is flowing and there is no stream drying.

I'm not disagreeing with that. I'm just saying you cannot necessarily get that from this Table -- from Exhibit 71.

Q Right.

A An academic point, perhaps. I understand the point you are trying to get at.

Q So they not only had -- the Modeling Committee not only had before it the example of 1965, where you had largely linear behavior; it also had the examples of 1990, 1991 and 1992 where you had nonlinear behavior that we have demonstrated on the flip chart?

A Yes, for Beaver Creek, there were years, apparently, where both behaviors were -- were occurring.

I'm sorry, am I allowed to draw on this? I was starting to sketch, on Exhibit 71.

Q You can make any mark you want.

A Okay.

MR. BLANKENAU: A little memo.

MR. DRAPER: Yes, our present.

THE WITNESS: All right.

MR. WILMOTH: You were expecting a watch? What?

THE WITNESS: A mug, actually, I was hoping for filled with water undepleted.

MR. DRAPER: And it looks like you are doing very well with your own water up there this

morning, contrary to some other witnesses.

THE WITNESS: I have plenty of glasses and I'm just fine.

MR. WILLIAMS: Hey, hey, hey, hey, hey.

Q (BY MR. DRAPER) I would like to turn your attention to Nebraska Exhibit 39, please. That is the table you presented yesterday which had three different accounting points, starting with Beaver Accounting Point --

A Yes.

Q -- for the period of record 1918 to 2006?

A Right. Okay. Is this -- if I may just interject. Is this Exhibit -- does it have a number? I don't see it.

Q Yes. It should be marked as Nebraska Exhibit 39.

ARBITRATOR DREHER: I don't know what that is.

MR. DRAPER: I'm sorry, if you don't have it.

MR. BLANKENAU: I can show it to you so you know what it is.

THE WITNESS: I have another copy, if you need a extra copy. Okay.

Q (BY MR. DRAPER) This is the exhibit you testified to yesterday?

A Yes.

Q And this starts out with your poster-child situation of Beaver Creek, correct?

A That's correct, yes.

Q And if we look at Beaver Creek, what you have got listed there, if I understand it, is for the period 1918 through 2006 for different runs of the model, the maximum and minimums baseflows at this accounting point as calculated by the model?

A Exactly. Over the period of record -- I mean over the period of simulation, 1918 to 2006, as indicated there, yes.

Q That was the calibration period, wasn't it?

A I think the calibration was 1918 to 2000.

Q Now, the maximum flow that you found for that period for the historical run, the run that was calibrated against baseflows and water levels that had been measured, that maximum figure is 10,960 acre-feet per year, correct?

A That's correct.

Q You show also on this Table, in the

second line CKM. That corresponds to Nebraska pumping being turned off, correct?

A Yes, that's correct.

Q And the CMN on the fourth line corresponds to Kansas being turned off, correct?

A CMN is Kansas turned off, correct.

Q At the bottom you have Theta (All Off), and that's with all three States and the mound turned off; is that right?

A Turned off. Turned off, correct.

Q Now, when you look at the situation in the second row, Nebraska is turned off, the simulated baseflow from the model is -- it increases from 10,960 up to 11,637 as a max; isn't that right?

A At some point over the record, that was the maximum simulated, right.

Q And that represents about a 6 percent increase, doesn't it?

A Now, that's a bit tougher arithmetic, but it looks close enough. I will accept your premise that it's something like 6 percent.

Q About 6 percent. Thank you.

And if we can skip down two more lines to the line that represents everything on, except Kansas, we see that the maximum baseflow is now

12,380; is that right?

A Yes, that's correct.

Q And would you accept my calculation, which I will admit I had a lot of help with, that that represents a 13 percent increase over the calibrated maximum annual flow?

A That looks about right, your percentage.

Q So these two, where you turn one or other State off, are either a 6 percent increase or a 13 percent increase?

A Uh-huh.

Q Now, if we go two more lines down to the all-off condition where we have turned all three States and the mound off, the baseflow increases to a maximum of 16,707 acre-feet; isn't that right?

A That's correct.

Q And would you accept my calculation, the royal -- the royal "my" -- of the percentage increase that that represents being 52 percent above the calibrated maximum baseflow?

A Again, that looks about right. I don't know if you are using -- you know, as percent increase, there is the denominator to worry about. So I'm not sure how you are calculating that, but that's fine. It's around -- I'm sorry.

Q Just to be clear, the denominator is the calibrated maximum baseflow with all stresses on?

A Okay. And you said around 50 percent.

Q A little over 50 percent, 52.

A Okay.

Q So if you compare that to the -- to the difference in maximum baseflows when you have just one of the stresses off, you are seeing a much greater change, percentagewise, from the calibrated condition with just one of those stresses off; isn't that right?

A That's correct.

Q In other words, depending on which one you are comparing to, it's either 4 times or 7 times as much as the increase occasioned by turning just one of those stresses off?

A Talking about multiple of percentages gets a little tricky. I understand your arithmetic, but it can be misleading to speak in those terms.

But I don't disagree with the percentages -- well, just eyeballing the number, it looks like the percents you have offered are about right.

Q And so the proposal that you are making depends on this last condition of the model being

accurate, doesn't it?

A We believe that the all-off run is -- is a run which produces reasonable estimates of baseflow that would have occurred if no human activity had occurred in the basin.

This exhibit was an attempt to share with Mr. Dreher my -- part of my one reasoning for reaching that conclusion.

The -- I have worked enough with the model and the results and looking at the changes in baseflow that result from the various perturbations at a variety of the various different runs, rather at a variety of accounting points to be comfortable with the opinion that the model can be used to produce reasonable estimates of baseflow in the case of all activity -- all human activity off.

And this is just one sort of example of that -- of the information that I have used to draw that opinion, but ultimately, it's a matter of the professional judgment, obviously.

Q And just using your example here, relying on your all-off condition of the model requires relying on a condition that is, in terms of baseflow, 8 times further than just turning Nebraska off and 4 times further from just turning Kansas off

with respect to the calibrated condition; isn't that right?

A Well, I think your -- your -- I'm not sure how you are getting -- did you say 4 and 8 times respectively?

Q Yes.

A I'm not sure how you are getting those numbers --

Q I'm just multiplying.

A -- and also, what the significance is.

To me, the important number is 16,700, Which is actually quite close to the virgin water supply reported in the Compact -- in the original Compact. What that tells me is that running the -- running the model with the all-off condition is not producing some sort of screwy results -- screwy, I'm sorry.

It's producing reasonable results, apparently back in the '40s or beforehand, when the numbers were derived for the Compact virgin water supply, that was the streamflow -- the gaged streamflow.

So the fact that the all-off condition at some point in the period of record simulates that number is actually quite comforting, to my opinion.

