

2/29/2012

SAMUEL PERKINS, JR.

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1 .

2 No. 126, Original

3 In The

4 Supreme Court of the United States

5 .

6 STATE OF KANSAS,

7 Plaintiff,

8 v.

9 STATE OF NEBRASKA

10 and

11 STATE OF COLORADO,

12 Defendants.

13 .

14 .

15 DEPOSITION OF

16 SAMUEL PERKINS

17 taken on behalf of the Defendant State of

18 Nebraska, pursuant to Notice to Take Deposition,

19 beginning at 1:20 PM on the 29th day of February,

20 2012, at 109 Southwest 9th Street, in the City of

21 Topeka, State of Kansas, before Michelle D.

22 Hancock, RPR, C.S.R.

23 .

24 .

25 .

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2

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4

1 INDEX

2 .

3 .

4 Certificate - - - - - 78

5 .

6 .

7 WITNESS

8 ON BEHALF OF DEFENDANT STATE OF NEBRASKA: PAGE

9 SAMUEL PERKINS

10 Direct Examination by Mr. Wilmoth 5

11 .

12 .

13 EXHIBITS

14 PERKINS DEPO EXHIBIT NO: MARKED

15 No 1 expert report 6

16 No 2 expert report 6

17 No 3 deposition notice 7

18 No 4 expert report 8

19 No 5 expert report 18

20 No 6 Safe Yield Determination 23

21 No 7 CIR 2006 update 37

22 No 8 7-6-07 Barfield to Perkins 43

23 No 9 expert report 60

24 .

25 .

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1 SAMUEL PERKINS,
2 of lawful age, having been first duly sworn on his
3 oath to state the truth, the whole truth, and
4 nothing but the truth, testified as follows:

5 DIRECT EXAMINATION

6 BY MR. WILMOTH:

7 Q. Good afternoon, Mr. Perkins. How are you
8 today?

9 A. I'm good.

10 Q. I don't think we've had the pleasure. My
11 name is Tom Wilmoth. I'm counsel for the state of
12 Nebraska, and you might know these folks, but my
13 partner is Don Blankenau, and Justin Lavene sits
14 there.

15 A. Nice to meet you.

16 Q. You too. Thank you for coming. I
17 understand that you did some work on a couple of
18 reports with a coauthor Mr. Larson, is that
19 correct?

20 A. Yes.

21 Q. And I'd like to just get those reports
22 into the record to expedite things. Is this a
23 copy of one of the reports, sir?

24 A. Yes.

25 Q. And we're going to start over with the

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1 exhibit numbers. This will be Exhibit 1.

2 (Deposition Exhibit 1 marked for
3 identification.)

4 BY MR. WILMOTH:

5 Q. And does this look like a copy of the
6 second report, which we'll mark as Exhibit 2?

7 A. Yes.

8 Q. Okay. Thank you.

9 (Deposition Exhibit 2 marked for
10 identification.)

11 BY MR. WILMOTH:

12 Q. And you also produced a curriculum vitae
13 for this proceeding, did you not?

14 A. I --

15 Q. Or, a resume if you will.

16 A. I don't recall producing one.

17 MR. DRAPER: I don't -- I don't think
18 one's been produced.

19 MR. WILMOTH: Okay.

20 BY MR. WILMOTH:

21 Q. Do you have a current version of the --
22 of your CV?

23 A. I have -- I can provide you one.

24 Q. For example, do you have one on your
25 computer here that you could just print off today

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1 or would you need to prepare that afresh?

2 A. I might be able to provide it sometime
3 today.

4 Q. Okay. Well, maybe we'll take a break in
5 a bit and I might ask you to do that, too.

6 A. Okay.

7 Q. I'd also like to just provide you a
8 notice of the deposition and ask you if you've
9 seen this document?

10 A. Yes.

11 Q. On the second page of that document we
12 had asked you to bring any supplemental materials
13 that might augment your -- the report you --

14 A. Uh-huh.

15 Q. -- prepared. Did you do that today?

16 A. I -- I didn't bring anything. I don't
17 think there's anything that's supplemental.

18 Q. Okay. Thank you. Yes, we'll mark that
19 as Exhibit 3.

20 (Deposition Exhibit 3 marked for
21 identification.)

22 BY MR. WILMOTH:

23 Q. Before we get into your reports, Mr.
24 Perkins, I wanted to ask you about some of your
25 earlier work. We'll mark this as Exhibit 4.

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1 (Deposition Exhibit 4 marked for
2 identification.)

3 BY MR. WILMOTH:

4 Q. Could you take a moment and just
5 familiarize yourself with that document, please?

6 A. That goes back awhile.

7 Q. Does it look familiar?

8 A. Uh-huh. Yeah.

9 Q. Could you tell me when you prepared that
10 document?

11 A. Let's see. Well, this would be work from
12 1992, '91-'92. And as a -- Marios was the lead
13 author and he did most of the writing. We -- we
14 had discussions about results and so forth. He
15 did -- he wrote -- he wrote the article.

16 Q. Could you describe for me what your role
17 was in the preparation of this article?

18 A. Develop -- I was involved in preparing
19 input data, model runs, extracting results and
20 assembling results so he could -- so he could
21 analyze them, and just met with Marios on a daily
22 basis --

23 Q. And is that --

24 A. -- to discuss what --

25 Q. Is it Mr. Sophocleous?

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1 A. Uh-huh.

2 Q. Am I pronouncing that correctly?

3 A. Correct.

4 Q. Okay. Pretty good. And what is your
5 relationship with Mr. Sophocleous? Is he a -- a
6 colleague of yours at this time or a mentor of
7 yours or --

8 A. He's a -- was a senior scientist at
9 Kansas Geological Survey.

10 Q. Okay.

11 A. Continues to be there. So we -- so
12 current -- currently we're -- we stay somewhat in
13 touch, but just no -- no formal relationship.

14 Q. Have you continued to work with Mr.
15 Sophocleous on other projects?

16 A. Rarely and occasionally, yes.

17 Q. What was the general issue that you were
18 addressing in this paper?

19 A. I think the general issue is using --
20 using groundwater models to make projections of
21 the effects of groundwater pumping on stream
22 depletions. These were mainly alluvial aquifer
23 groundwater models, so we were -- but it was
24 generally to project stream depletions and -- into
25 the future.

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1 Q. And then did you attempt to draw some
2 conclusions about how that water supply might be
3 managed to address those depletions?

4 A. To some extent. We -- we were primarily
5 trying to develop them as tools that those in --
6 in the regulatory capacity might be able to use.

7 Q. Okay.

8 A. So we weren't trying to draw a conclusion
9 about how -- how it should be managed.

10 Q. You were just developing a tool that
11 someone else might utilize to make those
12 decisions?

13 A. Right.

14 Q. Was it ever utilized in that way?

15 A. I can't really -- can't really -- can't
16 really tell you.

17 Q. So this wasn't done for any particular
18 client, if you will, or recipient of the work; it
19 was just an academic piece?

20 A. It was -- I think it was probably done
21 for motivate -- at least motivated by work at the
22 division of water resources.

23 Q. Here in Kansas?

24 A. Right.

25 Q. But you're not aware whether the division

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1 of water resources ever adopted this tool in
2 furtherance of its management objectives?

3 A. Correct.

4 Q. Could you please turn to page 45 of the
5 document. The page numbers appear in the top
6 right-hand corner of the odd numbered pages.

7 A. Okay.

8 Q. There's a heading there entitled
9 management applications in the middle. Do you see
10 that?

11 A. Uh-huh.

12 Q. There's a reference there to desired
13 situations. What are the desired situations that
14 you were addressing in this paper? And feel free
15 to take --

16 A. Uh-huh.

17 Q. -- some time to review the material.

18 A. I -- I can't tell you what the desired
19 situations are from --

20 Q. Okay.

21 A. -- what I've seen in the last minute or
22 two.

23 Q. Okay. Could you turn to page 46, please.

24 A. To page 46?

25 Q. Yes. In the top left-hand corner the

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1 even numbers appear.

2 A. Oh, okay.

3 Q. And the odd numbered pages are in the top
4 right-hand corner.

5 A. Okay.

6 Q. As I interpret this couple of paragraphs
7 here you're attempting to make various projections
8 about how streamflows will respond to certain
9 things, is that correct?

