BEFORE THE

CALIFORNIA STATE WATER RESOURCES CONTROL BOARD

CALIFORNIA WATERFIX WATER RIGHT CHANGE PETITION HEARING

JOE SERNA, JR. BUILDING

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

BYRON SHER AUDITORIUM

1001 I STREET

SECOND FLOOR

SACRAMENTO CALIFORNIA

PART 1 REBUTTAL

Thursday, May 11, 2017

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APPEARANCES:

CALIFORNIA WATER RESOURCES BOARD

Division of Water Rights

Board Members Present

Tam Doduc, Co-Hearing Officer:
Felicia Marcus, Chair and Co-Hearing Officer:
Dorene D'Adamo, Board Member

Staff Present

Samantha Olson, Senior Staff Attorney
Conny Mitterhofer, Senior Water Resources Control Engr.
Kyle Ochenduzsko, Senior Water Resources Control Engr.

For California Department of Water Resources

Mark Cowin, Director
Robin McGinnis, Senior Attorney
Cathy Crothers, Assistant Chief Counsel
Ken Bogdan, Senior Attorney

Duane Morris, LLP
By: Thomas Martin Berliner, Attorney at Law

U.S. Department of the Interior, Bureau Reclamation, and Fish and Wildlife Service
Amy Aufdemberge, Assistant Regional Solicitor

State Water Contractors

Stefanie Morris
Adam Kear
Becky Sheehan

(Continued)

APPEARANCES (continued)

Cities of Folsom and Roseville, San Juan Water District, and Sacramento Suburban Water District
Ryan Bezerra

Glenn-Colusa Irrigation District; Biggs-West Gridley Water District
Andrew M. Hitchings

Local Agencies of the North Delta
Osha Meserve

City of Brentwood
David Aladjem

San Joaquin Tributaries Authority
Timothy Wasiewski

California Sportfishing Protection Alliance, California Water Impact Network, AquAlliance
Michael Jackson

Delta Agencies, and other parties
John Herrick

Tehama-Colusa Canal Authority & water service contractors in its area
Meredith Nikkel

County of San Joaquin, San Joaquin County Flood Control and Water Conservation District and Mokelumne River Water and Power Authority
Thomas H. Keeling

San Luis and Delta-Mendota Water Authority
Rebecca Akroyd

Snug Harbor Resorts, LLC
Nicole S. Suard

Deirdre Des Jardins
Deirdre Des Jardins

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I N D E X

Thursday, May 11, 2017 9:30 a.m.

PROCEEDINGS

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CO-HEARING OFFICER DODUC: All right. Good morning, everyone. It is 9:30 on our third day of a four-day intense session of the California WaterFix hearing, the water right change petition for that project.

I am Tam Doduc, Hearing Officer. I expect we'll be joined shortly by the Co-Hearing Officer and Board Chair Felicia Marcus, who will be to my right. And then to her right will be Board Member DeeDee D'Adamo. To my left, filling in for Dana Heinrich this morning, is Samantha Olson, and to Samantha's left are Conny Mitterhofer and Kyle Ochenduszko.

The usual three announcements: alarm, stairs, park. Wave at us if you can't use the stairs. We'll push you into a protective area somewhere.

Second announcement: Microphone, speak into it. Start with your name and affiliation, for the court reporter as well as for the webcast and the recording.

Third and most importantly, the one that I will always take special care and not rush through, is

to ask that everyone check to make sure that your noise-making devices are on silent, vibrate, do not disturb for the courtesy of everyone participating in this hearing as well as the Hearing Officer.

All right. Before we turn to Mr. Aladjem, let's do just a couple of housekeeping check-in.

First of all, Mr. Ochenduszko, you had a clarification or at least an update?

MR. OCHENDUSZKO: We do. So hearing staff have been working with DWR to straighten out the misidentified exhibit numbers that happened on Tuesday. Excuse me. And I just wanted to let everybody know as well as people on the webcast that DWR-902 through DWR-910 as displayed on the screen here are now appropriately identified and posted for the public's view.

CO-HEARING OFFICER DODUC: All right. Mr. Bezerra has a question about that.

MR. BEZERRA: Just one clarification for the record. Ryan Bezerra, Cities of Folsom et al.

Exhibits BKS-103 and 104, as I understand that, they were based on the modeling that is now DWR-907, just to clarify for the record.

CO-HEARING OFFICER DODUC: All right. Thank

you, Mr. Bezerra.

Secondly, thank you, Ms. Meserve has handed up hard copies. And I believe she has also provided the same to petitioners, the motion that was made I think initially by Mr. Keeling and then joined in by Mr. Jackson, Ms. Meserve, Mr. Herrick, and perhaps others.

And she will be serving that to the rest of the parties shortly, and petitioners or at least DWR or anyone else who would like to respond to that may have until 9:30 AM when we resume tomorrow to do so, in writing.

Let's do a quick time check. By my estimate of those who have requested cross-examination of this panel, I have anywhere from three to four hours left. And you had indicated, Ms. McGinnis, Mr. Berliner, and Ms. Aufdemberge, that you expect to do some redirect. How long do you estimate for your redirect?

MR. BERLINER: I would say 20 minutes.

CO-HEARING OFFICER DODUC: And I --

MR. BERLINER: Might be faster.

CO-HEARING OFFICER DODUC: I expect there will be then some recross, though obviously the timing is unknown at this time.

We would like -- I would like to finish around 4:30 again today. So cross-examination I expect will take until 1:00, 2:00-ish is my guess. And then depending on how long recross takes, we may or may not get to your two witnesses today, Mr. Bezerra or whomever from Group 7.

MR. ALADJEM: Madam Chair, David Aladjem on behalf of the Sacramento Valley Water users. We have Mr. Easton and Mr. Bourez here today.

CO-HEARING OFFICER DODUC: Mr. Walter William Bourez.

MR. ALADJEM: Precisely, Madam Chair. If it is the pleasure of the Chair for them to be here this afternoon, that will be very acceptable. They are prepared to testify. If the Chair wants to make a decision that we should excuse them until tomorrow, that's also fine.

CO-HEARING OFFICER DODUC: Not knowing at this point how long redirect and recross might take, I will ask them to so be prepared to be called upon this afternoon.

How long -- we've given each witness 15 23 minutes to present their summary of their rebuttal testimony. Do you anticipate, Ms. Nikkel, that your

witnesses might need more given the extensive nature of their testimony?

MS. NIKKEL: Good morning. Meredith Nikkel for Group 7. I don't anticipate taking more than 15 minutes for the direct examination.

CO-HEARING OFFICER DODUC: Of both or each?

MS. NIKKEL: Of both.

CO-HEARING OFFICER DODUC: All right. All right, that sounds good.

With that, then, I have Mr. Aladjem, who is going to be conducting his cross thanks to Mr. Keeling who agreed to allow the swap in position. Then we'll -- followed by Mr. Keeling, Mr. Emrick had indicated I believe last week that he no longer has cross. And I don't see him, so I will take that to be the case. Then after Mr. Keeling will be Mr. Jackson, Ms. Des Jardins, Ms. Suard, and Ms. Womack.

And that will be -- those are all I have for cross-examination of this panel.

MR. ALADJEM: Madam Chair, couple of clarifications on that order.

CO-HEARING OFFICER DODUC: Please.

MR. ALADJEM: Mr. Jackson, I understand.

CO-HEARING OFFICER DODUC: Oh, I'm sorry,

correct; he went already.

Oh, I almost gave you -- talk about double standards. I almost gave you a second shot, Mr. Jackson.

MR. JACKSON: Thank you very much, but no thank you.

MR. ALADJEM: And, Madam Chair, Mr. Emrick and I have coordinated our cross-examination so the questions he would have asked are incorporated into my cross-examination. So we're trying to be very efficient here.

CO-HEARING OFFICER DODUC: So takes my estimate of the time remaining for cross-examination down to about three-hour-ish. Okay. With that, Mr. Aladjem.

MR. ALADJEM: Good morning, Chair Doduc.

CO-HEARING OFFICER DODUC: I'm sorry, Mr. Aladjem. Before you begin, I actually have one other thing.

Mr. Herrick, I have a note from Mr. Ochenduszko that you had a question when you conducted your cross-examination about the Head of Old River barrier being in or out for the analysis. And we were unclear; there was some indication that they will

get back to you with a response. I just wanted to flag it.

Is it still an outstanding matter? Or have you totally forgotten about it, and now I'm confusing you.

MR. HERRICK: I've totally forgotten about it, and you've now confused me. I can certainly talk to DWR separately, and if there is an issue that I think should be re-raised or brought up, I'll let everybody know.

CO-HEARING OFFICER DODUC: All right. Thank you.

MR. HERRICK: Thank you.

CO-HEARING OFFICER DODUC: Apologize, Mr. Aladjem. Now you may begin -- with an outline of the topics you intend to cover would be great.

PARVIZ NADER-TEHRANI, JOHN LEAHIGH,
NANCY PATRICK, ARMIN MUNEVAR,
called by the petitioners as Panel 2 rebuttal witnesses, having been previously duly sworn, testified further as hereinafter set forth:

CROSS-EXAMINATION BY MR. ALADJEM

MR. ALADJEM: Good morning, Madam Chair, Chair

Marcus. I'm going to cover three major topics this morning in cross-examination. And I'm, by the way, appearing for the City of Brentwood.

The first is a set of questions relating to Boundary 1 and Fall X2.

The second is a line of questioning that will take most of the time this morning relating to modeling anomalies.

And the third is a line of questioning that relates to the question of whether these modeling results are quote-unquote "real." And I will be focusing my questions this morning I think exclusively on Dr. Nader-Tehrani and anticipate about 45 minutes. I'm going to try to build on previous cross-examiners and not duplicate.

CO-HEARING OFFICER DODUC: Thank you, Mr. Aladjem.

MR. ALADJEM: Good morning, Dr. Nader-Tehrani. Good to see you again.

WITNESS NADER-TEHRANI: It's good to see you too.

MR. ALADJEM: Madam Chair, I have for cross-examination a new exhibit, Brentwood 118, for the record. And, if I may, this is simply

Dr. Nader-Tehrani's testimony with highlights.

MR. ALADJEM: Dr. Nader-Tehrani, just a few very quick foundational questions.

You prepared this testimony?

WITNESS NADER-TEHRANI: Yes, I did.

MR. ALADJEM: And in preparing the testimony, did you discuss it with anyone else?

WITNESS NADER-TEHRANI: I did get assistance from my staff in preparing the figures, and I did rely on some of the CalSim modelers in response to, for example, the appropriateness of the model.

MR. ALADJEM: Very good. Did you discuss your testimony with Mr. Leahigh?

WITNESS NADER-TEHRANI: I don't recall.

MR. ALADJEM: Did you discuss it with Mr. Milligan?

WITNESS NADER-TEHRANI: No.

MR. ALADJEM: And by training and experience, Dr. Nader-Tehrani, you're a modeler; is that correct?

WITNESS NADER-TEHRANI: I'm a modeler, yes.

MR. ALADJEM: Thank you. Dr. Nader-Tehrani, last week you were questioned by my colleague Ms. Nikkel. Do you recall that cross-examination?