I want to point out there are many other sources of information.

This is a professional judgment about the utility of the all-off run that I have acquired after working on this project for a year. And I just wanted to share, in response to a question from Mr. Dreher, just a piece or a bit of the reasoning that went into that judgment.

Q In referring to the Compact, referring to your testimony, I think you testified to Article III and what the virgin water supplies were that were listed there, including Beaver Creek?

A That's what I'm referring to, yes.

Q That's the one that shows Beaver Creek as 16,500 acre-feet per year?

A I don't have that in front of me, but that sounds familiar -- that number.

Q Now, that figure necessarily includes not just baseflow, but also surface runoff, doesn't it?

A That would be gage flow.

Q So that's the sum of baseflow, i.e., discharge from groundwater, plus runoff during the year; isn't that right?

A Well, my understanding is that those

numbers were derived from gage numbers, so it would include everything that contribute to the gage. I don't know enough about what the hydrologic conditions were at the time to know what portion of things contributed to that.

Q What your figures on Nebraska Exhibit 39 demonstrate is that the baseflow goes over that number, just referring to the groundwater component -- groundwater discharge component of the flows, and the surface water runoff component would be in addition to that; isn't that right?

A Well, I don't know what year this -- this 16,707 arose, but whatever year that was, if there was any surface water component, it would be added; that's correct.

Q In that regard, I don't know if we have talked about this particular volume before, but another volume in the Final Settlement Stipulation is termed Volume 5 of 5. And this contains some of the appendices to the Final Settlement Stipulation. When we combined these together, we took the most often, at least the ones we expected to be most often needed and combined those all in Volume 1; but in the other volumes we had other pertinent information.

And I would like to hand you a copy of

this. This is -- just for the record, it's Final Settlement Stipulation, Volume 5 of 5, dated December 15, 2002.

ARBITRATOR DREHER: Mr. Draper, I do not have a copy of that.

MR. DRAPER: Your Honor, we have provided you with some other volume in hard copy, and I don't believe you have been provided with this volume. And I would propose that we complete -- further complete your set as soon as convenient by providing you the hard copy of this.

But I have -- I do have one -- oh, we have an extra one? Oh, good, Mr. Ampe is coming to my rescue, and I will provide my copy to the witness, the most important person.

THE WITNESS: Thank you.

Q (BY MR. DRAPER) I have opened the volume to page J3-1. This a fold-out Table, this is part of Appendix J, I think we have a J1, J2, J3, so this is labeled J2-1.

A Okay.

Q This is entitled "Summary of Estimated baseflow (October 14, 2002 version)."

I would like to ask you to go down -- the index number is in the first column,

"Index," down to No. 6.

A Okay.

Q And you see the USGS station's number there of something like -- maybe you could read that number for me.

A Yes. Index is Station 6846500.

Q And its name is Beaver Creek at Cedar Bluffs, Kansas; is that right?

A That's correct.

Q If we look across to, about the middle of the Table of Column No. 8, that is labeled, "Major Component of Streamflow."

A Okay.

Q And we can see, as we read down that, it's either designated as baseflow or surface flow or both.

Do you see that?

A I do.

Q What does it show for this particular gage?

A Surface runoff.

Q And if we look further over to the right-hand column, that is Column No. 12, which is entitled, "Average Baseflow for 1940-2000 for Period of Record Acre-Feet Per Year," what number do you see

in that column for this gaging station?

A 1300.

Q So this would show that if actually the baseflow here is considerably below the amounts that you have posited in your Exhibit Nebraska No. 39 with respect to the maximum baseflow that occurs when you use your run of all stresses off where you showed 16,000 some odd; isn't that right?

A Well, yes, of course, because this -- I assume this record is the measured -- or somehow estimated baseflow. And it would include the effect of all pumping which, of course, have been quite dramatic over that period and, obviously, the all-off condition doesn't include those effects. So, of course, there would be a difference.

Q And this would further conclude that the Compact number from Article III of 16,500 includes a major component of the surface runoff, wouldn't it?

A Well, again, I don't know the detail of how those Compact numbers were put together. The Compact is dated 1942, which is before, as I understand it, there was major groundwater development. So -- and this number 1300 reflects after major groundwater development.

So I don't know that I can conclude that

from this Table -- or from what you have pointed out.

MR. DRAPER: No further questions.

Thank you very much, Doctor.

THE WITNESS: You are welcome.

MR. AMPE: I do have some questions and I will be brief.

ARBITRATOR DREHER: I do have one question but I'm looking at the time and I don't know if we want to take a 15-minute break before you start or not.

MR. BLANKENAU: I would think if we could finish with this witness, at least finish with cross, that would allow us to move it along quickly.

THE WITNESS: Great. Thank you.

ARBITRATOR DREHER: Dr. Ahlfeld, I would like to refer you to Kansas Exhibit, I believe it's 30, but I'm not positive of that. It's Kansas Exhibit 28.

MR. DRAPER: I can identify for the record, Your Honor.

That is Kansas's Expert Response to Nebraska's Expert Report dated February 17, 2009.

ARBITRATOR DREHER: That's correct. Do you have a copy of that?

THE WITNESS: No, I don't.

ARBITRATOR DREHER: Could Nebraska provide him with a copy of it?

MR. DRAPER: We are also looking. I think we have a copy for him.

ARBITRATOR DREHER: All right.

MR. DRAPER: I have a copy, your Honor.

ARBITRATOR DREHER: All right. If you could provide it to the witness, please.

THE WITNESS: Thank you.

ARBITRATOR DREHER: Have you had an opportunity to review this report previously?

THE WITNESS: Yes, I have.

ARBITRATOR DREHER: I would like to direct your attention to Figure 6. As I understand it, Figure 6 attempts to show, or allegedly shows the percentage difference between calculating impacts using the current procedure versus calculating impacts using your procedure.

THE WITNESS: I believe that this is essentially a test of the virgin water supply metric to the whole basin, that's my understanding, of both by year and then a five-year average, which I suppose is the same thing that you just said.

ARBITRATOR DREHER: Well, I think you said it more accurately than I said it.

THE WITNESS: Okay.

ARBITRATOR DREHER: For the entire basin this shows, I don't know, a maximum difference of a negative -- something slightly greater than a negative 4 percent and then later in time, a maximum positive difference of about just something over 3 percent.

Do you have any reason to disagree with these percentages that are shown here?

THE WITNESS: I haven't -- I haven't confirmed these numbers, but I don't have any reason to disagree.

ARBITRATOR DREHER: Okay. I mean, I understand you wouldn't have necessarily confirmed these numbers, but you generated a lot of numbers on your own.

THE WITNESS: Right.

ARBITRATOR DREHER: So I mean, do these differences appear reasonable to you?

THE WITNESS: Well, they do because it's basinwide.