10 A. That looks correct.

11 Q. And do you know how accurate your
12 predictions actually were?

13 A. No.

14 Q. On page 51, if you'll turn to that page.

15 A. (So complied.)

16 Q. Midway down the paragraph, under
17 Rattlesnake Creek - Quivira model area?

18 A. Uh-huh.

19 Q. There's a statement that future
20 streamflows near the entrance of the Quivira
21 refuge will be declining by approximately 40
22 percent by the year 2010, according to the model.
23 Do you know whether that prediction came to
24 fruition?

25 A. First, I'd say it's not a prediction, but

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1 a projection. It's kind of a -- maybe it's a
2 modeler's distinction, but --

3 Q. Could you explain the difference for me.

4 A. The difference is that I doubt that we
5 were anywhere in this paper we were saying that we
6 were trying to make a prediction. I may be wrong,
7 but -- but the distinction is that the projection
8 is -- would be a calculation of the streamflow
9 into the future based on about -- based on a set
10 of assumptions about what the future is going to
11 be like, so it's -- I guess the distinction is the
12 caveats that -- that the projection shows
13 streamflows at a given date based on whatever
14 assumptions you're use -- you've built into the
15 model, what the hydrologic or pumping conditions
16 are going to be based for your scenarios.

17 Q. I see. So there's a -- if I understand
18 correctly, there's a difference between inputting
19 certain assumptions into a model which will give
20 you a projected outcome based on those inputs.

21 A. Uh-huh.

22 Q. And making a predictive determination
23 about what will happen in the future?

24 A. Correct.

25 Q. Okay. Could you continue two pages

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14

1 forward to page 53, please.

2 A. Uh-huh.

3 Q. The first sentence of that page, first
4 full sentence, I should say, talks about a 20-year
5 planning horizon?

6 A. Uh-huh.

7 Q. Could you explain to me what the
8 significance of that period was in your view in
9 developing the paper?

10 A. I don't think there's any particular
11 significance to the 20-year planning horizon.

12 Q. Do you have any recollection of why that
13 time period was relevant to the purposes of the
14 paper?

15 A. Not -- I could -- I can speculate,
16 basically, but I can't -- I can't give you a
17 definitive answer. I can just say that it's
18 likely that we had, based on a particular
19 historical data set we had, and for the responses
20 we were looking for, that seemed like a sufficient
21 planning horizon for what we were looking at.

22 Q. The responses to certain action --
23 management actions or what responses?

24 A. Responses to pumping I would -- I'm --
25 pumping and I assume streamflows. And I guess I

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1 might add we were looking at alluvial aquifers,
2 and so that may have had something to do with the
3 fact that we were looking at a more restricted
4 type of aquifer.

5 Q. Is that to suggest that a shorter time
6 period would be more relevant in an alluvial
7 system?

8 A. Yes.

9 Q. And why is that?

10 A. Just because of the constraints on the
11 distance that -- of pumping from a -- from a
12 stream that's bounded by the -- by the valley
13 walls, so the -- the time -- the time to see -- to
14 time of response is going to be more restricted.

15 Q. So in your experience, then, is it -- is
16 the responsiveness of a management action related
17 to the proximity of the well, for example, to the
18 river? Shutting down wells closer to the river
19 has a more immediate response on river flows than
20 otherwise?

21 A. Yes.

22 Q. And --

23 A. Generally --

24 Q. I'm sorry.

25 A. Generally you'd expect that.

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1 Q. And when you conducted this analysis, for
2 example, did you take into account any
3 optimization, as I've heard the word discussed by
4 Mr. Larson? In other words, as I understand it,
5 ways to ensure that the most amount of flow is
6 restored with the least amount of restriction?

7 A. No.

8 Q. Have you ever --

9 A. Wait a minute.

10 Q. -- conducted such analysis?

11 A. Well, we did that kind of in an
12 approximate sense just by examining different
13 corridor widths, and with kind of a rough
14 approximation that -- that the narrower the
15 corridors are going to show a quicker response to
16 the pumping management.

17 Q. Did you take into account the curtailment
18 of any surface water uses in this scenario?

19 A. No. This pretty much restricted to
20 groundwater model.

21 Q. Have you ever evaluated the effectiveness
22 of curtailing surface water uses on a stream
23 system to generate more base flow in the stream?

24 A. I can't -- I can't remember any
25 particular work about doing this.

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1 Q. Have you worked with surface water models
2 before?

3 A. To some extent.

4 Q. Have you ever evaluated the effectiveness
5 of curtailing surface water uses on generating
6 additional streamflow, for example?

7 A. I do think that one of these models we
8 did, we did include the -- the -- include surface
9 water users in our analysis.

10 Q. And what did you conclude from that
11 analysis?

12 A. I can't tell you at the moment what we
13 concluded from it.

14 Q. Do you know when that analysis was
15 performed?

16 A. I do -- let's see. I think -- I think we
17 might have been involved in looking at some --
18 either the -- either the -- either this model or
19 the -- or, I mean, either a Rattlesnake Creek
20 model or lower Republican River model, we involved
21 surface water sources.

22 Q. Let me ask you about this next document,
23 then.

24 MR. DRAPER: Can we go off the record for
25 just a second. I just want to tie in Steve

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18

1 Larson.

2 MR. WILMOTH: Yeah.

3 (Off-the-record discussion.)

4 BY MR. WILMOTH:

5 Q. Mr. Perkins, we're back on the record.

6 I'd like to hand you a copy of another study,
7 which we'll mark as Exhibit 5. And I'd like you
8 to take a moment, review it and see if you can
9 identify it?

10 (Deposition Exhibit 5 marked for
11 identification.)

12 MR. DRAPER: What was the exhibit number?

13 MR. WILMOTH: Five.

14 A. Yes, I can identify it.

15 BY MR. WILMOTH:

16 Q. Can you tell me when this document was
17 prepared?

18 A. About 1998.

19 Q. And do you recall the purpose of the
20 document at the time?

21 A. It was mainly to describe the linkage
22 between modflow with a groundwater 3D flow model
23 and a soil water balance simulator, SWAT, and then
24 describe its application to the lower Republican
25 River basin extent between Concordia and Clay

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1 Center.

2 Q. And Mr. Sophocleous was a co-author on
3 this, too?

4 A. Uh-huh.

5 Q. And what was your role relative to this
6 report and what function did Mr. Sophocleous
7 perform?

8 A. I developed the linkage, and the -- code
9 linkage, and was involved in preparing the data
10 sets, and we worked together on calibration and
11 that -- we worked -- collaborated on writing the
12 report.

13 Q. Could you turn to page 422. And these
14 numbers are in the bottom corners of the pages.
15 Do you see the heading labeled model calibration
16 and verification?

17 A. Yes.

18 Q. The last sentence of that first
19 paragraph, could you please read it?

20 A. It says: For this purpose we used
21 reconnaissance-grade calibration instead of more
22 rigorous optimization techniques.

23 Q. Could you explain the meaning of
24 reconnaissance-grade calibration?

25 A. I think -- I think we're referring to --

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1 I can't -- I can't tell you exactly what we're
2 referring to there.

3 Q. Can you tell me what you meant by
4 optimization techniques?

5 A. That would be systematic minimization of
6 model error using globalized minimization
7 techniques, I guess.

8 Q. So the idea there is to minimize the
9 difference between what the model shows and what
10 reality -- what in reality is occurring. Is that
11 the idea?

12 A. Right. Between --

13 Q. To minimize the differences between those
14 --

15 A. Minimize.

16 Q. -- two?

17 A. Right, the model -- calculated model
18 values and observations.

19 Q. Okay. And why is that an important thing
20 to do in a modeling exercise generally?

21 A. Well, to be able to use the model to make
22 -- it will increase the confidence in your model
23 projections.

24 Q. To see how well they'll demonstrate what
25 might occur in the future if the assumptions are

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21

1 accurate?

2 A. Right.

3 Q. Could you turn to page 425, please. The
4 second full paragraph in the left-hand column is
5 the focus of my attention. Could you just read
6 that for a moment, familiarize yourself with it.

7 A. Okay.

8 MR. DRAPER: Which paragraph is that?

9 MR. WILMOTH: It would be the second full
10 paragraph in the left-hand column.

11 MR. DRAPER: It starts with water use
12 reduces?

13 MR. WILMOTH: (Nodded head up and down.)

14 A. Okay.

15 BY MR. WILMOTH:

16 Q. Do I understand from this paragraph that
17 you are finding that base flow is reduced when
18 groundwater is pumped and that the elimination of
19 the groundwater pumping increases the base flow?
20 Is that generally the conclusion?