WITNESS NADER-TEHRANI: Some of it.

MR. ALADJEM: Let me refresh your memory on some of this.

WITNESS NADER-TEHRANI: Sure.

MR. ALADJEM: Would it be fair to say, Dr. Nader-Tehrani, that you agreed under cross-examination that Fall X2 is part of the Boundary 1 conditions?

WITNESS NADER-TEHRANI: That's correct.

MR. ALADJEM: And would it also be fair to say that you attributed the differences between the Boundary 1 scenario modeling results and the no action alternative to the fact that Boundary 1 does not include Fall X2?

WITNESS NADER-TEHRANI: I think the correct way of saying, I believe I said, is mostly due to that.

MR. ALADJEM: Mostly. Okay.

Can you inform us this morning what is not caused as a result of Fall X2?

WITNESS NADER-TEHRANI: I didn't have anything specific in mind. I was trying to illustrate through the use of two four-year time periods, comparing results for Boundary 1 scenario against the no action alternative, and clearly illustrating that, when the two diverged, the timing of the divergence between the

model results, the larger differences between the chloride concentration at those periods coincided with the time that there was a Fall X2 action implemented under the no action and not on Boundary 1.

MR. ALADJEM: Did you do an analysis, Dr. Nader-Tehrani, of what might be the effects of operating the WaterFix project if it were to be approved in exactly the same way as it would be operated under Boundary 1 but without Fall X2 -- excuse me -- with Fall X2?

WITNESS NADER-TEHRANI: I don't recall.

MR. ALADJEM: Okay. You're aware, Dr. Nader-Tehrani, that the Fall X2 action requires the release of a substantial amount of water; isn't that true?

WITNESS NADER-TEHRANI: Yes. I believe that's also in my testimony.

MR. ALADJEM: Did do you any analysis, Dr. Nader-Tehrani, to indicate where that water would go in the system in the absence of Fall X2 if the California WaterFix project were otherwise being operated to Boundary 1?

WITNESS NADER-TEHRANI: I'm -- I don't think the question's very clear. Could you repeat the

question, please?

MR. ALADJEM: Sure. Let's assume that the project were to be operated to Boundary 1, and let's assume that there is no Fall X2, which is Boundary 1.

Have you done any analysis as to where that water would go?

WITNESS NADER-TEHRANI: The modeling reflects that -- I can't -- I don't think that's really a clear question. The water is coming mostly from Sacramento River. As far as what reservoirs they were released from, I don't have an answer to that question. That's what the question is.

MR. ALADJEM: Okay. Now let me just flip the question around. Suppose that the project were to be operated to Boundary 1 but we were to include Fall X2.

Did you do an analysis of what would be the results if that were to be the scenario?

WITNESS NADER-TEHRANI: I don't recall I've done that analysis.

MR. ALADJEM: Dr. Nader-Tehrani, on Tuesday, you indicated that the project would be operated to Fall X2 if it were required by the U.S. Fish and Wildlife Service; is that correct?

WITNESS NADER-TEHRANI: I don't think I quite

phrased it that way. I was trying to mention that, if in the future the projects were to operate Fall X2, then the Boundary 1 as modeled would not be a correct representation of what would happen.

MR. ALADJEM: And would it be fair to infer from that, Dr. Nader-Tehrani, that if Fall X2 were not a requirement, then the projects would operate Boundary 1 without Fall X2?

WITNESS NADER-TEHRANI: If Boundary 1 happens to be the scenario that the projects would be operated, yes.

MR. ALADJEM: Thank you. Let me turn to modeling anomalies.

Mr. Hunt, could you put up Brentwood 118, Page 31.

Dr. Nader-Tehrani, in the interest of time, I'd like to direct your attention to Lines 3 through 7, and once you've read those and refreshed your memory, please let me know.

WITNESS NADER-TEHRANI: Yes.

MR. ALADJEM: And, Mr. Hunt, could you now turn to Page 29 in Brentwood 118, Lines 9 through 12.

And again, Dr. Nader-Tehrani, if you could read the highlighted areas and let me know when you're

done.

WITNESS NADER-TEHRANI: Yes.

MR. ALADJEM: So is it fair to say, Dr. Nader-Tehrani that your disagreement with Dr. Paulsen's analysis has to do with her use of daily data rather than monthly data?

WITNESS NADER-TEHRANI: That's only part of it. I think she relied on the daily time series to arrive as to a -- an opinion on which alternative would or would not increase impacts to Antioch.

MR. ALADJEM: But you don't have any disagreements with her use of monthly data?

WITNESS NADER-TEHRANI: I think it is my testimony also that you -- it would not be appropriate to compare model results for a single month even if it's monthly average.

MR. ALADJEM: So let me make sure I understand that, Dr. Nader-Tehrani.

If there is an exceedance in a given month in one model run of DSM-2 and the comparative no action alternative run shows that that same month would comply with water quality standards, are you saying that we should disregard that monthly exceedance in the project run?

WITNESS NADER-TEHRANI: I think the best way to use DSM-2 model when, let's say, specifically you're trying to evaluate the one scenario to the other -- in this case, you know, one of the California WaterFix to a no action, in terms of the D1641, as an example -- you should not rely on the model results -- I think it would be inappropriate to use the model results, compare exceedance or lack of exceedance to a specific objective on a given day or given month.

Instead, I think the proper thing to do is do your calculations for each of -- there is -- model output is available to evaluate whether or not water qualities are being exceeded every day and every month. But rather than judging compliance based on a single day or a single month, you would look at it as a probability of exceedance throughout the period.

That would be the most appropriate way of evaluating whether one project or one scenario results in fewer or more exceedances with respect to D1641 water quality objectives.

MR. ALADJEM: There's a lot there, Dr. Nader-Tehrani. Let me try to begin to unpack it.

Mr. Hunt, could you please put up Table 1 from D1641, and that is SWRCB-21, Page 181 of the decision.

It's, I believe, Page 193 of the pdf.

MR. OCHENDUSZKO: Mr. Aladjem, would you please repeat your citation.

MR. ALADJEM: Yeah. It is Page 181 of the decision. I believe it's 81 -- 181; excuse me.

There -- back up. There we go.

Mr. Hunt, could you perhaps increase the size of this? So I want to make sure that we can all see it. Thank you.

Dr. Nader-Tehrani, you're familiar with this table?

WITNESS NADER-TEHRANI: I am familiar, but I just wanted to read it.

MR. ALADJEM: Please, please do.

WITNESS NADER-TEHRANI: Go ahead.

MR. ALADJEM: Okay. The lower portion of the table, Dr. Nader-Tehrani, establishes a year-round standard for chloride of 250 parts per million; isn't that right?

WITNESS NADER-TEHRANI: That particular objective is based on maximum mean daily; that is correct.

MR. ALADJEM: That is correct. Thank you. Appreciate the clarification.

So, Mr. Hunt, if we could go to Brentwood 102, Figure 8, which is found on Page 35. Excuse me, Mr. Hunt. Brentwood 102.

CO-HEARING OFFICER MARCUS: 102 Errata?

MR. ALADJEM: 102. The errata are different.

MR. HUNT: Can you repeat the page number?

MR. ALADJEM: Page 35.

Dr. Nader-Tehrani, I'd like to invite you to look at Figure 8 here, and let me know when you've reviewed the figure.

WITNESS NADER-TEHRANI: Yes. Go ahead.

MR. ALADJEM: Very good. Now, these are monthly averages of water quality at Contra Costa Pumping Plant No. 1; isn't that right?

WITNESS NADER-TEHRANI: I'm assuming this is an exhibit that Dr. Paulsen generated; is that correct?

MR. ALADJEM: And you don't have any reason to --

WITNESS NADER-TEHRANI: I'm just asking a question.

MR. ALADJEM: Yes, this is Dr. Paulsen's testimony.

WITNESS NADER-TEHRANI: Yes. And yes, that's correct.

MR. ALADJEM: And if you look here at December and January for Boundary 1, isn't it the case that the average monthly chloride concentrations are greater than 250 parts per million?

WITNESS NADER-TEHRANI: Yes. And I believe Dr. Paulsen explains in her testimony that she uses a different EC-to-chloride conversion in her analysis of WaterFix.

MR. ALADJEM: And, Dr. Nader-Tehrani, do you disagree with that conversion?

WITNESS NADER-TEHRANI: I'm just clearly making a point that the modeling that was done for California WaterFix uses a different conversion, and therefore, when do you that, you may not get the same numbers that you see on this figure.

MR. ALADJEM: And let me ask my question again. Do you disagree with the conversion factor that Dr. Paulsen used?

WITNESS NADER-TEHRANI: I don't have an opinion.

MR. ALADJEM: Thank you. Now, the concentrations of chloride in December and January for Boundary 1 are substantially greater than no action; isn't that correct?

WITNESS NADER-TEHRANI: According to this figure -- and this figure was generated from 1978-'79 and 1980 -- as I read it, according to this result, that's what it shows. And once again, that's the period where it would be affected by Fall X2.

MR. ALADJEM: Dr. Tehrani, can I summarize that answer as "yes"?

WITNESS NADER-TEHRANI: According -- can you repeat the question, making sure I'm saying yes to what?

MR. ALADJEM: Dr. Nader-Tehrani, we're looking at this particular exhibit. I'm simply asking you whether it is the case for December and January as shown on Figure 8 that the Boundary 1 conditions are substantially greater than the no action alternative. It's a simple question that calls for a "yes" or "no."

WITNESS NADER-TEHRANI: Yes. According to this figure, yes.

MR. ALADJEM: Thank you. And, Dr. Nader-Tehrani, if the monthly average is greater than 250 parts per million, is that, in your view, an appropriate result, an appropriate use of DSM-2 modeling?

WITNESS NADER-TEHRANI: Again, she's looking

at these three particular years, and yet -- if that's what you're confining your results -- because -- well, I think the results speak for themselves. That's what -- when -- and used in her analysis with her different conversion equation, that's what you get.

MR. ALADJEM: Dr. Nader-Tehrani, you have said that it's inappropriate to use daily figures, daily results from DSM-2. You said you should use monthlies. This is a monthly calculation.

I'm asking whether it's an appropriate use of 11 DSM-2 modeling output.

WITNESS NADER-TEHRANI: In reference to compliance to specific objectives, I believe the best way to look at it would be to look at the entire record.

MR. ALADJEM: Mr. Hunt, could we move back, then, to Table 1 from D1641? That's Page 181.

CO-HEARING OFFICER DODUC: While he's doing that, Mr. Aladjem, could I get a clarification from you?

MR. ALADJEM: Please.

CO-HEARING OFFICER DODUC: Because I'm trying to understand and follow the line of questioning.

When you use the term "appropriate" in that

question to Dr. Nader-Tehrani, what do you mean?

MR. ALADJEM: Chair Doduc, Dr. Nader-Tehrani has said that Dr. Paulsen's use of daily DSM-2 output to conclude that there would be exceedances of the Water Quality Control Plan standards is inappropriate.