ARBITRATOR DREHER: Right.

THE WITNESS: And if I may elaborate.

ARBITRATOR DREHER: Sure.

THE WITNESS: What we found -- you know,

we focused on the three -- the three subbasins: Beaver, Frenchman and mainstem/Harlan above -- Swanson/Harlan, we call it. And those have more dramatic violations of the virgin water supply metric, but they happen to cancel out. In other words, in the case of Beaver and Frenchman, they go in one direction. In the case of the mainstem, they go in the other direction. So when you do the whole basin, it cancels out.

So this isn't terribly surprising, but it kind of misses the point, I guess, of other analysis, which is to look at each subbasin. And, of course, the accounting is done by each subbasin. So that's important to do.

ARBITRATOR DREHER: All right. Thank you.

Mr. Ampe, you may proceed.

MR. AMPE: Thank you.

CROSS-EXAMINATION

BY MR. AMPE:

Q Doctor, first, Mr. Slattery would like to know how your toenails are feeling.

A I'm doing fine, thank you. Appreciate the question.

MR. AMPE: I think he's tougher than

you, Jim.

Q (BY MR. AMPE) Now, I think late yesterday when you were talking about the depletion storage, you made a statement -- and I think I will paraphrase that -- when storage drops below or groundwater levels drop below a certain point, there is no longer streamflow, but streamflow exists independently of the groundwater -- or can, can it not?

A Yes, yes. And that's -- that -- that's a great question. This is -- it's a bit more complicated, because in a given cell whether or not you have communication between the stream -- from the aquifer to the stream depends on the head being above the bottom of the streambed.

Q I'm not asking about the model. I'm asking, in reality, we can have groundwater levels that have broken connection with the stream, but there is still water in the stream?

A That's correct. Both in the model and reality, that can happen.

Q Your testimony was more toward baseflow or contributions from groundwater into the streamflow?

A Everything we have looked at is

baseflow; but, of course, the model accounts for it once it gets into the stream. So we are looking at streamflow, too, if that -- I think I'm following your question.

Q Yes. I'm not asking about the model, just to clarify.

A Yes.

Q We can have streamflow independent of a connection with groundwater levels?

A Right. You could at a particular location in the stream have a disconnection, heads are dropped, but the stream is still flowing because of upstream contribution, yes.

Q Going to your explanation this morning, I think we have it, but essentially your example of State A and State B have unmet demands between the two States?

A Yes.

Q Do you postulate that that unmet demand comes from storage?

A Yes.

Q And that you are unable to assign that depletion of storage to a particular State based upon pumping?

A I want to make sure I understand your

question.

Are you saying you would -- that the depletion of storage is because of pumping, or that the assignment would be proportional to pumping?

Q Well, I'm asking what your explanation this morning was of, We have an unmet demand.

A Yes.

Q And in your example between State A and B, you simply split that unmet demand 50 percent to each State; is that correct?

A That is the way our method works out --

Q And that is regardless --

A -- in the two-state case.

Q And that's regardless of pumping level in each State?

A That's correct.

Q So applying that to Frenchman, because you cannot determine what each State's impact is, you simply increase Colorado's burden by 13,000 percent?

A That's how the method works out.

MR. AMPE: No further questions.

MR. BLANKENAU: Could we have our morning break at this point?

ARBITRATOR DREHER: We can, but let me ask a couple of miscellaneous questions; not of the

witness.

MR. BLANKENAU: Yes.

ARBITRATOR DREHER: He is off the hook for now.

MR. WILMOTH: Get out quickly.

THE WITNESS: May I leave the stand? A personal break would be advantageous.

ARBITRATOR DREHER: Thank you. You may step down.

This is a little odd, because this exhibit didn't necessarily get introduced through a witness, but -- so I will direct the question to Mr. Draper and I'm not sure how we are going to get it answered.

But in Kansas Exhibit 71 that you had Dr. Ahlfeld look at earlier, in the legend there are various colors showing Colorado wells, which, of course, are absent since they don't affect Beaver Creek, Kansas wells and Nebraska wells and Nebraska mound. And parenthetically, following the legend entry for Kansas wells, it talks about a decrease of 5938 acre-feet per year. In the legend following the entry for Nebraska wells, it shows a decrease of 5131 acre-feet per year.

Now, I'm having trouble -- I don't know

what those numbers are because when I look at Appendix U to the Final Report of the Special Master with Certificate of Adoption of the RRCA Groundwater Model, and I look at averages for Beaver Creek, both Nebraska and Kansas, they don't appear to comport with one another.

And I just need to understand what these decreased numbers are that are shown in the legend.

Since we are at the point of our morning break, I guess what I would ask is that you confer with your experts and when we come back, if you could explain those -- the differences for me.

MR. DRAPER: Okay, glad to do that.

ARBITRATOR DREHER: All right.

We will take a break.

(Break was taken from 10:31 to 10:45.)

ARBITRATOR DREHER: All right. Before you continue with the rebuttal, Mr. Draper, do you have an answer for me regarding my question prior to the break?

MR. DRAPER: Yes, I do.

ARBITRATOR DREHER: Okay.

MR. DRAPER: We have put the graph up on the projector, again just to help us answer to you. And I can point out with a little laser deal here

that we are talking about the numbers up in the upper left-hand corner of this chart and the acre-foot numbers that are shown for Kansas and Nebraska wells.

Those numbers that are shown in that legend are derived from the pages U2 and U3 that we were looking at.

If you would turn to page U2, I can show you just which numbers were used. In the case, this is for U2, that is Kansas. And that number on our graph, that came from the Modeling Committee that is up on the projector is 5938 acre-feet per year. That is the average of the last five years for Beaver Creek as shown on page U2.

So the third column from the left, the bottom figure, you can see for the year 2000 is 4560.

If you average that with the four previous years' amounts, you get the number 5938. That is how it was derived, both for Kansas and if you do the same thing for Nebraska on the next page, page U3, the Nebraska number in the graph legend is derived from the last five years of that -- of the period shown on page U3 for Beaver Creek.

ARBITRATOR DREHER: All right.

Thank you.

MR. DRAPER: If I may, I would move the

admission of the two exhibits that were referred to during cross-examination, the paper copy. That is Exhibit 71, which is the graph we are talking about right now, the printout from the DVD; and No. 72, which is the flip chart sheet. That's the one also that we need to make that final notation on asterisks.

ARBITRATOR DREHER: I was going to ask if you could have somebody make the notations as calculated by Kansas.

MR. DRAPER: We will do that. I don't think we have done it yet, but we will do it at the very first break that we have.

MR. BLANKENAU: We have no objection and we have our own exhibits.

ARBITRATOR DREHER: Those are admitted.

Which exhibits would Nebraska move?