21 A. Yes.

22 Q. Now, if you were using this same tool but
23 were analyzing the impact of the injection of
24 water into a groundwater system, what would your
25 expectation be?

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1 A. You'd likely see the same relationship.

2 Q. Would you expect the base flow to
3 increase?

4 A. Yes.

5 Q. In the right-hand column on this page
6 there's a heading, effective drought -- excuse me.
7 Effective water use reduction on stream yield
8 during droughts. Do you see that?

9 A. I do.

10 Q. Do I understand from this section that
11 you chose to curtail water uses near the river in
12 this analysis? And feel free to take your time
13 and review it.

14 A. That looks right.

15 Q. And why did you select the wells closest
16 to the river?

17 A. To get the most immediate response and --

18 Q. On base flow?

19 A. On base flow.

20 Q. On page 426, the following page, under
21 conclusions and recommendations, in the second
22 full paragraph there's a discussion of an 18-year
23 simulation. A series of 18-year simulations.

24 Would you have a look at that for a moment.

25 A. Okay. Okay.

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23

1 Q. Why did you choose to run 18-year
2 simulations? Was there any significance to that
3 time period?

4 A. I -- I don't remember, but it -- now, I
5 don't -- I don't think that there's any particular
6 significance to 18 years of simulation.

7 Q. At the very end of the discussion and the
8 conclusions above the acknowledgments you note
9 that the predictive capability of this exercise
10 was limited. Do you see that discussion? About
11 halfway down that last paragraph.

12 A. Okay.

13 Q. What were the limitations on the
14 predictive capability of the model?

15 A. I think -- I think the limitation was the
16 lack of sufficient spatial data -- sufficient data
17 to have a good -- good coverage of the domain that
18 we were -- the alluvial aquifer that we were
19 trying to model over the transient -- over the --
20 over the time period. You -- that's -- it was
21 really the lack of groundwater level measurements.
22 That's it.

23 (Deposition Exhibit 6 marked for
24 identification.)

25 BY MR. WILMOTH:

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24

1 Q. I'm going to hand you another analysis,
2 Mr. Perkins. And I'll tell you that this is not
3 the entirety of this document because it's very
4 lengthy. I do have a single copy which you're
5 welcome to review if you'd like. I simply
6 reproduced the pages that I have interest in, but
7 if you need to review the entire document, I have
8 one copy. It's --

9 A. That's all right.

10 Q. -- pretty big.

11 A. Yeah.

12 MR. DRAPER: Would it be convenient for
13 me to take a quick look at that?

14 MR. WILMOTH: Yeah, that's fine. The
15 pages that I'm interested in are flagged.

16 MR. DRAPER: Okay. Thanks.

17 BY MR. WILMOTH:

18 Q. And I believe I've given you copies of
19 each of the flagged pages.

20 A. Okay.

21 Q. Are you familiar with this work?

22 A. Yes.

23 Q. Could you explain to me the nature of
24 your involvement in this work. Well, first --
25 strike that. Let me ask you, generally, what was

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25

1 the purpose of the work, and then if you would
2 please explain your involvement in it, I'd
3 appreciate it?

4 A. Okay. This was work that was done after
5 we received a groundwater model that had been
6 developed by USGS. It's a multilayer model of
7 confined aquifer in southeast Kansas. And the
8 purpose of our work was to try to use the model to
9 develop estimates of groundwater availability for
10 further appropriation. My role within that was to
11 use the model provided by USGS, and then just
12 develop -- develop model runs that we could use to
13 evaluate the availability.

14 Q. Of additional water that could be put to
15 use?

16 A. Right.

17 Q. Is that the idea? That the objective was
18 to define the amount of water that might be made
19 available?

20 A. Right.

21 Q. And in doing so, were you trying to
22 determine what the impact of that additional use
23 might be on other users? Or on the aquifer as a
24 whole?

25 A. It -- it was to basically determine the

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26

1 impact of additional groundwater pumping on the
2 aquifer as a whole, of any -- of any given
3 location within the domain we were looking at in
4 Kansas, so that -- so that additional
5 appropriation at a given place would be reflected
6 in the entire domain within Kansas.

7 Q. Could I turn your attention to page 4,
8 please, which should be just the next page. They
9 should be all in order. The fourth paragraph
10 talks about continued monitoring. Could you read
11 that for me. Just that sentence.

12 A. Okay.

13 Q. And why was continued monitoring
14 important in this regard?

15 A. Mainly to compare with what the model is
16 telling us.

17 Q. As you proceed into the future?

18 A. Right.

19 Q. So, for example, if real world experience
20 showed that the model was inaccurate in its
21 projections, some management change could adapt or
22 deal with that discrepancy? Is that what you're
23 saying?

24 A. Right. We could revisit the model and
25 see what -- see what we'd need to do to try to

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27

1 improve -- improve our model projections, so --

2 Q. I'm interested in this passage about the
3 continued monitoring being essential to the
4 management of the area for the long term. Are you
5 suggesting or are the authors of this report
6 suggesting that it's important to monitor to deal
7 with the changes in the model or to deal with
8 management on the ground because of differences on
9 the ground from what the model projected? Or
10 both. Maybe it's both.

11 A. It -- it could be both. I mean, we're
12 projecting both the pumping and the response to
13 the pumping, so, yeah.

14 Q. So if those responses don't pan out,
15 either the model or the management change, and
16 things get on the same page, I guess.

17 A. Yeah, that sounds -- that sounds right.

18 Q. And then on the -- in the last sentence
19 of that paragraph, as I understand this, you're --
20 you're suggesting that the hydrologic data that's
21 observed and the model should be worked -- should
22 work toward some reconciliation in the future? So
23 that they match up to make management decisions?
24 Is that the intent of that last sentence?

25 MR. DRAPER: Tom, could you repeat your

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28

1 question with respect to --

2 BY MR. WILMOTH:

3 Q. Yeah. I think the --

4 MR. DRAPER: -- that last sentence?

5 BY MR. WILMOTH:

6 Q. -- simplest thing is to just ask you to

7 read that last sentence and give me your

8 interpretation of its meaning?

9 A. Okay.

10 MR. DRAPER: And would you like him to

11 read it out loud?

12 MR. WILMOTH: No.

13 A. I think it's just saying that we -- we

14 believe that we've made an estimate of safe yield

15 that gives us confidence that the water will be

16 available into the future based on the model

17 projections, but it's kind of a followup to the

18 continued monitoring that we'll need to -- need to

19 monitor how well -- how well that holds up into

20 the future, and so that -- so that the estimates

21 may need to be revised on -- on available safe

22 yield.

23 BY MR. WILMOTH:

24 Q. What type of factors would commonly

25 influence the scale or degree of any discrepancy

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29

1 between a model projection and what actually
2 happens? Is it climate variability, pumping
3 variability, those kinds of things?

4 A. Well, knowing -- knowing the -- the
5 groundwater projection is based on knowing or
6 having values for aquifer properties, but the data
7 that you actually have for that is generally
8 relatively sparse so you generally don't know all
9 the aquifer properties that well for the -- for
10 the scale of the model area you're looking at.
11 So, with the -- with the data you have available,
12 the model error is going to -- you're going to be
13 evaluated based on the available data that you
14 have.

15 Q. Let me stop you there. I think I may
16 have asked you an inarticulate question, which may
17 not be the first or last time I do it, but let me
18 try again.

19 A. Okay.

20 Q. I think we agree that there are sometimes
21 discrepancies between what a model might project
22 and what actually occurs. And my question is,
23 what factors contribute to that discrepancy?

24 A. Okay. Start with aquifer properties,
25 hydraulic conductivity and the storage coefficient

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30

1 you -- you may be using.

2 THE REPORTER: I'm sorry. Coefficient?

3 A. Storage coefficient. Your initial
4 conditions that you're using for your projections,
5 that can be very important. Your -- the stressors
6 that you're applying, that as you're pumping, your
7 recharge. I assume recharge is going to involve
8 presip -- well, stream -- streamflow interaction.
9 So it's -- generally, it's just -- it's a comp --
10 the real world system is a complicated system and
11 you can't -- there's no way you're going to be
12 able to represent the -- completely represent the
13 real world system, so you need to settle for a
14 simplified version of it and try to assess it
15 against the limited data set that you have.

16 BY MR. WILMOTH:

17 Q. And in your experience do management
18 actions have an impact on the extent to which
19 model projections in the real world differ? For
20 example, if you had a model projection based on a
21 certain baseline and then the regulator decided
22 that the baseline pumping, for example, would be
23 reduced by 25 percent, but you didn't account for
24 that in your projection, how would that affect
25 your -- your view of the value of the projection

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31

1 versus reality? And what would you do to account
2 for that, I guess?