I'm trying to understand when Dr. Paulsen has done monthly analyses whether that is an appropriate use, and I will get to the question about dailies in a few moments.

CO-HEARING OFFICER DODUC: All right. Thank you. That helps me understand where you were going.

MR. ALADJEM: And to the extent the Chair has any further questions, please interrupt.

Dr. Nader-Tehrani, I want to turn your attention to the upper portion of Table 1 now. And again, I'd like to ask you to read this and make sure that your memory's refreshed, and then let me know.

WITNESS NADER-TEHRANI: Yes. Go ahead.

MR. ALADJEM: So for the 150 parts per million chloride standard, Table 1 requires that objective to be met for different numbers of days for different water year types; isn't that correct?

WITNESS NADER-TEHRANI: That's correct.

MR. ALADJEM: And in calculating the number of

days that it must be met in each of those water year types, the State Water Board has required that those daily values be provided in intervals of not less than two weeks' duration; isn't that right?

WITNESS NADER-TEHRANI: That's correct.

MR. ALADJEM: So in order to determine whether or not the water quality standard here, the 150 parts per million standard complies -- excuse me. Strike that.

In order to determine whether water quality at 11 Contra Costa Pumping Plant No. 1 complies with this 150-part-per-million standard, you need to look at daily chloride values in intervals of not less than two weeks' duration; isn't that true?

WITNESS NADER-TEHRANI: Yes, that's correct.

MR. ALADJEM: Now, in your analysis, Dr. Nader-Tehrani, did you calculate how many -- when you calculated whether or not the California WaterFix project would meet this 150 parts per million standard, did you calculate how many days each year would be satisfied and incorporate the fact that all of those days needed to be in intervals of at least two weeks' duration?

WITNESS NADER-TEHRANI: I did rely on my

staff. So I -- I don't -- I mean, the criteria, I've given that to the staff, and I think -- so I don't -- I can't say, because I didn't personally do the analysis. I can't say for sure, but I'm -- the instructions to my staff are clear that that's what the water quality standards are.

MR. ALADJEM: Okay. But, Dr. Nader-Tehrani, if the State Water Board were to look merely at monthly averages, they wouldn't be able to evaluate whether or not the 150-part-per-million chloride standard was met; isn't that right?

WITNESS NADER-TEHRANI: That's correct.

MR. ALADJEM: Thank you. Dr. Nader-Tehrani, last week -- excuse me. It was last week.

My colleague Ms. Nikkel had some questions for you about the use of DSM-2 in evaluating compliance with water quality objectives.

Do you recall that line of questioning?

WITNESS NADER-TEHRANI: Please refresh my

memory.

MR. ALADJEM: Okay. Let me fresh your memory.

If I may, Madam Chair?

CO-HEARING OFFICER DODUC: Please, because my memory could use some refreshing as well.

MR. ALADJEM: If I may ask the court reporter, Madam Chair, if she has the transcript from last Friday if we could pull it up?

THE REPORTER: I do not.

MR. ALADJEM: Madam Chair, if I may read the rough transcript?

CO-HEARING OFFICER DODUC: Please do.

MR. ALADJEM:

> "Co-Hearing Office Doduc: Ms. Nikkel, I would like a follow-up to ask Dr. Nader-Tehrani. If one were to want to examine these short -- those short-term impacts, is there presently a tool available to do so, a modeling tool?"
>
> "Witness Nader-Tehrani: Not to my knowledge."

MR. ALADJEM: Dr. Nader-Tehrani, do you recall that interchange?

WITNESS NADER-TEHRANI: I believe in the context that I was responding was not in reference to the D1641 -- I mean, examples such as the D1641 water

quality standards. What I was trying to get at is it would be inappropriate to compare model results in a given day or in a given month in response to a short-term. There is a difference.

MR. ALADJEM: Madam Chair, if I could proceed further on this? This is now Page 100-and --

CO-HEARING OFFICER DODUC: Actually, before you do.

So, Dr. Nader-Tehrani, if I were to ask you the same question but put it in the context of determining compliance with that 150 milligrams per liter standard, what would your answer be?

WITNESS NADER-TEHRANI: In order to arrive at an opinion based on model results on compliance to this 150, the criteria is based on a calendar year. There are model output available every 15 minutes. So it could compute daily averages based on DSM-2 model output, convert -- do the conversion, EC to chloride, and get a single number for chloride for every day of that calendar year.

So, yes, the model simulates and calculates chloride in short duration. But in this particular case, you're going to be looking at the whole calendar year, count the number of days that you're below

150-milligram threshold chloride, daily average concentration of chloride, and compare it to the criteria that's given in the D1641 table.

And if you look at my DWR-513, you will see that I've shown that. And the only year that it shows that there was an exceedance was 1977.

CO-HEARING OFFICER DODUC: So that's fine. So your answer is the model does have the -- could be used that way, even though it's not what you would advise?

WITNESS NADER-TEHRANI: Well, no.

CO-HEARING OFFICER DODUC: Okay.

WITNESS NADER-TEHRANI: So -- okay. So the reference that we were talking about before was the 250-milligram. That's a criteria for a given day. This is a calendar year objective. In the context that I was -- you know, it would be better to discuss the -- the daily standard, the 250-milligram-per-liter per se. So the model output can calculate the daily average chloride concentration, and you can compare the model results.

What I'm saying is it would be inappropriate to compare one scenario against another on a given date and say on February 6th, 1981, one scenario says it's meeting the objective; the other is not. In order to

evaluate the performance of each of those scenarios, you would need to look at how they meet this criteria based on the entire period. That's the most effective and the most appropriate way, I believe, is to use the model results in that context.

So to be clear, the model is capable of simulating those short-term trends, but because of all the limitations that we discussed, it is my testimony that you shouldn't rely on, you know, comparing one scenario to the other on a short term, in a given day or a given month.

CO-HEARING OFFICER DODUC: Thank you. That was out of my time not yours, Mr. Aladjem.

MR. ALADJEM: Madam Chair, I think we're having very productive discussion. I think it may take more than 45 minutes.

Dr. Nader-Tehrani, I want to clarify something you just said. You said it's inappropriate to do this for a short period of time, and you specifically said "daily." I wasn't clear yet whether you said on a monthly basis or whether really the analysis should be done on an annual or more than annual basis, longer than annual. Could you clarify, please?

WITNESS NADER-TEHRANI: Sure. In order -- so

let's take the 250-milligram-per-liter objective at Contra Costa Canal. For that particular objective, it's based on daily average chloride concentration. For that particular objective, it is my opinion in order to evaluate the performance of a given objective, you need to look at the entire 16 years based on a probability of exceedance.

And specific to this one, because this particular objective is very different, the objective varies by water year. So it wouldn't -- it would be very hard to look at how the model performs in respect to the entire 16 years.

So what we've done is -- and care must be taken. But in this particular objective, the only way we can -- I actually evaluate the compliance to this particular objective is to evaluate it based on a given year, and that's exactly what we've done.

We've looked at the model simulation each day, looked at the entire year whether or not it's meeting that objective and reported the results in DWR-513. That's how it is doing it. That's the only one that's based on calendar year. Everything else is we're looking at the entire 16-year period. Emmaton, Jersey Point, the 250-milligram-per-liter criteria is all --

we're looking at the entire 16-year period.

MR. ALADJEM: So I take that, Dr. Nader-Tehrani, to say that it really should be the entire 16-year period; is that fair? I'm trying to make sure I understand this correctly.

WITNESS NADER-TEHRANI: The question is not complete. I'm not sure what it's referring to. So could you expand on what you just said? Are you talking in reference to this particular objective, or are you talking -- because the answer would be different.

MR. ALADJEM: Why don't you give me both answers.

WITNESS NADER-TEHRANI: Okay. As I said, the only one, the only water quality objective that we had to look at a -- given one year at a time was the evaluation of meeting the objective for this particular one, meeting the 150-milligram-per-liter chloride objective, because the compliance varies depending on the water year type.

Everything else is -- we were able -- we were able to present the results as the -- in the entire 16 years of compliance as shown as a probability of exceedance. And we talked about modeling anomalies,

and I'm sure we're going to get to that soon.

CO-HEARING OFFICER DODUC: But when you performed that analysis with respect to the 150 --

WITNESS NADER-TEHRANI: Yes.

CO-HEARING OFFICER DODUC: -- standard there, did you not look at it as daily values?

WITNESS NADER-TEHRANI: It's a collection of daily values.

CO-HEARING OFFICER DODUC: But you looked at it as daily values?

WITNESS NADER-TEHRANI: Correct.

CO-HEARING OFFICER DODUC: Thank you.

WITNESS NADER-TEHRANI: Yeah.

MR. ALADJEM: Let me return to sort of a bigger-picture question, Dr. Nader-Tehrani.

You said repeatedly that it's appropriate to compare one set of modeling results with another set of modeling results to determine whether or not the proposed project would have an impact; isn't that right?

WITNESS NADER-TEHRANI: If done with care.

MR. ALADJEM: Pardon me?

WITNESS NADER-TEHRANI: If done with care.

MR. ALADJEM: I'd like to -- Mr. Hunt, if you

could put up DWR-79. Actually, Brentwood 108, Page 5. I see you have that up already.

CO-HEARING OFFICER DODUC: And as stated yesterday, when these seats are not being occupied by witnesses or their attorneys, you're welcome to come up and use the monitors.

MR. ALADJEM: Excuse me, Mr. Hunt. I may have misspoke. Brentwood 102. Excuse me. Let me -- Brentwood 118 -- excuse me. Back up. Brentwood 118, Page 5. Thank you. There we go.

Dr. Nader-Tehrani, direct your attention to Lines 17 and 18.

WITNESS NADER-TEHRANI: Yes, I see that.

MR. ALADJEM: Okay. So your testimony, sir, is that, notwithstanding the fact that you should do comparisons of modeling runs with care, you now are relying on Lines 17 and 18 on operations to expunge a significant -- an exceedance of water quality standards; isn't that right?

MR. BERLINER: Objection --

WITNESS NADER-TEHRANI: I don't think that's what I'm saying.

MR. BERLINER: -- vague and ambiguous in the context of the use of the word "expunge."

CO-HEARING OFFICER DODUC: Yes.

MR. ALADJEM: To excuse.

CO-HEARING OFFICER DODUC: Let's not use the word "expunge," Mr. Aladjem.

MR. ALADJEM: Consider it stricken, Madam Chair.

WITNESS NADER-TEHRANI: So could you re-ask the question, please.

MR. ALADJEM: Yes. You've just said, Dr. Nader-Tehrani, that it's appropriate to do comparisons with care.

WITNESS NADER-TEHRANI: That's right.

MR. ALADJEM: And then you've testified in Lines 17 and 18 that, notwithstanding the fact that there is an exceedance, that we should disregard that exceedance because, quote, "DWR can operate the SWP to meet the required water quality requirements."

WITNESS NADER-TEHRANI: Are you referring to the lines that are highlighted here?

MR. ALADJEM: I'm referring to Lines 17 and 18, and I'm sorry that those were not highlighted.

MR. BERLINER: Objection. I don't find the word "exceedance" on this paragraph.

CO-HEARING OFFICER DODUC: I'm sorry.