MR. BLANKENAU: We have Exhibit 37, which was the head map, the psychedelic two maps, the four-slide one. And then we had Exhibit 38, which had two slides, the same thing, the head map.

MR. DRAPER: That's 38?

MR. BLANKENAU: That's 38.

39 was the Beaver Creek and Mainstem Accounting Point charts.

And then No. 40 is the Dr. Ahlfeld drawings of this morning, pages 1 and 2.

MR. DRAPER: The last one is -- is it a two-page example?

MR. BLANKENAU: I'm sorry, what?

MR. DRAPER: The two-page example on the flip chart?

MR. BLANKENAU: Correct, that we addressed this morning.

MR. DRAPER: No objection, Your Honor.

MR. AMPE: No objection.

ARBITRATOR DREHER: They are admitted.

(WHEREUPON, Kansas Exhibits 71 and 72 and Nebraska Exhibits 37, 38, 39 and 40 were admitted into evidence.)

MR. BLANKENAU: We have no redirect for Dr. Ahlfeld, and we would like to recall Dr. Schneider.

MR. DRAPER: On the record I would like to make a correction. I have the exhibit numbers mixed up. We have actually three exhibits. I mentioned only two, and I mixed those numbers up. If I may be allowed just to restate that correctly.

ARBITRATOR DREHER: Please.

MR. DRAPER: Kansas Exhibit 71 is the

graph printout from the DVD entitled "Confluence: Beaver: Change."

Kansas Exhibit 72 is the print of -- it's a two-page printout of the first computer page, if you will, from the DVD. It has the title at the top, "Republican River Compact Administration Groundwater Model," and it was from this -- this listed the members of the committee and also access to the other part of the DVD. And then the one I didn't mention, we will mark as Exhibit 73 and that is the flip chart, the one with the famous asterisk on it.

ARBITRATOR DREHER: All right.

MR. DRAPER: If I may remove the admission of those exhibits with the more correctly identified, I would appreciate that opportunity.

MR. BLANKENAU: Thank you for that correction.

We have no objection to any of those.

MR. AMPE: No objection.

ARBITRATOR DREHER: Admitted.

(WHEREUPON, Kansas Exhibits 71, 72 and 73 were admitted.)

ARBITRATOR DREHER: And Dr. Schneider, you are still under oath.

THE WITNESS: I understand.

JAMES SCHNEIDER,

having previously been sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. BLANKENAU:

Q Dr. Schneider, you were present yesterday when Dr. Schreuder testified about the impact associated with Frenchman Creek regarding Nebraska's method, weren't you?

A Yes, I was.

Q And you were present this morning when Mr. Ampe cross-examined Dr. Ahlfeld regarding the Frenchman Creek?

A Yes, I was.

Q You have some thoughts with respect to both those examinations?

A Yes, I believe we have an exhibit on that.

Q All right. And Mr. Powers is handing out a small demonstrative, for ease of use.

This will be Exhibit 41.

Dr. Schneider, what is this, please?

A This an attempt to place a bit of context on the current and the proposed method in

terms of the impacts on Frenchman Creek for both Nebraska and Colorado. And you can see if we start on the top left, this shows the total acres in the Frenchman Creek drainage basin, in both Colorado and Nebraska. And then it presents the data on total number of wells: Colorado with 13 percent of the wells and Nebraska with 87 percent.

The next pie chart shows the irrigated acres. And Colorado has 21 percent of the irrigated acres in Frenchman Creek subbasin and Nebraska with 79 percent.

The last pie chart on the top row on the right shows that the current depletions are calculated by the model: Colorado, essentially zero percent and Nebraska with 100 percent.

And then finally, on the bottom left, the pie chart shows the depletions that would result under the proposed method by Nebraska. And Colorado would be assigned 4 percent of the depletions to Frenchman Creek, while Nebraska would be assigned 96 percent of those depletions.

Q Dr. Schneider, just to be perfectly fair, on the pie chart on the upper row the far right, the current depletions --

A Yes.

Q -- Colorado depletions aren't truly zero percent, are they?

A No. It's round, probably about zero, zero one. It's very near zero.

Q And you would agree with Dr. Schreuder's analysis that hard number translates to less than a hundred acre-feet?

A Yes. I believe we have it listed here as 30.

Q What was the source of your information for the Colorado wells irrigated acres and conclusions?

A That is listed on the bottom of the 2005 RRCA Groundwater Model.

Q And that was information provided by Colorado?

A That's my understanding.

Q Even though Dr. Schreuder was unaware of this information, it did come from Colorado?

A Right. He apparently did not -- was unaware of these volumes, but this is, in fact, the data.

Q Let me then switch topics on you and go to Kansas' Expert Response to Nebraska's Expert Report, Exhibit No. --

MR. BLANKENAU: Mr. Powers, do you have that exhibit number?

Q (BY MR. BLANKENAU) I have got it as Exhibit No. 28 and refer you to Figure 6.

A I have got it.

Q And you were present this morning in the courtroom when Mr. Dreher asked some questions of Dr. Ahlfeld regarding this Figure?

A Yes, I was.

Q You, subsequent to questions about this Figure yesterday, or previously, have done some additional analysis regarding this Figure?

A Yes, we have. We have several exhibits that will help clarify this issue.

Q I would ask Mr. Powers to hand out what will be Exhibits 42 regarding Beaver Creek, 43 regarding Frenchman and 44 regarding the mainstem.

All right. Dr. Schneider, you have done additional analysis in regard to Figure 6.

Can you explain what it is that you did.

A Certainly. I will just note that the text, I believe, is inconsistent with the way the Figure is labeled. I think we cleared that up that they, in fact, did a percent difference as the total of the simultaneous impacts and that's how we

prepared these as well. We didn't address that as a percent of the sum of the impacts.

Anyway, I believe this is the same information that they presented in Figure 6 for the basin as a whole. And Dr. Ahlfeld started to elaborate on this important point of looking at the subbasins, rather than the basin as a whole.

I will just note that Appendix C in our report contains the absolute values of those residuals by subbasin. And as Dr. Ahlfeld did note, in some subbasins those residuals are positive and in some subbasins those residuals are negative. Primarily, the difference is because of the mound and that creates negative residuals in the mainstem and in Medicine Creek, whereas the subbasin is affected only by States pumping, those residuals are positive.

So, again, these are -- these charts are meant to be identical to Figure 6, the same exact type of analysis, except these show results for three of the subbasins and these are the three subbasins that we discuss in our report.

Starting with Beaver Creek, you can see that there is, in fact, a substantial residual as a percent of those simultaneous impacts, particularly in recent years, that has grown to be much larger

than it was in the past. And as a percent, that's greater than 80 percent in recent years.

I believe that that peak would be represented by 2003, which we discuss in our report. And then this also shows the five-year average and you can see there is an obvious trend of increasing residuals over time.