3 A. Sounds like the assumptions of your
4 projections are -- you're looking at the wrong
5 scenario.

6 Q. How so?

7 A. If your -- if your projections, based on
8 one set of assumptions of pumping but the
9 projection -- but you're using it to assess
10 projections with 25 percent pumping, then it
11 sounds like you're -- didn't formulate your
12 scenario correctly.

13 Q. Can I turn you to page 6 on this
14 document. Should be the very next page.

15 A. Okay.

16 Q. In the paragraph above the graphic there,
17 there's a statement that with the release of the
18 USGS groundwater model and the model work by DWR a
19 greater understanding of the aquifer has been
20 acquired and appropriate management decisions have
21 been made. Can you tell me, first, what the
22 additional information was that led to the greater
23 understanding referred to there; and, second, what
24 the management decisions were that you're
25 referring to?

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32

1 A. Well, I think the greater understanding
2 refers specifically to how the aquifer responds to
3 pumping. I think we're -- just a way of saying
4 we've quantified what the response is to pumping
5 so that we can use that to evaluate groundwater
6 availability.

7 Q. And were there some management decisions
8 that arose out of that?

9 A. Yes.

10 Q. Do you recall what those were?

11 A. As I recall, we've used that to decide on
12 -- for or against certain applications for water
13 rights.

14 Q. So am I correct in inferring that this
15 additional understanding facilitated the improved
16 management decisions?

17 A. Yes.

18 Q. Could you turn to the next page, please,
19 page 7, and I think this may speak more directly
20 to the management decisions, but fourth paragraph
21 down, the last sentence, explains the groundwater
22 model serves as a support tool for KDA, DWR to
23 make management decisions? Is it -- do you see
24 that sentence?

25 A. I do.

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33

1 Q. When you say that the model serves as a
2 support tool, are there other tools in that
3 toolbox that you're familiar with? Are there
4 other considerations that go into these management
5 decisions?

6 A. Yes.

7 Q. What are those factors?

8 A. Well, the availability of water for --
9 groundwater for appropriation. It's generally
10 based on available precip -- precipitation
11 recharge, but in this case, with a confined
12 groundwater system, and the direct precip --
13 precipitation recharge approach, it wasn't --
14 wasn't -- it wasn't helpful for evaluating
15 groundwater availability, so -- so this was --
16 this was a tool we had for those evaluations, and
17 so other tools would be based more on precip
18 recharge.

19 Q. And so depending on how much
20 precipitation or recharge occurs, you could make a
21 different decision? Is that the idea?

22 A. Right.

23 Q. Could you turn to page 34, the next page.
24 I believe it's the next page.

25 A. Page 14?

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34

1 Q. 34, please.

2 A. 34? Okay.

3 Q. Could you explain to me this phenomenon
4 of model cells going dry and what that means?

5 A. Well, within a particular layer, if its
6 computed head of -- dropped below the -- you know,
7 the bottom of the layer, so at that point the --
8 the -- the cell is basically -- it's taken out of
9 the solution.

10 Q. And does that present a new problem in
11 your analysis that you've got to address?

12 A. Yeah, it -- yes, it -- are you asking
13 about this particular analysis or is it --

14 Q. Well, yes.

15 A. -- more of a general?

16 Q. This one here.

17 A. Okay. Yes, it -- it -- it can present a
18 problem in the analysis.

19 Q. What problem does that create and how do
20 you attempt to address it?

21 A. It -- well, probably -- if you're -- if
22 you're looking at -- if you're trying to assess
23 the availability within a particular domain, and
24 you're getting dry cells, then part of your --
25 you've lost part of your model of that area over

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35

1 the -- over the time frame that you have dry
2 cells. So you're not getting any help from the
3 model for that part of your domain. In this -- so
4 -- so for -- our part was just to try to
5 distribute the pumping over a wide enough number
6 of cells centered on an area of interest within
7 the domain so that any given pumping location, the
8 -- well, it -- so that the response wouldn't be so
9 severe at any given location.

10 Q. So that the cells would not go dry.

11 A. Right.

12 Q. And how did that operate to solve your
13 problem?

14 A. We were able to assess the -- the
15 response of the change in groundwater storage to a
16 given level of pumping that supplied within a
17 given area of the model.

18 Q. Let me turn your attention to the last
19 page, page 39, and the final recommendation of
20 staff in this document. Do you see that last
21 sentence?

22 A. Uh-huh.

23 Q. Why did -- why did you all recommend that
24 the safe yield determination be updated into the
25 future?

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36

1 A. Well, I think we wanted to track how well
2 the model is doing compared with -- with measured
3 groundwater levels and take advantage of
4 additional measurements if -- if we need to
5 reevaluate -- reevaluate the availability.

6 Q. So the safe yield determination may
7 change and then the management actions could
8 respond to that change, I suppose.

9 A. Correct.

10 Q. That was the idea?

11 A. Yeah.

12 MR. WILMOTH: Let's just take a 10-minute
13 break.

14 MR. DRAPER: Okay.

15 (There was a recess from 2:25 PM to 2:42
16 PM.)

17 BY MR. WILMOTH:

18 Q. Okay. Mr. Larson, are you ready?

19 A. I'm Mr. Perkins.

20 Q. Excuse me. I was talking to the guy on
21 the phone.

22 MR. BLANKENAU: Nice try.

23 MR. AMPE: Steve, you ready to go?

24 A. Take over, Steve. Please.

25 MR. LARSON: Hi, there.

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37

1 BY MR. WILMOTH:

2 Q. Mr. Perkins, I'm going to hand you a
3 couple of documents that we obtained during the
4 arbitration proceedings earlier from the state of
5 Kansas and just ask you to identify some of these
6 documents for me? I will confess to you that I
7 don't know much about their context, and so if you
8 could help me understand their genesis and their
9 purpose, I would appreciate it. Number seven.

10 (Deposition Exhibit 7 marked for
11 identification.)

12 A. Okay. This is documentation of the
13 procedure we used to calculate crop irrigation
14 requirements for 2006, and

15 BY MR. WILMOTH:

16 Q. And when did you conduct this analysis,
17 do you recall?

18 A. Yeah, I did this in early 2007.

19 Q. And what was the purpose of the work?

20 A. It's to calculate crop irrigation
21 requirements that they're -- that we could use to
22 compare against ag -- reported irrigation use as a
23 per -- as a depth which falls in --

24 THE REPORTER: As a?

25 A. As a depth of irrigation or volume

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38

1 prevented area, but it's -- we do it as part of
2 our duties to -- as part of the data exchange, but
3 for -- for Kansas, we -- we have reported --
4 reported use based on metered -- metered
5 monitoring, so that we don't use this -- we don't
6 use the results of this to estimate what our use
7 is in Kansas. We depend on -- on water use
8 reports for that, which is more accurate, more
9 accurate as to what we actually used.

10 BY MR. WILMOTH:

11 Q. So what would be the standard use of this
12 information? You're making a comparison to actual
13 data.

14 A. Right.

15 Q. And then what are you doing with the
16 information you learn from that comparison?

17 A. For -- for our purposes, this is -- it's
18 -- we wouldn't -- we might -- we might use it as a
19 -- we would use it as a check to -- if there's a
20 huge variance from how it's compared with reported
21 use in earlier years, then we might use that as a
22 check on -- on one set of data or the other, our
23 reported use data, or our calculations of the crop
24 irrigation requirements.

25 Q. I see. So do I understand that this is

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39

1 something that you report to the other states?

2 A. Right.

3 Q. I see. And I notice that Jewell and
4 Republic Counties are not included in any of these
5 tables. Is that because you have no reporting
6 obligation in those counties?

7 MR. GRUNEWALD: Which table?

8 BY MR. WILMOTH:

9 Q. Three, four, five, for example.

10 A. Well, I think -- I think we -- I think
11 those were left out because they were -- I think
12 they're fairly minor parts of the active
13 groundwater domain, at least within Kansas.
14 That's -- I can't tell you for sure on -- that's
15 --

16 Q. Where do you obtain the data that
17 supports these tables, for example, tables one and
18 two on page 2?

19 A. The -- this all comes out of our -- our
20 water use report data, not -- what -- what we have
21 in our water use data is reported -- reported
22 crops that were grown.