Mr. Berliner, your objection is based on?

MR. BERLINER: Mr. Aladjem asked a question about exceedances, referring to, I guess, specifically the last sentence in the paragraph, but I can't find the word "exceedance" at all in the paragraph.

CO-HEARING OFFICER DODUC: So strike "exceedance."

Your point, I believe, Mr. Aladjem, is regardless of what the modeling results show, Dr. Nader-Tehrani seems to be saying that DWR can operate to meet water quality requirements.

MR. ALADJEM: Yes, Madam Chair.

WITNESS NADER-TEHRANI: And, again, I believe this is in reference to Boundary 1.

MR. ALADJEM: It is, Dr. Nader-Tehrani. And it is -- is your answer "yes"?

WITNESS NADER-TEHRANI: Yes, that's correct.

MR. ALADJEM: Madam Chair?

CO-HEARING OFFICER DODUC: Mr. Aladjem? I almost gave you the promotion that "Dr. Herrick" got yesterday.

MR. ALADJEM: It would have been undeserved.

Dr. Nader-Tehrani, at the outset of his testimony this morning, indicated that he was -- had

not spoken to the operators, that he was a modeler, and his testimony is very consistent with modeling.

So based on the fact that this relies upon a speculation about operations, I would request that the Board strike Lines 17 and 18, the sentence beginning with "even with these results."

CO-HEARING OFFICER DODUC: Thank you. We'll consider that.

But, Dr. Nader-Tehrani --

WITNESS NADER-TEHRANI: Yes.

CO-HEARING OFFICER DODUC: -- what is the basis of your statement?

MS. McGINNIS: Before Dr. Nader-Tehrani responds, I just wanted to respond to the motion, that in Evidence Codes Sections 801 to 805, it says what an export is allowed to rely on. So it's -- and I'll just leave it at that.

CO-HEARING OFFICER DODUC: I'm asking him what he relied on.

MR. ALADJEM: Madam Chair, but he's already testified that he didn't speak to any of the operators.

CO-HEARING OFFICER DODUC: Maybe he read it in some operating guidance. I don't know.

Dr. Nader-Tehrani?

MR. BERLINER: Well, if I might before he answers -- I apologize.

CO-HEARING OFFICER DODUC: Mr. Berliner?

MR. BERLINER: The question that Mr. Aladjem asked at the beginning was whether he conferred with Mr. Leahigh regarding his testimony. He didn't ask him if he does -- about 20-plus years of experience with the State Water Project.

CO-HEARING OFFICER DODUC: And you have just led your witness to an answer, but okay.

Dr. Nader-Tehrani?

WITNESS NADER-TEHRANI: I did rely on a number of facts. First of all, I have reviewed model results that were done in support of BDCP. There were some alternatives with the larger-capacity intakes that were included that did not include WaterFix. And based on the model results, it showed that it's not showing more severe exceedances relative to no action alternative.

Furthermore, I also relied on the operators by the fact that that shows that the past track record in terms of meeting the water quality objectives and the fact that -- so two things. One is that the model results in reference, in comparison to the no action, doesn't show substantially more exceedances and the

fact that I know the model limitations and I know the issue with the modeling artifacts.

So that, in combination with the fact that the track record shows that a lot of those modeling exceedances will not occur in real life, that's the basis of me understanding, basically, 20-some years of how water quality works in the Delta and the different -- under different water -- hydrologic, you know, variations, all of that.

CO-HEARING OFFICER DODUC: Mr. Aladjem.

MR. ALADJEM: As the Chair has pointed out, Mr. Berliner very effectively led the witness to a response.I don't think it's productive for us to continue this line of discussion.

CO-HEARING OFFICER DODUC: So you have withdrawn your motion?

MR. ALADJEM: I have not withdrawn my motion.

CO-HEARING OFFICER DODUC: Then I am hereby denying your motion.

MR. ALADJEM: Thank you, Madam Chair. Mr. Hunt, could we go to Brentwood 102, 22 Figures 4 and 5, which are on Page 30 and 31.

Let's use Figure 4 here.

Dr. Nader-Tehrani, I want to ask you to look

at this figure and let me know when you've reviewed it.

MR. BERLINER: Mr. Aladjem, for the record, could you just explain what this figure is? You've cited the -- you gave the cite but not what the figure is.

MR. ALADJEM: This is daily average chloride concentrations at Pumping Plant 1.

WITNESS NADER-TEHRANI: For two years, 1978, 1979.

MR. ALADJEM: Mm-hmm. Absolutely.

WITNESS NADER-TEHRANI: Yeah, I see that.

MR. ALADJEM: Okay. Dr. Nader-Tehrani, we look here at both the no action and Boundary 1 from October 1977 through roughly February 1978. You see that the daily average chloride concentration is well above the 250 parts per million concentration; isn't that right?

WITNESS NADER-TEHRANI: According to this figure, yes.

Could you repeat the time period just so I make sure I understood the period?

MR. ALADJEM: Excuse me?

WITNESS NADER-TEHRANI: Can you repeat the -- what time periods you were referring to, please?

MR. ALADJEM: Oh, yes. October 1977 through roughly February 1978.

WITNESS NADER-TEHRANI: Well, what I see is sometime around December of '77 there seems to be a crossover.

MR. ALADJEM: My question was simply that both of them are above the 250-part-per-million line for that period of time?

WITNESS NADER-TEHRANI: Both of them are. That's correct, yes.

MR. ALADJEM: And then from roughly December 1978 or January 1979 through approximately March or April 1979 you'll see that the Boundary 1 conditions are in excess of the 250-part-per-million chloride?

WITNESS NADER-TEHRANI: According to this plot, yes.

MR. ALADJEM: Mr. Hunt, if could you go to DWR-5 Errata, Page 61.

CO-HEARING OFFICER DODUC: Mr. Aladjem, while that's happening, how much additional time -- did you set the clock at, 60 or 45 to begin with?

MR. OCHENDUSZKO: We started at 45.

CO-HEARING OFFICER DODUC: Okay. How much time do you --

MR. ALADJEM: Madam Chair, this is taking substantially longer than I thought it would, but I think it's productive.

CO-HEARING OFFICER DODUC: I think so.

MR. ALADJEM: If I might ask for a half hour?

CO-HEARING OFFICER DODUC: All right. Let's give him 30 minutes.

And would the court reporter be okay with going for 30 minutes and then taking a break?

THE REPORTER: Yes.

MR. ALADJEM: Mr. Hunt, I think we're different -- there we go. Thank you.

And, Dr. Nader-Tehrani, you're familiar with this chart, Page 61 of DWR-5 Errata?

WITNESS NADER-TEHRANI: Yes.

MR. ALADJEM: And if we look at all of the bar charts here, they don't show an exceedance of the 250-part-per-million standard; isn't that right?

WITNESS NADER-TEHRANI: That's correct.

MR. ALADJEM: So isn't it the case, Dr. Nader-Tehrani, that the exceedances that were shown on Figure 4, Brentwood 102, have been averaged out in this figure here on Page 61?

WITNESS NADER-TEHRANI: I don't -- I do not

have this exhibit, but there is another figure that does reflect those daily exceedances.

And if you scroll down, we can get to it. I don't have this -- I don't have the page number, but could you go further down? Down, down, down. Okay. Slow down, please. One more.

Oh, yes. Let me look at this.

So can you tell me what slide -- is this Slide 71? Yes. Okay.

MR. OCHENDUSZKO: This is Slide 71.

WITNESS NADER-TEHRANI: Okay. So this particular slide would reflect what, you know, the -- is the proper plot, in my opinion, to evaluate how each of the scenarios compare in terms of meeting the 250-milligram-per-liter daily average chloride concentration at Contra Costa Canal.

What goes into each of every line here is daily concentration of chloride for 365 days times 16. So that's in excess of 5,000 data points goes into each and every one of these plots.

And as you can see, if the line stayed below zero, that means they were in compliance in the entire 16 years. But all lines except Boundary 2 go above that 250-milligram-per-liter threshold, including the

no action alternative as represented by the black line in this figure.

So I was -- back last year, I was explaining, yes, they're not meeting this objective 100 percent of the time mostly because of the modeling exceedances. That's number one.

The second point I was trying to make is the proper way to interpret the results of this particular objective is looking at, for example, H3 and H4, reflected by the blue line and the one that's -- they're right on top of each other. They're actually meeting this objective at, you know, higher probability as compared to the no action.

And even when you look at the no action compared to Boundary 1, you see actually they're very similar, meaning according to model results, about 93 percent of the time both Boundary 1 and no action meet that objective, yet modeling shows that they exceed the objective 7 percent of the time, which it is my opinion that most of it is related to the modeling artifacts that we went over.

CO-HEARING OFFICER DODUC: So are you saying that the chart that Mr. Aladjem first had up there reflected what?

WITNESS NADER-TEHRANI: Well, the purpose of that plot was not to indicate whether or not there was compliance.

MR. ALADJEM: Wait, Dr. Nader-Tehrani. Are you saying that Figure 4 from Brentwood 102 was not intended to reflect compliance with the 1641 objectives, or were you saying that your probability of exceedance plot on Page 71 of DWR-5 Errata is not intended to reflect compliance? I'm not sure which one you're referring to.

WITNESS NADER-TEHRANI: I'm referring to this particular plot we are looking at right here.

MR. ALADJEM: Dr. Nader-Tehrani, excuse me. For the record --

WITNESS NADER-TEHRANI: Yes.

MR. ALADJEM: -- which plot are you referring to?

WITNESS NADER-TEHRANI: The Slide 61 on DWR-5, I believe, or I don't know if it's the errata. I forget which one we're looking at correct right now.

MR. ALADJEM: Madam Chair, excuse me.

So Slide -- Page 61 of DWR-5 Errata is not intended to allow us to draw any conclusions about compliance with the chloride standard at Contra Costa

Canal. Did I hear you correctly?

WITNESS NADER-TEHRANI: That was not the intention for this particular plot.

MR. ALADJEM: Was that a "yes," sir?

WITNESS NADER-TEHRANI: Yes.

MR. ALADJEM: Okay. So let me now go back to what I believe was the Chair's question.

Dr. Paulsen, Figure 4 from Brentwood 102, you were saying -- strike that.

Page 71, DWR-5 Errata, Mr. Hunt, if you could 11 put that up.

You were saying that this is the proper way to determine compliance with the 250-part-per-million chloride standard at Contra Costa?

WITNESS NADER-TEHRANI: That is my opinion. That's the most proper way of comparing compliance to the 250-milligram-per-liter compliance.

MR. ALADJEM: Madam Chair, I believe you had a question, but I interrupted you. If you don't, I will continue.

CO-HEARING OFFICER DODUC: Then I think you answered it by saying that the figure on Page 60- --

MR. ALADJEM: 61.

CO-HEARING OFFICER DODUC: -- 61 was not

intended for this purpose.

What was the intention of that plot?

WITNESS NADER-TEHRANI: It was simply to present -- because this plot by itself does not show seasonal variations.

MR. ALADJEM: Dr. Nader-Tehrani?