The next exhibit refers to Frenchman Creek. And you can see that those residuals did start to appear sometime ago, although more recently they have grown substantially. In other words, the trend that was present, say, in the '80s or '90s was increasing; but in more recent years, that trend has become much more significant. It increases much more rapidly in those maybe final five years.

And then finally for the mainstem subbasin, and I will just note that I think we focused more closely on the Swanson to Harlan reach of the mainstem in our report, but this does, in fact, reflect the entire mainstem subbasin in this Figure.

And you can see that there were some residuals in years prior to 2000. In many years, they were, in fact, near zero. It's kind of a pattern of going up and down from near zero to some

negative residual of around 5 or 10 percent.

But very significantly since 2000, following completion of the model and as the model was updated over the past -- well, this chart shows through 2006. So for the six years following 2000, those residuals as a percent difference from the simultaneous impacts have become quite substantial.

And again, I believe that that negative peak does reflect 2003 and that percent difference is greater than 30 percent, about 32 or 33 percent.

Q Dr. Schneider, I notice that Kansas Figure 6 goes to 2007 and yours only go to 2006?

A Yes. There is no intention of not presenting 2007. We simply -- the data we developed for our report utilized a model simulation from 1918 through 2006 and that simply -- this data simply reflects the data that was prepared for our report.

So we did not analyze 2007 in that report, so that is really the only reason for that.

Q And what do the pattern trends in these charts tell you about the current accounting procedures?

A Well, I think it indicates that the current accounting procedures have caused problems in the past and have caused much greater problems more

recently and would suggest that these problems would continue to grow over time.

Q With respect to the Kansas Figure 6, because that is, as I understand it, a basinwide approach, you wouldn't have any reason to disagree with that Figure, then, would you?

A Oh, absolutely not. In fact, I'm very familiar with those numbers and that is, in fact, how it comes out. In part, because you are dividing by a much larger number, the basin is -- you know, the impacts are over 200,000 acre-feet, so those percent different values are going to be smaller, but also because of the fact that some of the residuals are positive and some of them are negative.

Q Again, I think we have already stated this. Why is it important to resolve these at a subbasin level?

A Certainly, well, there are three major points. The Compact allocated water by subbasin, so it's critical that the subbasin accounting is accurate to be consistent with the impact.

In addition, the FSS created subbasin, I believe they are called nonimpairment tests. So again, it's critical to have accurate accounting in those subbasins for those tests.

And as a final note, the imported water supply from Nebraska does only occur in two subbasins: Medicine Creek and the mainstem. So, errors in those subbasins that are canceled by errors in other subbasins simply aren't acceptable.

Q All right. Then, to bring this line of questioning full circle, I will take you back to what we referred to as our Pacman chart --

A Sure.

Q -- which is Nebraska Exhibit -- lost my chart here.

MR. LAVENE: 41?

Q (BY MR. BLANKENAU) -- 41.

Mr. Ampe indicated that Nebraska was attempting to increase the impacts associated with Colorado by, I believe -- I believe he said by 1300 percent?

A I believe he said 13,000.

Q I'm sorry.

A It's easy -- when you start with a small number and go to a bigger number, it's very easy to play games with those percentages.

Q But, in fact, the Figure on the lower left portion of the chart, what does that tell us?

A It tells us that the depletions as a

percentage of total depletions in the Frenchman Creek would be 4 percent for Colorado.

Q What does it tell us about the so-called fairness aspect of this?

A Well, I think it -- this chart indicates that -- that Colorado has a significant amount of groundwater irrigation in the Frenchman Basin and, you know, they are not -- for example, they have 21 percent of the irrigated acres; that their depletions aren't 21 percent because that irrigation is further from the stream than much of the irrigation in Nebraska; but I believe it is -- you know, the 4 percent is a fair representation of their actual impact on the stream.

MR. BLANKENAU: Thank you, Doctor.

I have nothing further.

ARBITRATOR DREHER: Dr. Schneider, again referring to Kansas Exhibit 28, the Expert Response to Nebraska's Expert Report Estimating Computed Beneficial Use for Groundwater and Imported Water Supply, referring to Figure 5 -- and I realize that trying to assimilate, in a qualitative way, lag effects and all of this is difficult, but I'm still puzzled by Figure 5 showing the -- an increasing contribution from the imported water supply, the

Platte River mound, or whatever you want to call it, when overall diversions from the Platte River into the Republican Basin are not increasing and, in some -- by some measure, are actually decreasing.

Do you have a physical explanation as to why the mound effects would be increasing?

MR. WILMOTH: Excuse me, Mr. Arbitrator. I think Figure 5 was replaced and I'm not sure Dr. Schneider has the most recent version.

ARBITRATOR DREHER: All right, if you could provide him with the most recent version.

MR. DRAPER: Yes, and I'm not sure what happened to that version that I gave the last witness of the report. That has the current --

MR. WILMOTH: This one is dated 3-17-09.

MR. DRAPER: Right. There may be one left up there from Dr. Ahlfeld, but 3-17-09 would be the correct one.

MR. WILMOTH: This is the correct one.

THE WITNESS: Yes. There are a couple of important points, I think, and you mentioned the lag effect and that is certainly a big part of it.

I believe that during Dr. Ahlfeld's testimony he was asked about the recharge in the mound backwards in time and it was established that

that was, in fact, quite significant as far as back as the 1940s. I think if you look at the groundwater model report, I don't know, I think it has been introduced as an exhibit, but it has the Table that shows the -- the recharge from the canals. It's about 600,000 acre-feet per year.

And that really was fairly constant for about six decades. It was a very constant stress that was being applied on the system.

So I really wouldn't expect a short-term, you know, recent change in that to manifest itself so quickly.

The other important point about this Figure is, I believe the way it's presented is a bit misleading, because this is, in fact, the imported water supply as a percent of the total Platte River recharge.

So it would, in fact, take into account that -- that reduction of Platte River recharge in recent years. And for any stress that has a significant lag impact, you would expect its impact to grow over time as a percent of that stress.

Does that make sense?

ARBITRATOR DREHER: Yes.

THE WITNESS: So I believe that this

Figure actually is quite supportive of our proposal and indicates that because you would expect the effect of a stress on the stream, as a percent of that stress to increase over time and especially if it was substantially lagged as the mound would be.

This is -- this is exactly what you would expect and that is what the proposed method reflects.

ARBITRATOR DREHER: Where are the charts that you were referring to out of the Special Master volumes?

THE WITNESS: It's a Table early on in the Report. If I could have a copy of that Final Report from the groundwater model documentation.

It's on page 15 of the bound copy, the inflows. There are surface water recharges -- it says recharge of water on applied lands and then the canal leakage.