23 Q. These are reported by the producers?

24 A. Right.

25 Q. Farmers?

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40

1 A. Right. And so we -- based on the
2 reported crops and the associated irrigated area,
3 we -- we can estimate what the -- what the crop
4 distribution is within each county.

5 Q. Okay. And on page 1 here there's -- at
6 the very bottom paragraph midway through there's a
7 sentence that reads: Taken over all Kansas
8 counties within the RRCA model domain. Do you see
9 that sentence about halfway down?

10 A. The -- which paragraph?

11 Q. Last paragraph.

12 A. Okay.

13 Q. Taken over all Kansas counties within the
14 RRCA model domain reported water use is 13.32
15 inches? Or 76.6 percent of CIR? Do you see that?

16 A. CIR, yes.

17 Q. How does that relate to the water use
18 that was reported in Jewell and Republic Counties
19 to the best of your recollection?

20 A. I don't -- I don't - I can't really tell
21 you for sure, but I don't -- I don't -- I don't
22 think that it's representing what was used in
23 those counties.

24 Q. In those counties?

25 A. Yeah. I -- I might not be --

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41

1 Q. Could you --

2 A. -- reading that correct.

3 Q. -- take a look through this document and
4 just tell me if there's any way that I could
5 discern what the crop irrigation requirement was
6 on the water use in those counties?

7 A. In Jewell?

8 Q. Jewell and Republic Counties?

9 A. And Republic Counties? Let's see. Well,
10 Jewell and Republic Counties, they're -- let's
11 see. Wait a minute. They're listed here, but
12 they're not -- oh. Okay. I -- I really can't
13 tell you, I don't think.

14 Q. If you look at page 3, footnote two to
15 table three?

16 A. Yeah.

17 Q. It looks like those counties were
18 removed. Do you know why they were removed?

19 A. I don't -- I don't think they were -- no,
20 I can't tell you why they were removed exactly,
21 but I don't think that we were calculating CIR for
22 those counties, I don't think.

23 Q. And you don't have any opinion on what
24 the CIR might have been?

25 A. For?

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42

1 Q. Jewell and Republic Counties.

2 A. No, not at --

3 Q. Okay.

4 A. Not at this moment.

5 Q. Give me five. I'm going to hand you
6 another document that may be related to what we
7 just discussed, and if it is, that's fine. Maybe
8 short circuit some of the discussion. Could you
9 tell me what the relationship is of this document
10 to the one we just discussed? Is this addressing
11 the same issue?

12 A. It -- it -- yes, it looks like it. It
13 looks like it's -- could be a -- maybe just an
14 earlier version of it.

15 Q. Earlier version of the same subject
16 matter?

17 A. That's -- that's what I'm thinking.

18 Q. Okay.

19 A. I think they're -- I think they're both
20 internal documentation of our results and
21 procedure.

22 Q. Okay.

23 MR. GRUNEWALD: Tom, I'm sorry. Did --
24 was that one marked or --

25 MR. WILMOTH: No.

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43

1 MR. DRAPER: -- not marked?

2 BY MR. WILMOTH:

3 Q. Mr. Perkins, I'd like to hand you another
4 document which we'll mark as Exhibit 8.

5 (Deposition Exhibit 8 marked for
6 identification.)

7 BY MR. WILMOTH:

8 Q. And ask you to review and identify this
9 document for me, please? And take your time as
10 you need it.

11 A. Okay. Okay.

12 Q. Do you recognize this document?

13 A. Yes.

14 Q. And you prepared this document?

15 A. Yes.

16 Q. And before we get too far down the road
17 here, there's a reference in the date to an
18 earlier version of this document dated June 25.

19 Do you see that?

20 A. Yes.

21 Q. Do you recall that document -- preparing
22 that document? The earlier document I'm referring
23 to now.

24 A. Only that -- not specifically, but I -- I
25 imagine I'd recognize it if I saw it.

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44

1 Q. Okay. And in the first paragraph of this
2 memorandum there's a reference to a June 27
3 memorandum.

4 A. Uh-huh.

5 Q. Do you recall producing that memorandum?

6 A. I -- I recall producing kind of a series
7 of versions, just -- just of drafts, you might
8 say.

9 Q. And what was the issue you were
10 attempting to evaluate in this regard? Both in
11 this memorandum and the June 27 memorandum? I
12 believe they were two different issues.

13 A. We were evaluating different --
14 evaluating alternate ways of evaluating impacts on
15 -- on streamflow.

16 Q. And what was the nature of the analysis
17 employed in this memorandum? What were you
18 evaluating?

19 A. Well, we're evaluating different
20 combinations of stresses on groundwater and the
21 impacts on streamflow.

22 Q. And what were your ultimate conclusions?

23 A. I'll have to look at the report a little
24 bit to see --

25 Q. Take your time.

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45

1 A. -- specifically.

2 Q. In fact, why don't we do this, Chris, if
3 it's all right with you, why don't we take a
4 break. Take about 10 minutes, 15 minutes. I'd
5 like to ask if Mr. Perkins could print off his
6 resume or CV as he mentioned earlier, and I'd also
7 like to ask whether you could locate the June 27
8 memorandum and evaluate whether it's appropriate
9 to disclose it to us. We've done the best we
10 could to locate it in the documents we have, but
11 I've not been able to do that. If you don't mind
12 trying to give a look for it, let us know if it's
13 something that can be disclosed, if you can find
14 it, and maybe we could resume then.

15 MR. GRUNEWALD: I think that sounds fine.
16 So 10 minutes?

17 MR. WILMOTH: As much time as you need.

18 MR. GRUNEWALD: My guess -- for what it's
19 worth, my guess is digging for another version of
20 -- or another document --

21 MR. WILMOTH: Sure.

22 MR. GRUNEWALD: -- is going to take a
23 while. But I think what you wanted was Mr. -- Dr.
24 Perkins, too --

25 MR. WILMOTH: I apologize, Dr. Perkins.

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46

1 MR. GRUNEWALD: To look over this
2 document and a CV, and I think that -- that seems
3 a more reasonable 10-minute set of tasks. Anyway,
4 what do you want to do?

5 MR. WILMOTH: Just to be clear about what
6 I'm hoping to find is, if you look in the third
7 paragraph, there's a reference to a specific
8 memorandum dated June 27, 2007 addressing Dr.
9 Schneider's proposed resolution to certain issues,
10 and that's the memorandum I'm requesting.

11 MR. GRUNEWALD: Okay.

12 Q. Along with a CV. And if you believe it
13 would be more fruitful to take a half an hour and
14 look for that memorandum and evaluate whether it
15 should be disclosed, that's fine with me; or if
16 you want to take 10 minutes, that's fine with me,
17 too. It's up to you all.

18 MR. GRUNEWALD: All right. Well, why
19 don't we do 10 minutes?

20 MR. WILMOTH: Okay.

21 MR. GRUNEWALD: We'll come back.

22 MR. GRIGGS: If we need more time, we'll
23 come up before then --

24 MR. WILMOTH: Okay. That sounds good.

25 MR. GRIGGS: -- and let you know.

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47

1 (There was a recess from 3:02 PM to 3:26
2 PM.)

3 MR. WILMOTH: So we're back on the record
4 and I appreciate the copy of the CV, Mr.
5 Grunewald, and I think you were going to speak to
6 the other issue we discussed.

7 MR. GRUNEWALD: Yes. I said copies of CV
8 have been given to you. This is what -- this
9 should be current, is my understanding, and we
10 just obtained it from Dr. Perkins. And he had had
11 a chance to review the Deposition Exhibit 8 which
12 you had asked him to take a look at. And at the
13 moment, we are -- we don't have a copy of the memo
14 that you're asking about, but we're happy to
15 continue looking, and then if we do find it, we
16 may need to get back with you about it, so we will
17 keep doing that.

18 MR. WILMOTH: Thank you very much. I
19 guess in lieu of a written request I'll just ask
20 that that be a standing request until we resolve
21 it.

22 MR. GRUNEWALD: That's fine. We're happy
23 to follow up on that.

24 BY MR. WILMOTH:

25 Q. Mr. Perkins, then, with regard to Exhibit

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48

1 8, could you please tell me the nature of the
2 analysis that is reflected in this memorandum. I
3 think I asked you about the prior memorandums
4 which led to our break, but this memorandum
5 contains an independent analysis, and could you
6 describe the nature of that for me.

7 A. This is a comparison of two methods of
8 calculating the impacts for each of -- pumping for
9 each state and the mound import credit. One which
10 is comparing -- one is the RRCA approach.