WITNESS NADER-TEHRANI: And but the -- sorry. But the other plot showed the seasonal variations through the use of the long-term monthly averages.

CO-HEARING OFFICER DODUC: Which then masked, potentially, daily exceedances?

WITNESS NADER-TEHRANI: Which is exactly why we also presented this result.

CO-HEARING OFFICER DODUC: All right. Thank you. That clarifies things a little bit more for me. All right. Thank you.

Back to you, Mr. Aladjem.

MR. ALADJEM: Thank you, Madam Chair. Dr. Nader-Tehrani, you indicated that there 20 were approximately 7 percent of days where Boundary 1 21 on -- this is Page 71 of DWR-5 Errata -- would not comply with the 250 milligram per liter standard; isn't that right?

WITNESS NADER-TEHRANI: This is based on model

results.

MR. ALADJEM: And this is a 16-year period?

WITNESS NADER-TEHRANI: This is a 16-year period.

MR. ALADJEM: When you took the daily data, if I understand correctly, from the 16-year period, you rate them in a probability of exceedance plot here to generate this graphic; isn't that right?

WITNESS NADER-TEHRANI: That's correct.

MR. ALADJEM: Where in that process, Dr. Nader-Tehrani, did you include the two-week average?

WITNESS NADER-TEHRANI: This particular plot does not require a two-week average. This is the 250 milligram per liter daily.

MR. ALADJEM: Okay. This exceedance plot, sir, does not indicate the length of a particular exceedance, does it?

WITNESS NADER-TEHRANI: By "length," what do you mean?

MR. ALADJEM: The duration. So if the daily -- if the daily value exceeded 250 milligrams per liter for one day or one month or six months, this chart does not allow us to distinguish between those cases?

WITNESS NADER-TEHRANI: That is correct.

MR. ALADJEM: And this chart tells us only, if I understand you correctly, the total number of days over the 16-year period that this standard is met -- would be met at Contra Costa Canal?

WITNESS NADER-TEHRANI: And, again, I want to repeat because this information seems to be getting lost. I am not necessarily seeing these are real exceedances. I'm just illustrating the fact that there would not be additional exceedances under any of these alternatives in reference to no action.

So whenever I use the word "exceedance," it would be in reference to model results and not necessarily that there would be those exceedances. So I want to make sure the record is clear on that.

MR. ALADJEM: Madam Chair, I would move to strike as non-responsive.

CO-HEARING OFFICER DODUC: It was non-responsive. Denied because it's not different than anything he's said before.

But, Dr. Nader-Tehrani, please be direct and focused in answering Mr. Aladjem's question. And I think he has a question outstanding.

WITNESS NADER-TEHRANI: Could you repeat the

question, please.

MR. ALADJEM: Actually, Madam Chair, Dr. Nader-Tehrani has raised this question about whether the modeling results are real, and that's my final discussion. So if I might move to that.

CO-HEARING OFFICER DODUC: Okay. Thank you.

MR. ALADJEM: Dr. Nader-Tehrani, if I might go back again to your examination by my colleague Ms. Nikkel last week, you said that there was an analysis that you had performed of whether the exceedances were real or not or whether they were modeling anomalies.

WITNESS NADER-TEHRANI: Could you explain what exceedances are you referring to?

MR. ALADJEM: Madam Chair, if I might read from the transcript?

CO-HEARING OFFICER DODUC: Please.

MR. BERLINER: And, Mr. Aladjem, could we get a reference as to what you're going to read, please?

MR. ALADJEM: Mr. Berliner, I will. Let me just grab my copy here.

This is Page 139 of the draft -- the rough draft transcript from May 5, 2017, beginning Line 20.

"Ms. Nikkel: And did

you conduct an analysis as to each of those instances" --

He was talking there, if I might interpolate, about the anomalies and whether or not they were real.

-- "and attribute it directly to a modeling anomaly of which the monthly time step issue is one example?"

"Witness Nader-Tehrani: That's correct."

The discussion continued, Madam Chair, and Ms. Nikkel asked at Page 140, Line 23:

"But the complete analysis you conducted has not been presented in this hearing?"

"Witness Nader-Tehrani: That's correct."

Dr. Nader-Tehrani, do you remember that interchange?

WITNESS NADER-TEHRANI: And I think there was a lengthier extension of that discussion that you did not just read from that. I think the rest of it was important in reference to the issue you're referring to, I guess.

MR. ALADJEM: Well, I have some questions for you about the analysis that you performed.

WITNESS NADER-TEHRANI: Correct. Go ahead. Mm-hmm.

MR. ALADJEM: Could you please describe the analysis that you performed to determine whether these exceedances were the result of modeling anomalies or something else?

WITNESS NADER-TEHRANI: In order to answer that question, I would first ask you to -- if you could show DWR-79.

MR. ALADJEM: Mr. Hunt, could you bring up DWR-79 of Dr. Nader-Tehrani's testimony?

WITNESS NADER-TEHRANI: Yes, Page 37. So, Lines 19 through 21 -- or actually starting from Line 17.

MR. ALADJEM: Excuse me, Dr. Nader-Tehrani.

Madam Chair, I think I can short-circuit this.

CO-HEARING OFFICER DODUC: Please.

MR. ALADJEM: Dr. Nader-Tehrani, we've all read your testimony.

WITNESS NADER-TEHRANI: Yes.

MR. ALADJEM: What I understood from your colloquy with Ms. Nikkel was you had done an analysis

that was not captured in your testimony; is that correct?

WITNESS NADER-TEHRANI: That's correct.

MR. ALADJEM: Then there's no need for you to rehearse your testimony. I'm going to ask you some questions about the analysis.

MS. McGINNIS: Objection, relevance.

Dr. Nader-Tehrani and Mr. Aladjem just explained that the analysis that was done is not included in his rebuttal testimony. It's not relied on in his rebuttal testimony.

CO-HEARING OFFICER DODUC: So refresh my memory, Mr. Aladjem, as to the relevance, if it's outside of his rebuttal testimony.

MR. ALADJEM: Well, in answering a question about how he comes to the conclusion, he says, "I did an analysis that was outside" -- and was not included in his rebuttal testimony.

CO-HEARING OFFICER DODUC: Refresh my memory again. What conclusion was it that --

MR. ALADJEM: The conclusion is that the modeling -- the modeled exceedances, the times when the project would not meet the D1641 standards Dr. Nader-Tehrani has said are not, quote/unquote,

"real."

CO-HEARING OFFICER DODUC: Has he done an analysis to determine that those exceedances were in fact not?

MR. ALADJEM: That is correct.

CO-HEARING OFFICER DODUC: Okay. Ms. McGinnis?

MS. McGINNIS: And I would want to respond that Mr. Aladjem is misstating the testimony from Friday. He -- Dr. Nader-Tehrani explained that his results are not -- or his -- sorry -- his rebuttal testimony is not relying on this analysis.

The analysis was done for a specific purpose. So maybe if we need to read from the transcript about what purpose it was done for or maybe explore with Dr. Nader-Tehrani why it was done, it would be more clear about whether this is -- whether his rebuttal testimony relied on this analysis or not.

CO-HEARING OFFICER DODUC: All right. That's fair enough. We need to establish whether that analysis was used in any way by Dr. Nader-Tehrani to make these statements in his rebuttal testimony.

And, Doctor, can you clarify, or do we actually need to take a break so that I might borrow a

copy of the transcript?

WITNESS NADER-TEHRANI: I can say that I did not rely on my statement that the water quality -- D1641 water quality standard exceedances are not real. That particular fact, I did not rely on it in my rebuttal testimony.

However, there was some specific questions that were asked by Ms. Nikkel regarding why I believe they are not real, and truly they are not referenced in my rebuttal testimony. I did talk about those -- I did talk about the issues with that.

And here's an example of the issues that I was relating to as to why I believe they're not real. But I didn't necessarily use this information, for example, in reference to North Delta Water Agency, whether or not they are there are water quality impacts, for example.

MR. ALADJEM: Madam Chair, let me see if I can cut through this.

CO-HEARING OFFICER DODUC: Please.

MR. ALADJEM: Dr. Nader-Tehrani, did you -- strike that.

In reaching your conclusion that the modeled exceedances of water quality standards are not real, is

there any analysis that you did that is not described in your testimony?

WITNESS NADER-TEHRANI: It's not in my rebuttal testimony, no.

MR. ALADJEM: Thank you.

Madam Chair, I think the -- we can now dispense with the line of questioning.

CO-HEARING OFFICER DODUC: Thank you.

MR. ALADJEM: So the only bases for your conclusion, Dr. Nader-Tehrani, that the modeling results are not real are set forth fully in your rebuttal testimony?

WITNESS NADER-TEHRANI: No. I think I did discuss the modeling anomalies back last year in our --

MR. ALADJEM: Okay. Either in your case in chief testimony or in your rebuttal testimony?

WITNESS NADER-TEHRANI: Can you repeat the question, please.

MR. ALADJEM: Yes. Is it your testimony, sir, that all of the analysis that you used to come to the conclusion that the modeling results that exceed water quality standards are not real is contained either in your direct testimony from last fall or your rebuttal testimony that's been submitted as DWR-79?

WITNESS NADER-TEHRANI: I did not share the entire analysis that I -- and I think I made that clear that I did not share the actual analysis to come to the conclusion that those exceedances are mostly not real, either in my direct testimony or --

CO-HEARING OFFICER DODUC: That was not Mr. Aladjem's question.

WITNESS NADER-TEHRANI: And then --

MR. ALADJEM: Madam Chair, I believe that Dr. Nader-Tehrani has just said that he did not share his full analysis in the two pieces of testimony that were submitted to the Board.

CO-HEARING OFFICER DODUC: But my understanding was that, however, his conclusion, with respect to this statement, was not based on that analysis.

WITNESS NADER-TEHRANI: I --

MR. ALADJEM: Is that correct, Dr. Nader-Tehrani?

WITNESS NADER-TEHRANI: Well, I want to make sure I'm clear. Back last year, I showed results that reflected there are going to be -- that there were some model exceedance -- modeling was showing the results that showed exceedances. And I showed examples as to

why the models are reporting those exceedances.

CO-HEARING OFFICER DODUC: And that was in your direct testimony?

WITNESS NADER-TEHRANI: That's -- all was in my direct testimony. That's correct.

CO-HEARING OFFICER DODUC: So the basis for your conclusion that is stated in Lines 17 and 18 have all been provided into the record?

WITNESS NADER-TEHRANI: That's correct.

MR. ALADJEM: So, Dr. Nader-Tehrani, one last question here.

Actually, Mr. Hunt, if could you go back to Brentwood 102, Figure 4.

CO-HEARING OFFICER DODUC: Do you happen to know what page Figure 4 is on?

MR. ALADJEM: Page 30 or 31.

Actually, Mr. Hunt, let's use Figure 5. Dr. Nader-Tehrani, if you might examine this 19 figure, and this is daily -- Figure 5, daily average chloride concentrations at Pumping Plant No. 1 for water years '78 to '79.

WITNESS NADER-TEHRANI: Yes.