While there are other canals in the model domain, the most -- by far, the most significant portion of that is, in fact, the mound recharge, regardless, you could see that that has been fairly constant over time. It's a little higher in some decades and a little lower in others, but . . .

ARBITRATOR DREHER: The column that you are referring to is labeled, "Canal leakage," is that correct?

THE WITNESS: Primarily that. I think, that represents most of what results in that, what we call the mound recharge.

As I said, there are other canals, but like it has been established, along the Platte they divert substantial amounts of water for power usage. So there is a very large amount of water that is run through those canals and it produces most of that canal leakage that is simulated in the model.

I couldn't tell you the exact proportion of what this is, relative to the other canals, but it is the lion's share of it.

I believe when you turn off the mound and you look at water-balance data in the model, it fairly well reflects that, approximately 600,000 acre-feet per year, on average.

I don't have a comparison of that, and I'm basing that on my analysis of water budget data.

ARBITRATOR DREHER: Report. Thank you.

Kansas or Colorado, who is going first this time?

MR. DRAPER: Could we have a real 5?

ARBITRATOR DREHER: Sure.

MR. DRAPER: Thank you.

(Break was taken from 11:15 to 11:21.)

ARBITRATOR DREHER: Mr. Ampe, you may proceed with cross-examination.

MR. AMPE: Thank you.

CROSS-EXAMINATION

BY MR. AMPE:

Q Dr. Schneider, looking at Exhibit 41, did you prepare this exhibit yourself?

A You have to tell me your number.

Q The Pacman chart.

A Oh. No, we prepared this with Nebraska DNR.

Q When did you prepare this chart, when did Nebraska prepare this chart?

A Within the last month.

Q Do you know when within the last month?

A I don't know the date on which somebody worked on the information.

Q Of the chart itself, when was it produced? Within the last month?

A When was it -- yeah, it was probably -- that was printed out just in the last month.

Q And you have not provided this before?

A Provided it to who?
Q To either Kansas or Colorado.
A No. This was something that was prepared after we read the responsive reports.
Q So in this chart, are you proposing that we allocate depletion by drainage area?
A I didn't say that.
Q Didn't say that, but you have total acres, correct?
A To use as a reference.
Q And that's total acreage for the entirety of Frenchman Creek subbasin -- or excuse me, entirety of the drainage basin for Frenchman, correct?
A Right. It's a bit misleading and that is why we actually show the irrigated acres.
Q And according to the Compact, Colorado gets all of the water flow in Frenchman Creek in Colorado; isn't that correct?
A That's my understanding.
Q So, in fact, the Compact essentially divides Frenchman Creek into the area above the Colorado stateline and the area below the Colorado stateline, correct?
A Well, I think Colorado is allowed to dry

up the stream at the stateline. I should note that the model -- Frenchman Creek in the model does not cross the stateline. So all of these impacts are impacts of Frenchman Creek in Nebraska. It goes nearly to the stateline, but it doesn't cross into Colorado.

Q And yet, you show the total acres for the entire Frenchman Basin; is that correct?

A That's one of the pie charts, yes.

Q And you also show all of the wells in the basin, correct, whether they are in Colorado or Nebraska?

A Well, to show Colorado wells, we have to show the wells in Colorado. I don't understand the question, I guess.

Q Which are --

A It's a pie chart of all of the wells and it shows the percent in Colorado and the percent in Nebraska.

Q And within Colorado where Colorado can fully deplete the Frenchman Creek under the Compact, correct?

A I believe they were allowed to dry up streamflow to the stateline. I don't believe -- it's my understanding -- and I would have to consult the

Compact, but it's my understanding that they weren't allowed to pull water out of Nebraska into Colorado.

Q And there is no live stream in Colorado, is there?

A I have never been to the stateline or around Frenchman Creek in Colorado, but that's my understanding. I think it has been dead for quite some time.

Q And the model does not show any stream cells in Colorado, does it?

A I believe that's what I just testified to, yeah.

Q Well, I would just like to be clear. I realize, with modelers, sometimes the model is reality but, of course, there is a difference between what the model shows and what actually occurs?

A There is, or at least there was a channel that went up into Colorado. I don't know if it's even still there today.

Q So to your knowledge, is there flow at the stateline in Frenchman Creek?

A I don't believe there is a stream gage there anymore, so I don't know. I don't think so. I doubt it.

Q How far into Nebraska does Frenchman

Creek travel before it has a live flow?

A Well, currently, it's quite aways.

Q More than 10 miles?

A I don't know the exact number.

Q More than 20 miles?

A I think I just provided an answer, I --

Q Well, you said you didn't know the exact number, but --

A Yeah. I would need a map and I would need a considerable amount of information to be able to give you a good answer. I honestly don't know the distance from Colorado to the reservoir, for example.

Q And yet, stream depletion is a function of distance from the well to the stream, isn't it?

A Clearly.

Q And at no point on this chart do you make any reference to the distances from, say, a group of Colorado wells to a live streamflow, do you?

A Well, I believe I discussed that already in that -- obviously, you wouldn't expect Colorado to have 20 percent of the depletions, even though they have 20 percent of the acres, because most of those acres are much further from the stream and that is why our method shows substantially less than 20 percent of the depletions.

Q So do you have an idea approximately how far from the centroid of Colorado pumping it is to the live stream in Nebraska?

A Live stream where?

Q Where Frenchman Creek becomes a live stream in Nebraska.

A Well, I guess, I mean, do you mean before pumping started or today?

Q Currently, average the last five years.

A No, I don't.

Q Any idea of the distance between the centroid of Nebraska pumping and the live stream in the Frenchman?

A No. I mean, centroid what? And you would have to have wells or acres, and obviously Nebraska wells are much closer to the Frenchman Creek than Colorado wells.

Q They are probably within an eighth of a mile -- wells within an eighth of a mile of Frenchman Creek in Nebraska, correct?

A I suspect there are some alluvial wells in Nebraska along the Frenchman Creek. I don't know for sure, but I would be surprised if there weren't.

Q And the groundwater model is not run on a subbasin level, is it?

A Well, we extract results on a subbasin level, but we don't turn off the subbasin and turn -- that would, in fact, produce substantially more problems than the current method already gives us.

Q But in your Exhibit 41, you simply ran the model as it normally is? You didn't go to a subbasin-by-subbasin comparison, in other words?

A Are you suggesting that we determine the effect on Frenchman Creek of only the wells in Frenchman Creek.

Q No. I'm asking you what you did.

A Well, you are going to have to repeat the question, then. What we did for what?

Q In creating the data for this pie chart, did you run the RRCA Groundwater Model covering the entire basin? And then -- well, we will start with that question.

MR. BLANKENAU: If I could interrupt, you are referring to the pie chart in the lower left corner?

MR. AMPE: Yes, I am.