11 Q. Is that what's called the current
12 approach in your memo?

13 A. Right. Right. And this second approach
14 is, turning it around, com -- looking at the
15 impacts with respect to the case with no pumping
16 or -- or mound imports, and so the -- and then the
17 impacts under each approach are -- are compared,
18 and that's as far as I've looked at the memo. I
19 think it's just presenting a comparison of those
20 two approaches without -- just presenting the
21 results without drawing any further conclusions
22 from it.

23 Q. And generally were the results comparable
24 to one another or did they differ?

25 A. They differed.

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49

1 Q. And how did they differ?

2 A. They -- they -- they -- I can't tell you
3 off the top of my head, give you a good synopsis
4 of how they differed without spending some more
5 time with it, but the -- the calculated impacts
6 are different for a given state or -- on a
7 year-to-year basis, and they were -- without
8 spending a little more time with it, I -- I can't
9 give you a good description of how they differ, I
10 guess.

11 Q. Do you have any recollection of what
12 caused the differences? Was it, for example, how
13 you turned on or off certain stresses or in some
14 order? Did that have anything to do with it?

15 A. No, I don't think so. The -- because
16 these are all independent runs that don't --
17 they're not -- don't depend on sequence of the
18 runs to -- but I think it's just --

19 Q. Does the current approach depend on a
20 specific sequence?

21 A. No, they're just independent, independent
22 calculations of impacts.

23 Q. And is the ultimate goal to determine the
24 virgin water supply in the basin?

25 A. You mean of either of these approaches?

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50

1 Q. Yes. And I'm really referring to the
2 regarding line in your memorandum. Is that the --

3 A. Oh.

4 Q. -- purpose of these analyses to determine
5 the --

6 A. Oh. That's --

7 Q. -- virgin water supply?

8 A. Well, that's -- I think it -- I think
9 what I'm trying to say there on that line is that
10 I'm comparing the impacts of the Republican River
11 flows with respect to virgin water supply versus
12 the impacts with respect to the base case. So
13 that it's two different sets of impacts that I'm
14 comparing.

15 Q. And you reference in this memorandum the
16 third approach advocated by Dr. Schneider.

17 A. Uh-huh.

18 Q. Do -- I know you don't have that
19 memorandum handy, but do you happen to recall the
20 general relationship of those results to the
21 results in this memorandum?

22 A. No, I don't.

23 Q. I'm going to hand you a additional
24 document here and just ask if you can identify
25 this document for me? And let me start by saying

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51

1 that somehow the first two pages got copied as the
2 last two pages, so we just tore it apart and
3 restapled it, if you're wondering why it's
4 mangled. We didn't add anything to it, but we did
5 a poor copying job.

6 A. What was your question?

7 Q. Do you recognize this document?

8 A. Yes.

9 Q. Could you tell me a little bit about what
10 led you to produce this document.

11 A. Yeah, just -- well, in general, the -- it
12 -- we wanted to start producing some future
13 scenarios for -- for use to analyze impacts on
14 streamflow just within our state so we can -- to
15 help us evaluate applications for further
16 appropriation, but secondly, to be used to see
17 where things are going for -- on impacts for all
18 three states in general. So this is one way to
19 produce a sequence of years based on historical
20 years that you have available, and so it's -- I
21 think it's essentially a description of Monte
22 Carlo approach for selecting a sequence --
23 selecting sequences of years.

24 Q. Why is it called the Monte Carlo
25 approach?

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52

1 A. Where is it? Where is it?

2 Q. Why is it called --

3 A. Why is it --

4 Q. -- the Monte Carlo approach?

5 A. Well, I can't -- I really can't tell you
6 exactly. I think it's related to Monte Carlo is a
7 good place for gambling, but -- but --

8 Q. So it's a gambling reference.

9 A. I think so.

10 Q. Okay.

11 A. Was there another part to that question?

12 Q. On the bottom of the first page you talk
13 about, for example, employing a 15-year sequence
14 three times? Do you see that?

15 A. Let's see.

16 Q. At the very bottom, there's a reference
17 to a 48-year future scenario.

18 A. The last sentence says: Alternatively,
19 adjusted years from the period 1990 to 2005.

20 Q. Yeah. The sentence preceding that.

21 There's a reference to a 48-year future scenario.

22 A. Oh, okay.

23 Q. Could you tell me what the significance
24 of the 48-year time period is.

25 A. That -- that's based on a chronological

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53

1 sequence of years, 1990 through 2005, which were
2 what we regarded as a good set of historical data
3 that was available, at least with respect to
4 Kansas, because we felt like our reported water
5 use data was -- was good, good in quality,
6 starting with 1990, so -- so it's just three times
7 through a 16-year sequence.

8 Q. And what water use data are you referring
9 to that was reported and relied on?

10 A. From our WRIS, water right information
11 system --

12 Q. I see.

13 A. -- database.

14 Q. And how did you employ that information
15 in your analysis? Why was it important to
16 understand the nature of that data?

17 A. Because the reported water use for each
18 of those historical years would be kind of a --
19 part of the hydrologic or response to the
20 hydrologic conditions for each of those years, so
21 --

22 Q. Okay.

23 A. -- it would be -- it's appropriate for
24 the hydrologic conditions, so --

25 Q. This doesn't have anything to do, then,

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54

1 with the climatological status from 1990 to 2005.
2 This has to do with actual water use during that
3 period?

4 A. It's drawing a -- it's -- this article,
5 in this part of this journal?

6 Q. This -- this discussion here that we're
7 referring to at the bottom of the page. The
8 selection of the years 1990 to 2005 is based on a
9 water use scenario rather than a climatological
10 scenario. Is that what I'm understanding?

11 A. Right, yeah, that's -- be -- the date --
12 the beginning point of 1990 would be mainly
13 because -- because the better quality of the water
14 use -- the other data.

15 Q. All right.

16 A. We -- other types of data we would be
17 able to -- there wouldn't be a -- we wouldn't have
18 decided on the basis of some of the other data
19 sets and a lot of them that go back farther.

20 Q. Okay. And the next sentence that spans
21 the two pages, reading: However the sequence
22 should be hydrologically representative of
23 historical conditions over the simulated period
24 beginning in 1918?

25 A. Uh-huh.

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55

1 Q. Allowing for possible changes to these
2 conditions in the future such as long-term
3 climatological projections. Could you explain to
4 me the importance of that statement, its relevance
5 to your analysis?

6 A. It just is -- I think -- I think it just
7 means that because the bad sequence appeared to be
8 fairly representative in terms of the
9 precipitation record, historical.

10 Q. Which sequence is that?

11 A. The 1918 through 2006, which is the --

12 Q. Okay.

13 A. -- sequence for the full -- full
14 simulation period of the model.

15 Q. Okay.

16 A. That -- going into the future, if the
17 future condition -- if the full historical record
18 is representative of what happens going into the
19 future, then the shorter period, 1990 through '05
20 should be a good sample of that. So it ought to
21 be representative at least in terms of precip of
22 the full record.

23 Q. So is the reason you selected the -- that
24 fraction of the entire record because you wanted
25 something to correlate to your water use data in

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56

1 that period?

2 A. We wanted to be able to represent water
3 use into the future based on -- based on years
4 that we had what we thought was reliable water use
5 data, which is 1990 through '05, at least with
6 respect to Kansas --

7 Q. Okay.

8 A. -- pumping.

9 Q. So then, if I understand it, you were
10 taking that water use data and seeing how that
11 water use would look out into the future by
12 repeating the hydrologic conditions that occurred
13 during the period of record, is that right?

14 A. Yes.

15 Q. And is that hydrologic condition
16 developed using this Monte Carlo approach?

17 A. The Monte Carlo approach was used to
18 select sequences of years going into the future
19 out of that -- out of that set of years.

20 Q. And do I understand that that's a random
21 selection --

22 A. Yes.

23 Q. -- approach?

24 A. Yeah. That's -- it -- it uses a uniform
25 -- starts with a uniform distribution but uses the

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57

1 -- it takes into account the precipitation
2 distribution, so it uses -- represents -- so it's
3 so that the random sequence is drawn from the
4 annual precip cumulative probability distribution
5 and not just from a uniform distribution.

6 Q. So could you turn to page 3, please, and
7 you see the third paragraph down that begins with
8 the transformation method?