MR. ALADJEM: So just so I understand your testimony, your testimony is that the water quality

concentrations that are showing here, chloride concentrations above 250 parts per million, which go from roughly October or November 1977 through February, roughly, 1978; and then for Boundary 1, again, from roughly December or January 1979 through March or April 1979, that those are modeling anomalies and are not real; is that correct?

WITNESS NADER-TEHRANI: Two things I want to add about this.

MR. ALADJEM: Dr. Nader-Tehrani, yes or no? It's a simple question.

WITNESS NADER-TEHRANI: I think this question deserves a further clarification.

CO-HEARING OFFICER DODUC: All right.

WITNESS NADER-TEHRANI: The -- yes, according to this plot, yes, there are exceedances.

Two things I want to say is I guess the more important thing, this is coming from a -- not my analysis; it's Ms. Paulsen which used it -- and I want to repeat, different EC-to-chloride conversions.

So when Mr. Aladjem refers to exceedances, it's based on not DWR's analysis; it's based on somebody else's analysis which is using --

CO-HEARING OFFICER DODUC: Understood.

WITNESS NADER-TEHRANI: So in that context, based on this analysis, yes, those are -- it is my opinion that most of these exceedances are not real.

MR. ALADJEM: So most of these exceedances are not real, Dr. Nader-Tehrani; is that correct?

WITNESS NADER-TEHRANI: That is -- that is my testimony, yes.

MR. ALADJEM: No further questions, Madam Chair.

CO-HEARING OFFICER DODUC: Thank you, Mr. Aladjem.

Let's go ahead and take our 15-minute break. 13 We will return at 11:05.

(Recess taken)

CO-HEARING OFFICER DODUC: All right. If everyone could please take their seat. It is 11:05. We are back in session.

We have cross-examination of this panel by Ms. Des Jardins.

Ms. Des Jardins, you have requested quite a bit of time. As I stated earlier, I recognize that this is a special area of interest for you, so I will start you off with 30 minutes instead of 15, but I will entertain requests for additional time upon showing of

cause, good cause, and also of probative value.

So with that, please outline the points that you intend to cover.

And I'm sorry; your microphone is not on.

MS. DES JARDINS: Sorry. So the questions I have, I have some specific questions for Mr. Leahigh about operations and carry-over storage targets that have not been covered. And that would take about half an hour.

And then I have questions for Mr. Munevar about -- he did introduce some testimony about climate change. And I had questions about the results for long-term shifts in runoff. And that, I estimated, was about 20 minutes.

And then I also had some questions -- Mr. Munevar had testimony about sea level rise, which I estimated were about ten minutes. And then I also have questions about Mr. Munevar's statement about modeling results being available that would be just a few minutes. And then I also have specific questions about the modeling and the water supply index, demand index curve, which I may or may not have time to get to.

And I did bring copies of the questions that I was going to ask, if you would like an offer of proof.

CO-HEARING OFFICER DODUC: Let's go ahead and begin, and we will revisit your offer of proof if you still need additional time after 30 minutes.

CROSS-EXAMINATION BY MS. DES JARDINS

MS. DES JARDINS: Okay. So may we -- I'd like to pull up Exhibit DWR-78, which is Mr. Leahigh's testimony. And Page 7, Line 5.

Mr. Leahigh, you testify about how the State Water Project moderates the releases from Lake Oroville to meet contractor demands. The project balances the needs of the current year with the risk for meeting many requirements for -- and beneficial purposes of storage in subsequent years.

And you testified that you use the formula in DWR-902, the carry-over storage target, to do this balancing?

WITNESS LEAHIGH: Yes. That formula represents an expression of that policy.

MS. DES JARDINS: Okay. Let's pull up DWR-902, Page 8, which has the -- and so it says under "Reservoir Targets," "The Lake Oroville storage target is 1 million acre-feet plus F times 3.045 million acre-feet minus 1 million acre-feet."

So my understanding is the 3.045 million

acre-feet is the storage on September 30th of the previous year?

WITNESS LEAHIGH: That is correct.

MS. DES JARDINS: Okay. And is this for your storage target for the end of December?

WITNESS LEAHIGH: No. This would be -- well, so this equation is to come up with a storage target for September 30th.

MS. DES JARDINS: Okay. Okay. So I'd like to ask you about what this formula set as storage targets during the 2013 calendar year.

So let's pull up DDJ-23.

MS. McGINNIS: Objection, relevance. The time frame of 2013 is not relevant to the scope of Mr. Leahigh's rebuttal testimony.

CO-HEARING OFFICER DODUC: I think his testimony covers all years --

MS. DES JARDINS: Yeah.

CO-HEARING OFFICER DODUC: -- including that year. Overruled for now.

MS. DES JARDINS: Okay. So it's in the storage stick I gave you, DDJ-203.

So this shows end-of-September carry-over storage for 2012, and I got -- it's about 1.98 million

acre-feet. Mr. Leahigh, is that -- this is from CDEC. Is that roughly your recollection?

WITNESS LEAHIGH: I don't recall what the end-of-September storage was in 2012, but this looks to be CDEC data showing that.

MS. DES JARDINS: Yeah. So we'll assume the CDEC data is correct.

Let's pull up Exhibit DDJ-4, just the initial 2013 allocation notice.

So this shows that your initial allocation was 1130 percent. Was that -- do you -- is that your recollection? This is the official notice.

WITNESS LEAHIGH: I'm sorry. Can you scroll to the top just so I can see the date?

MS. DES JARDINS: Yeah, scroll to the top. This is the notice to the State Water Project contractors.

WITNESS LEAHIGH: Yeah. So this is the initial allocation for calendar year 2013 that was made in late November of 2012.

MS. DES JARDINS: Okay. So let's pull up DDJ-207. I calculated the Oroville carry-over storage according to your formula. So I got that, with an initial allocation, your target was about 1.3 million

acre-feet. Does that look reasonable?

WITNESS LEAHIGH: It looks to be correct based on the equation that was used the previous year.

MS. DES JARDINS: Okay. And so -- and then your allocation changed, and I'll go back to the notice; it shows it. But the allocation increased to 40 percent. So assuming that's correct, your storage target then increased to 1.4 million acre-feet.

Does that look correct?

WITNESS LEAHIGH: That looks to be correct if it was -- well, let's see. I'm sorry. Let me look at this a little closer.

MS. DES JARDINS: Yeah. Scroll down a little so we can see, because the allocation first increased in 2013 and then decreased. So I just used your formula.

WITNESS LEAHIGH: Okay. I do see now there's something missing in -- I think in the way you are describing this.

When you're showing the 1.98 million acre-feet 21which was the end-of-September storage in 2012 which you've represented with the CDEC data, the formula actually uses that number and subtracts out a million acre-feet.

MS. DES JARDINS: Correct.

WITNESS LEAHIGH: So that number should be 0.98 rather than 1.98.

MS. DES JARDINS: Oh, okay. So it's actually -- I apologize. It's actually somewhat less than that. So it's minus -- 1.98 minus 1. Okay. So this is off a little. All right. Okay.

So at the same time, let's pull up Exhibit DDJ-204, which has Oroville storage. So I show that, by the end of September in 2013, you had -- it looks like around 1.6 million acre-feet, roughly.

So you had a little more storage than you had projected in 2013?

WITNESS LEAHIGH: That's what this looks like, correct.

MS. DES JARDINS: Okay. But you didn't have enough storage when you had a severe drought in 2014; isn't that correct? You didn't have enough storage to meet all of the -- your minimum health and safety and all the system needs?

WITNESS LEAHIGH: Well, quite frankly, there wasn't enough water supply in the entire system to meet those requirements in 2014.

It's kind of a misconception that most of the

water supply comes from reservoir storage. The vast majority of the water supply actually comes from accumulated snowpack in any given year plus the precipitation that occurs in that year. The actual storage in the reservoirs is a very small portion of the water supply in any given year to meet needs in those year -- in that year.

MS. DES JARDINS: Okay. I'd like to -- do you know about the previous history of your formula, that there was a consultation with the operations office and then it was changed in 2005?

MR. BERLINER: Objection, relevance.

CO-HEARING OFFICER DODUC: Ms. Des Jardins?

MS. DES JARDINS: I believe it is relevant if this formula has changed, particularly since there was -- it appears to have also been changed in the CalSim modeling. And I think it's relevant if it changed from a more conservative to a less conservative operations of -- you know, there's the question.

CO-HEARING OFFICER DODUC: Okay. All right.

Overruled, Mr. Berliner.

MS. DES JARDINS: Okay. So I'd like to pull up Exhibit DDJ-206.

WITNESS LEAHIGH: There was a question

pending, I think, I'd like to respond to.

MS. DES JARDINS: Okay.

WITNESS LEAHIGH: Yes, there was a change, I believe, somewhere in that time frame. And as I testified a couple days ago, there have been subsequent changes to the precise formula. The, you know, general policy as expressed by that formula has been consistent for some time.

MS. DES JARDINS: I would like to go to Exhibit DDJ-206, please.

And let me ask you. So this was a 2005 presentation by Ryan Wilbur to the California Water Environmental Modeling Forum, and I wanted to go to Page 2.

So it says the operations and control office requested an analysis of the water supply guidelines used to develop SWP allocations. Do you see that?

WITNESS LEAHIGH: Yes.

MS. DES JARDINS: Okay. And do you recall this?

WITNESS LEAHIGH: I -- I do recall taking another look at the water supply guidelines somewhere in this time frame, yes.

MS. DES JARDINS: Okay. So I wanted to ask --

let's go to Page 7. And this shows that there was -- the pre-2005 rule was just -- you used 50 percent of the previous September, minus 1 million acre-feet.

Do you recall having that rule previously?

WITNESS LEAHIGH: Yes. I recall we had a different -- we had a different rule curve at that time.

MS. DES JARDINS: So let's go to Page 11. And it says the pre-2005 operating guidelines are very conservative and provide room for improvements in delivery capability with little risk of lower reservoir storages.

Do you recall that conclusion, the analysis provides the basis for the 2005 State Water Project water supply guidelines update used for determining allocations?

WITNESS LEAHIGH: I don't recall these precise conclusions, no.

MS. DES JARDINS: Can we go to Page 9?

So I believe B was -- which is in red, was your -- was the pre-2005, and C, which is in green, was the post 2005. So this sort of assumed that, given the CalSim modeling, that you could get better delivery reliability by the new rule? Do you recall looking at

analyses like these?

WITNESS LEAHIGH: I recall looking at analyses such as these, yes.

MS. DES JARDINS: Okay. And then page -- next page, Page 10. This appears to show that between B, which is in red, and C in green there's some impact to carry-over reliability, but you thought it wasn't too bad?

WITNESS LEAHIGH: Well, so, yeah. And I think what I testified before, all of this gets to the balancing of current year's supply versus carry-over storage and protecting against drier years. And so that's always going to be a trade-off. The more aggressively you operate the reservoir, you will improve the overall average annual deliveries, but the trade-off there is, you know, it would be less dry-year reliability for that State Water Project supply.

So this was really looking at that trade-off in terms of the State Water Project allocations from year to year.