MR. BLANKENAU: Thank you.

A Well, I guess the question is not very good, I'm sorry; but I can just say that the results are based on the model runs that are documented in

our report.

Q (BY MR. AMPE) Okay, thank you.

In looking at the lower left pie chart where you list 96 percent proposed depletions to Nebraska and 4 percent to Colorado, I believe you testified you consider that's fair?

A Yes.

Q And that's fair based on your 50/50 split of the residual?

A It's fair based on the fact that that residual is water that both States are trying to deplete.

Q And that 50 percent split is not based on any physical meaning; it's simply an arbitrary number?

A It's the result of our method.

Q Which is arbitrary?

A No. It's based on a very specific set of criterion, as Dr. Ahlfeld testified to.

Q It's based on mathematical criteria, not physical criteria?

A Well, I don't know if I would say that.

MR. AMPE: Nothing further.

ARBITRATOR DREHER: Mr. Draper.

MR. DRAPER: Thank you, Your Honor.

CROSS-EXAMINATION

BY MR. DRAPER:

Q Good morning, Doctor.

A Good morning.

Q I would like to turn your attention, if I may, back to be Nebraska Exhibit 42, 43 and 44.

A Would those be the charts I just discussed?

Q These would be in the charts, one for Beaver Creek and one for Frenchman Creek and one for the main steam entitled "Difference between the sum of the individual impacts and the simultaneous impacts as a percent person of the simultaneous impacts."

A Okay.

Q If you would take a look first at Nebraska Exhibit 42.

A Is that Beaver Creek?

Q That's Beaver Creek.

A Thank you.

Q Looking at this chart for Beaver Creek, we can see historically what the amount of the residual was as a percentage of the --

A The total impacts.

Q -- the total impacts?

A That's right.

Q So we can see, for instance, 2003 that you and Dr. Ahlfeld and Mr. McDonald analyzed in the report that you presented?

A Yes, I believe that is the last peak.

Q Yes. And the peak before that is the one that we discussed with Dr. Ahlfeld this morning, isn't it?

A Yes. It looks like it's 1990.

Q So this shows that the existence of the residual was something that was easily apparent at the time that the Modeling Committee was putting together the RRCA Model -- Groundwater Model and determining how it would be used; isn't that right?

A Well, I believe it shows that if one had made this comparison, they would have -- they would have seen this, they would -- have gotten this result. I do not know if the Modeling Committee made this comparison.

Q But this information was available to them, wasn't it?

A It was. I guess I will note that the fact that Figure 6 was presented the way it was suggests to me that at least some people had never even looked at something like this.

ARBITRATOR DREHER: Figure 6 from what?

THE WITNESS: Figure 6, I'm sorry, from the Kansas Responsive report, the one that this would compare to. I don't know the exact number.

ARBITRATOR DREHER: I believe it's 28.

THE WITNESS: 28. Thank you.

Q (BY MR. DRAPER) And the existence of a residual on the other two exhibits you have introduced on Frenchman Creek and the mainstem also showed that there was information available showing the existence of a residual at the time the model was created; isn't that right?

A With specific regard to the mainstem, the residual as occurred recently has no historical precedent.

MR. DRAPER: That will do it. No further questions.

Thank you, Doctor.

THE WITNESS: You are welcome.

ARBITRATOR DREHER: Let me make sure I understand the captioning of these Nebraska Exhibits 42, 43 and 44. Using 42 as an example, it's entitled "Difference between the sum of the individual impacts and the simultaneous impacts as a percent of the simultaneous impacts."

THE WITNESS: So that the total -- the first line difference between the sum of the individual impact and the simultaneous impact, that would equate to our residual and then that residual is divided by those -- the simultaneous or total impact and those simultaneous impacts are determined by comparing the all-on versus all-off.

ARBITRATOR DREHER: All right. Thank you.

THE WITNESS: Sure.

MR. BLANKENAU: May we have five minutes?

ARBITRATOR DREHER: Yes.

(Break was taken from 11:35 to 11:40.)

MR. BLANKENAU: Mr. Dreher, we have nothing further of this witness.

You indicated at the break you indicated a desire to ask a few more questions of Brian Dunnigan, who we had not intended to call as a rebuttal witness, but we would happily offer him up to you in that he respond only to your questions.

ARBITRATOR DREHER: I think to the extent I ask questions that have not previously been asked, that if Colorado and Kansas want to cross on the questions that I ask, I think that would be

appropriate.

MR. BLANKENAU: My only concern is we hadn't intended to call him as a witness; we had nothing particular --

ARBITRATOR DREHER: I understand.

MR. BLANKENAU: And we are kind of getting our case directed in a direction that we have no control over.

MR. WILMOTH: The questions have never been raised and, by definition, are not properly part of rebuttal by the other side.

ARBITRATOR DREHER: They have been raised in briefing, but no one, as far as I know, has addressed them during the hearing. And they are pertinent.

Let's take it a step at a time. Let me ask my questions --

MR. BLANKENAU: Sure.

ARBITRATOR DREHER: -- and then we will see where we go.

MR. BLANKENAU: All right.

BRIAN DUNNIGAN,

having previously been sworn, was examined and testified as follows:

EXAMINATION BY ARBITRATOR DREHER

ARBITRATOR DREHER: Good morning, Director Dunnigan.

THE WITNESS: Good morning.

ARBITRATOR DREHER: When were these accounting issues -- and when I refer to "accounting issues," I'm referring to the calculation of beneficial consumptive use and the accounting point in the model, the Haigler Canal diversion, all of these issues -- when were those first raised with the Republican River Compact Administration?

THE WITNESS: I think they were raised at different points in time. They -- looking back over some of the Annual Reports would be my only research because I wasn't involved in the Republican River Compact Administration prior to about a year ago. But I know there were lingering questions that were addressed at different times during the annual Compact reports.

As far as the CBCU issue, certainly my familiarity with it goes back a year and I know that we were working hard on it a year ago, and I know that it was something that had come up before that, maybe a year before that.

So that particular issue has been out there for about a year. We worked very hard on it

last year and had a number of meetings through the Compact. I -- my first one was in April, I believe we met again in May. We met again for the annual meeting in August.

And my recollection is, at least of the CBCU issue, that the issue was brought up on each of those occasions and we were looking to find a solution for that problem.

Regarding Haigler and some of those other ones, my recollection would be that they would have come up, perhaps, at different points in time throughout the years.

ARBITRATOR DREHER: The Republican River Compact Administration did agree to final accounting in 2005, with the sole exception of the treatment of evaporation from non-Federal reservoirs below Harlan County Lake; is that correct?

THE WITNESS: That's my understanding, yes.

ARBITRATOR DREHER: And this is the point of why I wanted to talk with him.