9 A. Third paragraph you said?

10 Q. Yeah. The transformation method. You
11 see that?

12 A. Uh-huh.

13 Q. I'm trying to understand the import of
14 this paragraph. Can you explain to me what you
15 mean in the second sentence when you're explaining
16 that the procedure is adapted to select years
17 between 1990 and 2005 by approximating the
18 cumulative distribution? And then I'll ask you
19 about the next sentence, too, just so --

20 A. Oh.

21 Q. -- I can -- I'm sorry --

22 A. Okay.

23 Q. -- but you'll need to walk me through
24 this a bit.

25 A. Okay. Yeah. What I want to do is draw

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58

1 years from the sample set 1990 through 2005, but I
2 want to draw them based on the cumulative
3 distribution that's for the -- for the entire
4 period of record, 1918 through 2006.

5 Q. Okay.

6 A. So -- so that cumulative distribution is
7 approximated by -- by using just the years from
8 1990 through 2005. I think they're right -- I
9 think it's -- or maybe a better way to say it --
10 let's see. Look at Figure three. We'd be dry
11 enough, we'd be selecting the year initially from
12 the 1918 through 2006 period, but then
13 approximating that with -- with one of the years
14 from the 1990 through 2006 period that's -- that's
15 closest along the curve to -- to the value that
16 you drew -- to the year -- from the historical
17 period that you drew.

18 Q. Is the idea to determine how well 1990 to
19 2005 approximates the average conditions from the
20 entire period?

21 A. Humm -- well, I think it's -- no, I think
22 it's -- the purpose was just to try to draw a year
23 from -- draw years only from the period 1990
24 through 2005, but use those -- but try to draw
25 them in a sequence that's still reflecting the --

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59

1 the whole period 1919 through 2006.

2 Q. And what did you ultimately do with this
3 analysis?

4 A. We used it to draw sequences of years for
5 -- for future model runs, and we ran future
6 scenarios based on these sequences.

7 Q. And what did you conclude?

8 A. Yeah. Well, as far as the technique
9 goes, it seemed -- it seemed to work pretty well.
10 It's a way to draw a sequence of years.

11 Q. Was this method ultimately incorporated
12 into your expert reports in this case?

13 A. No.

14 Q. Why not?

15 A. The -- we compared the -- first the
16 chronological sequence, and it -- it looked -- it
17 looked representative of the -- of the historical
18 period. It seemed sufficiently representative,
19 so, it was a little more straightforward approach
20 just to use the chronological sequence for our
21 future scenarios.

22 Q. In --

23 A. The reports.

24 Q. - in the expert reports?

25 A. Correct.

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60

1 Q. Okay. I'll give you my copy of that to
2 mark as Exhibit 9.

3 (Deposition Exhibit 9 marked for
4 identification.)

5 BY MR. WILMOTH:

6 Q. I'm just curious, why wouldn't you in
7 these analyses just repeat 1990 to 2005 over and
8 over and over and over again into the future
9 indefinitely? Doesn't that give you a better
10 longer term evaluation scenario? Is there some
11 limitation, some time limitation to why you would
12 only do it three times?

13 A. No.

14 Q. You could just do it over and over --

15 A. You could -- you could do that.

16 Q. Would that be an appropriate thing to do,
17 you think?

18 A. I think that it -- it could be, depending
19 on -- depending on your purpose, I guess.

20 Q. At the -- again, at the bottom of pages 1
21 and the top of page 2 you've mentioned what I
22 interpreted to be an adaptation for climatological
23 change or --

24 A. Uh-huh.

25 Q. -- some other types of change. How did

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61

1 you account for that in your analysis, in that
2 paper there?

3 A. In this one? You talking --

4 Q. Yes, in that paper there, in Exhibit 9.

5 Did you attempt to deal with that issue?

6 A. With climate change?

7 Q. Yes.

8 A. No.

9 Q. Did you attempt to deal with that in the
10 expert reports you worked on with Mr. Larson for
11 this paper -- for this presentation? Excuse me.
12 For this case?

13 A. No.

14 MR. WILMOTH: We may be done, but let me
15 take five minutes --

16 MR. GRUNEWALD: Sure.

17 MR. WILMOTH: -- and just confirm that.

18 MR. GRUNEWALD: Okay.

19 MR. WILMOTH: Just come back at 4:00. Is
20 that all right?

21 MR. GRUNEWALD: Sure.

22 MR. WILMOTH: Thanks.

23 (There was a recess from 3:52 PM to 4:01
24 PM.)

25 BY MR. WILMOTH:

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62

1 Q. Dr. Perkins, again, I apologize for
2 failing to recognize your degree.

3 A. No sweat.

4 Q. I almost forgot about your report, sir,
5 we got so carried away on these other things. As
6 you know, I've already spoken to Mr. Larson about
7 these. And these, for the record, are Exhibits --
8 Exhibits 1 and 2. My basic question, Doctor, is
9 if you could simply identify for me the work
10 within these reports that you were primarily
11 responsible for conducting. Are these similar to
12 the work you did with Mr. Sophocleous where you
13 did most of the background modeling work, for
14 example, but Dr. -- Mr. Larson wrote the text?

15 A. Let's see it. Not exactly.

16 Q. Let's start with Exhibit 1, the smaller
17 of the two reports.

18 A. Yeah.

19 Q. And would you be so kind as to just
20 simply direct our attention to the portions in
21 which you were primarily involved?

22 A. Okay. This is comparing the historical
23 conditions with one in which pumping has been
24 taken out within the attempt 10-2 corridor, and I
25 made the model runs for these --

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63

1 Q. Okay.

2 A. -- for these cases.

3 Q. And how about Exhibit 2?

4 A. All right.

5 Q. This is obviously a little more extensive
6 report.

7 A. Yeah.

8 Q. Take your time. We can work through it
9 either --

10 A. Okay.

11 Q. -- page by page or section by section.

12 A. Okay.

13 Q. However you'd like.

14 A. Let's see. I know this report, it
15 discusses model runs -- model runs that we made or
16 Kansas made, and it also discusses a couple of
17 sets of simulations of Nebraska's.

18 Q. Uh-huh?

19 A. But for our -- our model runs, let's take
20 a quick moment here.

21 Q. Sure. Take your time.

22 A. Okay. I believe I made all of our model
23 runs.

24 Q. Okay.

25 A. But I didn't prepare all of the data for

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64

1 that. I -- for -- for -- the data was -- I
2 collaborated with Steve on --

3 Q. Mr. Larson?

4 A. Mr. Larson.

5 Q. Okay.

6 A. On preparing the irrigation depths that
7 we used to represent the three NRDs for the years
8 two -- 1995 through 2009.

9 Q. And why did you select the depths you
10 did? Was that your professional judgment or Mr.
11 Larson's?

12 A. No. Oh, just for those three NRDs?

13 Q. Yes.

14 A. It was work that he did to represent the
15 IMPs as we understood them.

16 Q. Okay. So when you say you collaborated
17 on that aspect, what was your contribution or your
18 involvement? Did you just review that or --

19 A. No.

20 Q. -- did you implement that in the model?

21 A. I basically implemented it in the model.
22 I mean, we -- we had -- we represented historical
23 irrigation depths for all the NRDs, and those --
24 those three we substituted in the depths to --
25 that were adjusted to try to represent the IMP

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65

1 effect.

2 Q. Did you explore other alternatives for
3 that particular input?

4 A. No. Having -- well, we've run -- we've
5 run projections based just on historical.

6 Q. Okay?

7 A. Data.

8 Q. Sure. Okay. I think I understand.
9 Anything further that you'd like to highlight as
10 your work? Understanding from your prior answer
11 that you did a lot of the modeling --

12 A. Uh-huh.

13 Q. -- pieces doing -- turning the dials, if
14 you will, and --

15 A. Right.

16 Q. -- generating an answer.

17 A. Yeah. Well, I hesitated at first because
18 we -- because Mr. Larson was -- we -- we shared
19 the data sets so that they could make the same
20 model runs so that we could compare results to --

21 Q. I see.

22 A. -- to see if --

23 Q. So you were --

24 A. To see if we agreed.

25 Q. -- running them side by side to make sure

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66

1 you got --

2 A. Yeah.

3 Q. -- the same results.

4 A. Not --

5 Q. Kind of truth testing?

6 A. Right. Yeah, not entirely parallel, but
7 just was -- for truth testing.

8 Q. Gotcha. All right. Are there any
9 assumptions or conditions, if you will, that you
10 chose to employ for any of your analyses? And by
11 you, I mean you specifically --

12 A. Yeah.

13 Q. -- in your work, did you need to employ
14 any assumptions or conditions that are not
15 reflected in the report?

16 A. I don't -- I don't think that there's
17 anything that was based just on my decision
18 without --

19 Q. Okay.

20 A. -- more of an agreement.

21 Q. And when you ran the model, I assume you
22 just ran it off the shelf, so to speak. You
23 didn't make any modifications to the groundwater
24 model?