MS. DES JARDINS: But you used the CalSim results about Oroville carry-over to determine what your -- what your actual rule was, or to help -- help evaluate your actual rule?

WITNESS LEAHIGH: Well, so we were looking at the effects of these three different alternatives, and so one of the aspects we were looking at was Oroville carry-over reliability. And one of the other aspects we would have been looking at is average annual delivery capability. That's the trade-off. That's some of the trade-off that I've been talking about.

MS. DES JARDINS: Okay. Thank you. Now I'd like to go back and look at -- ask 10Mr. Munevar some about the questions about climate 11 change.

So I'd like to pull up Exhibit DDJ-185, which is Mr. Munevar's testimony with highlights. Exhibit DWR-86 Errata.

And I'd like to go to Page 34, Line 12. And you say -- you discuss analyses performed using the Q1 to Q5 climate projections, and you say this analysis showed that incremental changes were consistent, and that it's documented in Appendix -- SWRCB-4, Appendix 5A, Section D3.3.

Is that correct, Mr. Munevar?

WITNESS MUNEVAR: Yes, correct.

MS. DES JARDINS: Okay. So I'd like to go first to -- let's go to Exhibit SWRCB-4,

Appendix 5A, D. I'd like to look at this. I'd like to go to Page 72, Figure 2.3.

This -- just to remind everybody, so, Mr. Munevar, these are the projected change in annual runoff. And could you explain what -- Q5 is the central tendencies scenario; is that not correct?

WITNESS MUNEVAR: Yeah, that's correct. So there were five climate scenarios that were derived, and I testified on this previously.

Q5 represented the central tendency from amongst about 112 individual projections. Q1, Q2, Q3, and Q4 represented the bounds -- the drier, higher amounts of warming which was -- and then wetter and with lesser amounts of warming to bound those scenarios.

MS. DES JARDINS: So Q1 is drier, less warming; and Q2 is drier, more warming?

WITNESS MUNEVAR: I don't have the figure in front of me, but I believe it's in this appendix as well that shows those individual climate projections.

MS. DES JARDINS: Yeah. And so this graph shows, under the drier scenarios, you can get a 10 to 20 percent reduction in inflow in the northern Sierra reservoirs by early long-term?

WITNESS MUNEVAR: That's correct, not just in the northern Sierras but also in the southern Sierras.

MS. DES JARDINS: Yeah. And it's worse in the southern Sierras. The southern Sierras, it's over 20 to 30 percent.

MS. McGINNIS: Move to strike. That's not a question.

MS. DES JARDINS: In the southern Sierras, is it over 20 to 30 percent? Is it in the range of 20 to 30 percent?

WITNESS MUNEVAR: It could be for the driest of the scenarios.

MS. DES JARDINS: Okay. So let's go to Page 83, Section D.3.3. And this is the operations sensitivity to climate change analysis you did. So let's go to Page 88 to 89. Page 88.

Let's see. So I think it's document Page 88. So we need to go back to -- it might be Page 87. Scroll back up. It might be, yeah, Page 85 to 86. Let's scroll back up another page or two.

We have a summary at the beginning. Up one more. Apologize.

So, Mr. Munevar, this says you found Shasta storage and operations are very sensitive to climate

change; is that correct?

WITNESS MUNEVAR: Yes, that's correct.

MS. DES JARDINS: Line 22. And there's substantial reductions in Sacramento River and San Joaquin River inflow to the Delta.

So I would like to go to the graph on Page 86 for Shasta. Yeah.

So this shows that the end-of-September storage is considerably worse for the drier, warmer scenarios; is that correct?

WITNESS MUNEVAR: Yeah. So this was showing the -- this was showing the end-of-September -- simulated end-of-September storage across each of the five climate scenarios; whereas the Q5, which was the central tendencies, is what was used in all of the detailed analysis.

MS. DES JARDINS: So -- but this isn't a comparison with the no action alternative? It's the comparison with existing biological conditions?

WITNESS MUNEVAR: Yes. And off the top of my head, I'm -- cannot recall what the difference was between the EBC and the no action. They were -- this was meant to represent just the sensitivity of the climate change at the time.

MS. DES JARDINS: Okay. So it's difficult to tell from these graphs what the incremental effect of the proposed project is. I would like to --

WITNESS MUNEVAR: Just to be clear, this does not show the proposed project. This merely shows the incremental effect of the various climate conditions on top of an existing biological condition.

MS. DES JARDINS: Isn't this -- oh, right. Okay. Yes, I see. All right. So, yes. All right. So this shows incrementally.

And let's go to Page 87 for Oroville. So this shows Oroville is also somewhat worse 13 for end-of-September storage?

WITNESS MUNEVAR: Yeah, I wouldn't -- to me, it's not worse or better. It's showing a sensitivity to climate change.

MS. DES JARDINS: So it's lower.

WITNESS MUNEVAR: It's -- yeah. Most of the effect here, the response in reservoir storage in response to climate change is largely due to the shift in timing in runoff. We're receiving more runoff during the kind of winter, early spring; less in the late spring and summer. And that ability for the reservoir to respond and adapt to that shifting kind of

seasonal structure of climate change is what drives most of the storage impacts, not all, but most of the storage impacts.

MS. DES JARDINS: So I'd like to ask you why you didn't consider -- given that it's shown that the Oroville storage has shifted, why you didn't consider changing it back to, for example, the original pre-2005 rule which was more conservative?

WITNESS LEAHIGH: Who is that question for?

MS. DES JARDINS: Mr. Munevar.

WITNESS MUNEVAR: I'm not sure what you mean by shift back.

We represent to our best ability the operation of the projects as of today's philosophy under these conditions of roughly -- this is early long-term, so this is roughly 2030 climate change conditions.

MS. DES JARDINS: Mr. Leahigh, may I ask you, don't you try to -- isn't the underlying philosophy to try to have reasonable carry-over storage targets, not a specific formula?

WITNESS LEAHIGH: Yeah. As I've testified, it's to achieve a reasonable balance between average annual deliveries and that carry-over storage.

And just to respond to your last question, so

you pointed out a -- I've been talking about how the expression of the guidelines has changed several times. You pointed out a point in time when that change was from -- less conservative than what it had been prior, 2005. And I think what I testified to just a couple days ago was that, in the most recent changes in that equation or rule curve, we've gone more conservative.

So, you know, it's gone both ways as we continuously get new information. As the conditions in the basin change, you know, we respond. And so the most recent expression of that formula, we've actually raised the floor of that equation, and that is the definitely more conservative approach.

MS. DES JARDINS: Okay. Thank you.

I'd like to pull up Exhibit DDJ-199, please. And, Mr. Munevar, this is for you. This is a statement about BDCP modeling, and I'd like to go to Page 20.

And you're saying, "We recommend DWR develop a reoperation strategy for the CVP and SWP that includes modified operation scenarios to mitigate the effects of dead storage during climate change conditions prior to release of any studies (either these or BDCP) that include climate change."

So I have -- we have here a recommendation by Francis Chung, who's one of DWR's senior modelers.

And I wanted to ask you, Mr. Munevar, were you familiar with this concern about this early modeling? And if so, what was your opinion?

WITNESS MUNEVAR: So this is not my statement.

MS. DES JARDINS: No.

WITNESS MUNEVAR: There's been long-time discussions of how do we respond to climate change? How does the system operate? How do we change upstream operating criteria that might involve the Corps or others? How do we deal with these extreme dry conditions?

The purpose of our modeling for the WaterFix was not to assess a climate adaptation strategy for the State Water Project and the Central Valley Project but to demonstrate that the effects of the WaterFix as compared to a no action, under the same sets of assumptions, would not exacerbate the conditions of climate change.

MS. DES JARDINS: Okay. Mr. -- I'd like to go to Mr. Nader-Tehrani's testimony, Exhibit DWR-79.

CO-HEARING OFFICER DODUC: And as that's being pulled up, Ms. Des Jardins, I assume you would like to

request more time?

MS. DES JARDINS: Yes, I would.

CO-HEARING OFFICER DODUC: And so now that you've moved on to Dr. Nader-Tehrani, does that mean you're done with Mr. Leahigh and Mr. Munevar?

MS. DES JARDINS: I had -- I was going to go to Mr. Nader-Tehrani for a minute, but I do have some more questions for Mr. Munevar and possibly Mr. Leahigh. I haven't -- I'm getting close to the end of my shifts in runoff, and then I have sea level rise, and I have some questions about modeling results that were provided.

CO-HEARING OFFICER DODUC: All right. I'll give you until the noon hour when we take our lunch break to complete your cross-examination.

MS. DES JARDINS: Thank you, Ms. Doduc. So it's Exhibit DWR-79, and I'd like to go to 18 the graph on Page 14 of this testimony.

So can we zoom out just a little to show this? So previous -- this is your graph of the 21 frequency of exceedance of Sacramento River flow at Freeport, and you show the no action alternative and alternative operating scenarios.

WITNESS NADER-TEHRANI: That's correct.

MS. DES JARDINS: But you don't show existing biological conditions or --

WITNESS NADER-TEHRANI: I have not shown that here; that's correct.

MS. DES JARDINS: And we -- in essence, I mean, if -- my question is wouldn't assumptions about reservoir operations change -- potentially change this exceedance graph and the frequency of, for example, lower flows?

WITNESS NADER-TEHRANI: All the scenarios that are shown here are reflective of early long-term climate change assumptions and the six inches of sea level rise, 15 centimeters.

MS. DES JARDINS: But there's --

WITNESS NADER-TEHRANI: And in that sense, this was purely done in response to our determination of the effect of, you know, Sacramento River flow at -- you know, creation of reverse flow events in Sacramento River.

MS. DES JARDINS: But aren't these results very sensitive to -- fairly sensitive to your operating assumptions in those modeling?

WITNESS NADER-TEHRANI: As it's clearly illustrated, when you look at this set of probability

of distribution -- and each of those scenarios have their own assumptions. But when you put it all together, looking at it as a whole, they are not very different when looked at using the entire 16 years.

MS. DES JARDINS: Okay. So I'd like to go to SWRCB-4, Appendix 5.A D, and I'd like to go to Page 181 about the modeling assumptions.

And Mr. Munevar, this is for you.

So in the modeling assumptions, you assume an 10 extra 443,000 acre-feet a year increased North of Delta 11 demand?

WITNESS MUNEVAR: Correct. That was part of, I think, the CEQA/NEPA process of defining existing levels and a future -- a future level without the project and a future no action, and those were the changes that were projected.

MS. DES JARDINS: So this is modeled as -- is this modeled as a hard demand?

WITNESS MUNEVAR: Without recalling specifically, there were a number of demand increases. Some of them were -- as indicated here, were M and I service contracts, and some were water rights. So the service contracts would be subject to the CVP allocation process.

MS. DES JARDINS: But not water rights?

WITNESS MUNEVAR: Yeah, I don't recall the particular of these water rights, but I would envision that they were -- did not have a reduction clause associated with them.

MS. DES JARDINS: And on the next thing, it says that you modeled -- you attuned that as State Water Projects demands would be between 3- and 4.1 million acre-feet per year?