To the extent that any of the proposed accounting changes to the accounting procedures are eventually determined to be appropriate, to that extent, what is your view as to what point in time

they should be applied?

THE WITNESS: I guess my view would be that there are a few years that we have not agreed to numbers on, the last few years, in particular. And I think that the reasons why we did not agree to those numbers at that time were apparent.

I think that new issues would go forward from some point in time that we had an agreement.

ARBITRATOR DREHER: But the RRCA may not be able to reach agreement on its own; is that correct?

THE WITNESS: That is correct.

ARBITRATOR DREHER: So what are the appropriate accounting procedures to apply in the meantime?

THE WITNESS: That's a very good question.

I think that, as in 2005, we arrived at numbers using different assumptions and the more assumptions that you put in there, the more different numbers you are going to have. And I don't think that serves anybody well, knowing what -- what compliance is and where we have to be.

MR. BLANKENAU: I think, Mr. Dreher, we could probably offer a legal response to that, at

least what we believe legally would be the appropriate time and we would suggest that we do that in our final brief.

ARBITRATOR DREHER: Okay.

MR. AMPE: I concur.

ARBITRATOR DREHER: All right, that will be fine.

MR. BLANKENAU: Thank you.

ARBITRATOR DREHER: With that understanding, Mr. Draper, are you content not to ask any additional questions at this point?

MR. DRAPER: Yes.

MR. BLANKENAU: Excellent delivery.

ARBITRATOR DREHER: Thank you. That's all I have.

I hope you understand the issue.

MR. DRAPER: I do and I appreciate that very much.

ARBITRATOR DREHER: Thank you.

All right, I think we are at the point -- let me back up.

We have got some exhibits probably that need to be introduced.

MR. BLANKENAU: We do.

ARBITRATOR DREHER: So let's do Nebraska

first.

MR. BLANKENAU: Thank you.

We would offer Exhibit 41, which is our Pacman chart; Exhibit 42 is the Beaver Creek difference between the sum of the individual impacts and the simultaneous impacts as a percent of simultaneous impacts. Exhibit 43 is the Frenchman version of that. And Exhibit 44 is the mainstem.

ARBITRATOR DREHER: Any objection?

MR. DRAPER: No.

MR. AMPE: No.

ARBITRATOR DREHER: All right, they are admitted.

(WHEREUPON, Nebraska Exhibits 41, 42, 43 and 44 were admitted into evidence.)

ARBITRATOR DREHER: Does Kansas have anything else?

MR. DRAPER: I would just note for the record that on the flip chart we have inserted, as we agreed, on Kansas Exhibit 73 the definitions of the asterisk at the bottom, which means "As calculated by Kansas," so I think that has already been admitted, but I wanted to confirm on the record we have made that -- made that entry.

ARBITRATOR DREHER: All right.

MR. DRAPER: Thank you.

ARBITRATOR DREHER: Colorado, do you have anything additional?

MR. AMPE: No. I guess we are not quite done, but no, not at this time.

ARBITRATOR DREHER: No, we are not quite done, but we are for today --

MR. DRAPER: Yes.

ARBITRATOR DREHER: -- and for a period of three weeks, I believe, more or less.

MR. WILMOTH: Mr. Arbitrator, I do have one matter.

I just wanted to let the parties know that I had an email from Mr. Chapman at the Solicitor's Office last night and I returned it, about the depositions of the Bureau people. And I just -- I inferred from his email that he wanted me to prepare a Notice of Deposition. So I did so, in draft, and I will just give that to the parties.

MR. LAVENE: That is for the 7th.

ARBITRATOR DREHER: It's for the 7th.

MR. WILMOTH: I don't know if you want a copy of this or not. I don't know if there needs to be discussion on that or not; but Mr. Chapman, for clarity sake, inquired as to a number of people that

might attend, who would be allowed to be in the room, logistics issues. And I inferred from his email that he would like a Notice of Deposition formally, so I prepared that.

I did send that to him in draft last night, told him I was going to share it with the parties today. So that's where we are at.

ARBITRATOR DREHER: Well, to the extent something needs to be worked out regarding this, I think the States are capable of doing that, at least you have been thus far, on these kind of matters, at least.

MR. WILMOTH: We don't have a committee; we don't have a committee we have to agree on.

MR. AMPE: I actually have a couple of minor things.

ARBITRATOR DREHER: All right.

MR. AMPE: As for the oversized exhibits, I will once again take them home, photograph them and convert them to PDF and distribute them.

I had a discussion a little bit earlier with Mr. Dreher regarding what to do with the full-sized original. We don't need to decide now but if it would be okay with counsel to make the reduced

size and given to Mr. Dreher as the official exhibit.

MR. BLANKENAU: I think that will be appropriate.

MR. AMPE: You can consider. We don't need to know right now.

Our other request would be prior to the deposition the States exchange what they believe the current exhibit lists are so we can all compare and make sure we are on the same page.

MR. DRAPER: Good idea.

MR. LAVENE: Send final ones to them now or wait?

MR. AMPE: Wait.

ARBITRATOR DREHER: Anything else?

MR. DRAPER: So just to summarize the next step in this process, we will be taking the depositions of the two Bureau of Reclamation witnesses on April 7 in Grand Island and we will be returning here to attend the presentation of their testimony, which is on April 14.

ARBITRATOR DREHER: Correct. And then also on April 14, the States will have an opportunity to make closing statements.

MR. DRAPER: Very good.

And then we have moved the deadline one

week later than originally scheduled for us to submit our posttrial briefs to accommodate this extra bit of trial?

ARBITRATOR DREHER: Correct.

And for now, I'm going to continue to operate on the schedule that you all had presented. I have got some things I can work on, so I'm not asking for an extension at this point.

MR. DRAPER: Thank you very much.

And with the agreement of the other parties, I will locate a hard copy of the volume we referred to, Volume 5 of 5 of the Final Settlement Stipulation and send that to you, Mr. Dreher, with a copy of the transmittal letter to the other States.

MR. AMPE: Thank you.

MR. LAVENE: Just point of clarification, we have confirmed this room or this space?

MR. SPEED: So far, they haven't said no.

MR. DRAPER: Depends on whether we get all of our cards in.

MR. SPEED: I have asked. They said yes, and if it changes, I will let you know.

MR. AMPE: We assume we will be here,

unless we hear otherwise.

ARBITRATOR DREHER: So with that, we will be in recess until April 14.

(WHEREUPON, the hearing recessed at 11:50 a.m. to be continued to April 14, 2009, at 9:00 a.m.)

CERTIFICATE

I, Carol Patterson, Registered Merit Reporter, do hereby certify that the above-named proceedings were reported by me in stenotype; that the within transcript is true and correct, to the best of my knowledge and belief.

_____
Patterson Reporting & Video
Carol Patterson
Registered Professional Reporter