25 A. No, nothing -- well, wait. Let's see

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67

1 here. No, we -- we didn't make any -- we didn't
2 make any model changes for this.

3 Q. And is there any text in the document
4 here that you'd like to point out as your writing
5 specifically?

6 A. I don't think I -- there's anything I can
7 point to that --

8 Q. Okay. Let me ask you just generally when
9 you're doing modeling support work for the state
10 of Kansas, how many model runs would you say you
11 conduct in a given year to support management
12 decisions?

13 A. I don't -- I don't know.

14 Q. How do you --

15 A. 100, 200, 300. Somewhere between 50 and
16 a thousand, I guess I --

17 Q. Okay. That's fair enough. And just for
18 -- just for sake of my understanding about the im
19 -- the -- the purpose of this document --

20 A. Uh-huh.

21 Q. -- exhibit 2?

22 A. Yeah.

23 Q. We had an earlier conversation about the
24 difference between projections and predictions.

25 A. Uh-huh.

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68

1 Q. I assume this is a projection, correct?

2 A. Right. Correct.

3 Q. Thank you. Okay. Doctor, I've been
4 asked to request the most current version of the
5 Kansas version of the RRPP documentation. Does
6 that ring a bell? I suppose that is directed at
7 you also, Chris?

8 MR. GRUNEWALD: I was hoping you could
9 say it again. My notetaking skills --

10 MR. WILMOTH: The most current --

11 MR. GRUNEWALD: -- are lacking.

12 MR. WILMOTH: -- version of --

13 MR. LAVENE: Kansas version.

14 MR. WILMOTH: Kansas' version of the RRPP
15 documentation.

16 MR. BLANKENAU: Which has been previously
17 requested but not yet provided.

18 MR. GRUNEWALD: What was the document
19 that we -- Justin had asked us for -- I'm dragging
20 him away from his BlackBerry. There was a
21 document you'd asked -- that I thought we turned
22 over.

23 MR. LAVENE: That was a document --

24 MR. GRUNEWALD: Is it different?

25 MR. LAVENE: That was a document within

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69

1 the spreadsheets that was basically the shortcuts
2 and -- is that what we're talking about?
3 Shortcuts to -- but it was an old version. Same
4 thing.

5 MR. GRUNEWALD: Same document. You're
6 asking for a newer version, the current Kansas
7 version. Okay.

8 MR. LAVENE: I cannot tell you which
9 spreadsheet that was on. I'm sorry.

10 MR. GRUNEWALD: That's okay. But that
11 helps.

12 THE WITNESS: But it was a word document?

13 MR. GRUNEWALD: Yeah.

14 MR. LAVENE: Okay.

15 MR. GRUNEWALD: We'll take a look.

16 A. I don't think there is a current version,
17 but -- but as far as -- in the supporting
18 documents we've provided the version of RRPP that
19 we used.

20 BY MR. WILMOTH:

21 Q. Is that the version that you normally use
22 for all of your activities?

23 A. That's -- that's the version that we've
24 been using, but the -- we have different -- we
25 have different versions. One of the problems with

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70

1 the RRPP program is that there's a little bit of
2 over -- the way it -- the way the stresses are
3 pumping for each state has represented that
4 there's an overlap at the state line, so different
5 -- we have a different version that tries to
6 summarize the pumping before -- before all the
7 data gets lumped into the same grid so that it
8 keeps it a little bit straighter at the state
9 lines, but --

10 Q. I see.

11 A. -- it's more just summarizing the input.
12 A little bit cleaner.

13 Q. Is this something that -- you want the
14 whole deal?

15 MR. LAVENE: I mean, I think if you have
16 the current, more updated version or something
17 that you're using now that's different than what
18 was provided on that spreadsheet.

19 MR. GRUNEWALD: I'm -- I'm getting turned
20 around, Tom. I'm going to have to back up for a
21 second. Are we talking about the RRPP
22 documentation, the word document, or newer
23 version, or are you talking about a program?
24 That's different from the documentation.

25 A. Right now we've been -- yeah, we been

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1 talking about the program at the moment.

2 MR. GRUNEWALD: I wasn't sure that you
3 guys -- that you were talking about -- I thought
4 you were talking about the program. I thought Tom
5 was talking about the documentation, so I just
6 wanted to --

7 MR. WILMOTH: Let's do this. Let's ask
8 Pete if he has any questions. We're done. Pete
9 says he has no questions. You guys want to think
10 about whether you have questions, and in the
11 meantime --

12 MR. GRUNEWALD: Sure.

13 MR. WILMOTH: -- we'll work this out off
14 the record --

15 MR. GRUNEWALD: Okay.

16 MR. WILMOTH: -- and then we'll conclude
17 it on the record? Thank you.

18 (There was a recess from 4:16 PM to 4:23
19 PM.)

20 MR. GRUNEWALD: Okay. (Indicating.)

21 MR. WILMOTH: We have nothing further.
22 We do have this continuing request, which I think
23 I can articulate, but before we get into all that,
24 do you all want to do any --

25 MR. GRUNEWALD: No questions.

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72

1 MR. WILMOTH: Okay. So I guess that
2 concludes the deposition. Thank you very much. I
3 appreciate you coming Mr. -- or Dr. Perkins.
4 Excuse me. So I think what we're looking for is
5 the most recent version of the documentation. As
6 I understand it, the program contains references
7 to documentation that we may not possess. And so
8 what we're looking for is the most -- is all of
9 the documentation that's referenced --

10 MR. BLANKENAU: In the code.

11 MR. DRAPER: -- in the code for the
12 program we have. Does that make sense?

13 MR. GRUNEWALD: It does, and I think -- I
14 think you have it. I think that they're -- if I
15 understood the earlier answer, there is no newer
16 documentation --

17 MR. WILMOTH: Okay.

18 MR. GRUNEWALD: -- or document, no newer
19 version than the one you have. That's my
20 understanding.

21 MR. WILMOTH: Is that right?

22 THE WITNESS: That's right. I think that
23 the code itself is probably the best documentation
24 as far as knowing that you've got current
25 documentation if you've got the code that was used

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73

1 for the model runs.

2 MR. GRUNEWALD: Okay.

3 MR. WILMOTH: We do have that.

4 (Off-the-record discussion.)

5 (Whereupon, at 4:24 PM the deposition was
6 concluded.)

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3 The deposition of SAMUEL PERKINS was
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5 and place set out on the title page hereof.

6 .

7 It was requested that the deposition be
8 taken by the reporter and that same be reduced to
9 typewritten form.

10 .

11 It was agreed by and between counsel and
12 the parties that the deponent will read and sign
13 the transcript of said deposition.

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3 STATE OF _____:

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6 Before me, this day, personally appeared,
7 SAMUEL PERKINS, who, being duly sworn, states that the
8 foregoing transcript of his/her Deposition, taken in
9 the matter, on the date, and at the time and place set
10 out on the title page hereof, constitutes a true and
11 accurate transcript of said deposition, along with the
12 attached Errata Sheet, if changes or corrections were
13 made.

14 .

15 _____

16 SAMUEL PERKINS

17 .

18 SUBSCRIBED and SWORN to before me this _____
19 day of _____, 2012 in the
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21 .

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23 My Commission Expires

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3 REPORTING SERVICE, INC.

4 FILE NO.: 20014

5 CASE: STATE OF KANSAS vs.

6 STATE OF NEBRASKA AND STATE OF COLORADO

7 DEPONENT: SAMUEL PERKINS

8 DEPOSITION DATE: February 29, 2012

9 To the Reporter:

10 I have read the entire transcript of my Deposition taken in the
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13 indicated. I have signed my name to the Errata Sheet and the
14 appropriate Certificate and authorize you to attach both to the
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77

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3 ss:

4 COUNTY OF SHAWNEE

5 I, Michelle D. Hancock, a Certified
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8 and authorized to take depositions and
9 administer oaths within said State pursuant
10 to K.S.A. 60-228, certify that the foregoing
11 was reported by stenographic means, which
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14 and that the foregoing constitutes a true
15 and accurate transcript of the same.

16 I further certify that I am not related
17 to any of the parties, nor am I an employee
18 of or related to any of the attorneys
19 representing the parties, and I have no
20 financial interest in the outcome of this
21 matter.

22 Given under my hand and seal this
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