WITNESS MUNEVAR: I think that's what's -- it's stating as existing level. So it's very difficult to describe an existing level as what is existing. So I think the range was provided as this was a recent historical set of demands.

MS. DES JARDINS: But modeling assumptions, your minimum demand for the modeling was 3 million acre-feet?

WITNESS MUNEVAR: Well, for the no action, which is presented as part of my testimony, it's all -- they are all set at the maximum contract amounts, the Table A amounts for the no action.

This range of 3 million to 4.1- I believe is talking about the existing level of development.

MS. DES JARDINS: So I'd like to go to

Exhibit PCFFA-22, please, Page 147. This was about documentation of the hierarchy, CalSim demands, and was introduced on cross-examination in Part 1A, PCFFA.

And I'd like to go to Page 147. So it's a little bit hard to read, this Point 12 on Page 147. First priority in CalSim II is prior water right users and in-stream flow and water quality requirements.

Is this your recollection, Mr. Munevar?

WITNESS MUNEVAR: That's my recollection. This is a report, though, that I -- I don't believe I was part of preparing.

MS. DES JARDINS: Yeah. But in Part 1A, they testified that these are still the priorities for CalSim II, that second priority is Table A contracts and CVP contracts, and then reservoir storage in the modeling is the third priority; is that correct?

MR. BERLINER: Objection, outside the scope of his testimony.

MS. DES JARDINS: No, no. This is just how the modeling prioritizes CalSim water use.

CO-HEARING OFFICER DODUC: Overruled.

WITNESS MUNEVAR: This is consistent with my understanding and how the modeling works.

MS. DES JARDINS: So we have increased North

of Delta demands in maximum Table A demands. So the modeling -- effectively the carry-over storage targets are only met as a third priority.

How does this affect the modeling results?

MR. BERLINER: Objection, outside the scope of his testimony.

CO-HEARING OFFICER DODUC: Ms. Des Jardins?

MS. DES JARDINS: I think if he's a modeler and he's saying that his judgment is that the modeling is representative of the system operations, I'm just wondering if carry-over storage is met last, third, next to last? What is the effect on the model results -- that that's a reasonable modeling question, I would believe.

CO-HEARING OFFICER DODUC: Mr. Bezerra.

MR. BEZERRA: Yes. If I could support Ms. Des Jardins on this one.

Mr. Munevar's rebuttal testimony is largely about how he critiques MBK's modeling as not projecting appropriate levels of carry-over storage. So if these prioritizations regarding how CalSim prioritizes different aspects of the system relate to carry-over storage conclusions, they are well within the scope of his rebuttal testimony.

CO-HEARING OFFICER DODUC: All right. Overruled.

Mr. Munevar?

WITNESS MUNEVAR: I'd be glad to answer that. This table that's shown here is meant as the priority within CalSim in which water is allocated. CalSim works on a process of the set of weights that define kind of the priority for releases within each of its monthly time steps. The allocation, water rights, in-stream flows, and water quality requirements are generally met at priority.

The Table A contracts for SWP and the CVP ag 13 and M and I service are -- go through a process that 14 looks at both the existing storage, the available supply that's forecasted for the remainder of the year, as well as specific carry-over targets that were mentioned by Mr. Leahigh for Oroville.

Once that allocation is set and, for example, 19 if it were a 30 percent allocation, then water would be 20 released in order to meet that 30 percent allocation. That's what was intended by the use of the -- of the reservoir storage for the next year.

So we will meet the allocation once it's promised, but that allocation is dependant upon setting

carry-over targets for the subsequent year using the rules that Mr. Leahigh mentioned.

MS. DES JARDINS: Okay.

WITNESS MUNEVAR: The other -- the last point here, since it was brought up, if you assign a very aggressive set of allocations for both SWP and CVP, you will see impacts on carry-over storage if they are not set associated with the policy and -- conservative policy of the SWP and CVP. That's why we have criticized and have taken great care in trying to implement the CVP and SWP allocation policies as best as we can to emulate operational decisions.

MS. DES JARDINS: Oh. Mr. Munevar, I'd like to pull up Exhibit DDJ-192, please. And I'd like to ask you a little bit about specifically how CalSim calculates the water supply index for the State Water Project.

So you -- to calculate the water supply index, this says that this is a copy of the State Water Project delivery logic module. And it says the forecast of the runoff is some of beginning-of-month storages for Oroville, San Luis, and the forecast of runoff for the Feather River. Is that generally correct?

WITNESS MUNEVAR: That's correct.

MS. DES JARDINS: Okay. So then you take -- you then take this water supply index and convert it to a demand index; is that correct? I think you testified about this.

WITNESS MUNEVAR: Let me restate it just slightly differently.

So the water supply index is meant to be what do the operation -- what would the operators -- what type of information would they have at the time of setting their allocations? So they would know what storage is in the reservoir, what are the forecasts of inflow; not actual, what are the forecasts of inflow. And then we try to relate that.

So the sum of that storage plus that forecast of inflow is called the "water supply index."

And then we attempt to relate that to the available manageable supply, which is essentially how much could be delivered or how much could be carried over for the following year. And that's what the -- I believe your question was related to the demand index, and that's what the demand index is.

MS. DES JARDINS: Okay. So you at -- let's pull up DDJ-194. And I'm going to skip a step here in

the interest of time.

But you essentially take your water supply index and then you convert it to a demand index using this lookup table, don't you?

WITNESS MUNEVAR: That's correct.

MS. DES JARDINS: Okay. And my question is this takes -- you know, the water supply, when the total water supply gets below 2 million acre-feet, it looks like your demand index just stays at 1.8 million acre-feet even though -- isn't that correct?

WITNESS MUNEVAR: Again, the demand index is -- could be either delivery or carry-over storage.

MS. DES JARDINS: But there's -- let's pull up DDJ-195. This is a graph which is a little easier to look at. So the graph, from there.

So you can see when it gets down to 2,000, it looks like there's -- you know, you're telling the system that there's more water than is actually in your runoff forecast? Seems odd.

WITNESS MUNEVAR: No, no. That's incorrect. So that would be a misapplication, misunderstanding of what this is.

So water supply index is not all of the

available supply. It is only what -- what -- for -- in this case for the State Water Project, there's only Oroville storage plus forecasted runoff on the Feather River.

MS. DES JARDINS: Plus San Luis.

WITNESS MUNEVAR: Oroville, San Luis, plus Feather River runoff.

MS. DES JARDINS: Yeah.

WITNESS MUNEVAR: There is much more supply in the system than those three elements. And, as Mr. Leahigh testified, that in large part what the State Water Project delivers as its allocation is water that occurs in -- outside of the Feather River or downstream of Oroville.

And so what this is -- these are not equivalent. A water supply index of one value does not equal necessarily an available supply, total available supply of a demand index of the same value.

MS. DES JARDINS: Oh, thank you. I think that's about as far as I'm going to get with this line. Then I wanted to go back to Exhibit DDJ-185, 22 which is your testimony highlighted; and Page 34, Line 28. So it says detailed modeling results were made available to the public for all the modeling

conducted for the DEIRs, revised DEIRs, its Final EIR, and the biological assessment; is that correct?

WITNESS MUNEVAR: That's correct. It's my understanding that all the CalSim II modeling results have been provided.

MS. DES JARDINS: Well, I'm just wondering. I tried to get a copy of the modeling for the Q1, Q2, Q3, and Q4 scenarios, and I didn't -- all that we got was Q5.

MS. McGINNIS: Is that a question for Mr. Munevar?

MS. DES JARDINS: Yes.

MS. McGINNIS: What's the question?

MS. DES JARDINS: Are you -- you know, how -- Mr. Munevar, how do you know that the Q1 to Q4 modeling was -- was distributed to the public?

WITNESS MUNEVAR: It was my understanding that it was released.

MS. DES JARDINS: Somebody told you that it was released?

WITNESS MUNEVAR: It was my understanding. I didn't --

MS. DES JARDINS: Oh. I'd also like to ask you about the modeling for the 85086 analysis. I'd

like to pull up SWRCB-4, Appendix 3A. And I'd like to go to Page 3A-67.

MR. HUNT: What is the attachment for Appendix 3A?

MS. DES JARDINS: Just Appendix 3A, I believe. Yeah, Page -- let's do Page 67 of this document. Yeah.

Is that 3A-67? Line 48, "Results of model runs" -- and let's go to the next page -- "indicated reductions in SWP, and SWP and CVP water supplies in end-of-September reservoir storage in Trinity Lake, Shasta Lake, Oroville Reservoir, and Folsom Lake in more years with the 2010 flow recommendations than under baseline conditions."

I'm wondering how you -- so you're stating that these model runs were distributed to the public?

WITNESS MUNEVAR: Can you scroll up so I can see where you're referring to?

MS. DES JARDINS: Yeah. So it's the end of there and then --

WITNESS MUNEVAR: Could you scroll all the way to the heading so I can see where the heading is?

MS. DES JARDINS: Yeah, okay. So this is the analysis with respect to 85086, and this was an initial set of model runs presented to the Board.

WITNESS MUNEVAR: So what was the question?

MS. DES JARDINS: The question was you asserted that this was distributed to the public?

WITNESS MUNEVAR: You had asked about the climate change scenarios, Q2 through Q4.

MS. DES JARDINS: This is about a different set of model runs.

WITNESS MUNEVAR: Yes. And this is in the EIR/EIS?

MS. DES JARDINS: Yes.

WITNESS MUNEVAR: My understanding, all of the alternatives that were considered in the EIR/EIS have been distributed publicly.

MS. DES JARDINS: And I guess I would just say, and if my experience had been that we haven't been able to get a copy of that, what would be your response?

MR. BERLINER: Objection, beyond the scope of his testimony.

CO-HEARING OFFICER DODUC: I would suggest, Mr. Berliner, Ms. McGinnis, that you help Ms. Des Jardins outside of this hearing locate these modeling runs if they were indeed released to the public.

MS. McGINNIS: We'd be happy to do so.

CO-HEARING OFFICER DODUC: Thank you.

MS. DES JARDINS: Finally, I did have some questions on sea level rise.

WITNESS MUNEVAR: Just one comment here. All of this discussion of alternative scenarios were not part of my rebuttal testimony. We're only comparing the H3, H-plus, and the Boundary 1 and 2. So --

CO-HEARING OFFICER DODUC: I understand, Mr. Munevar. But to the extent that the modeling results Ms. Des Jardins is talking about has been publicly released or is subject to Public Release Request Act, Ms. McGinnis will make sure she gets them.

WITNESS MUNEVAR: Yes.

MS. DES JARDINS: We did subpoena those model runs.

CO-HEARING OFFICER DODUC: She will make sure you get them.

MS. DES JARDINS: Thank you.

CO-HEARING OFFICER DODUC: Please wrap up your cross-examination, please.

MS. DES JARDINS: I do have some questions on sea level rise, and if you wish, I can give you an offer of proof about what those are.

CO-HEARING OFFICER DODUC: Proceed, but do try to wrap it up within the next five to ten minutes, please.

MS. DES JARDINS: It's fairly quick.

So can we do Exhibit DDJ-185? And let's -- need to go down to sea level rise. I think it's Page 34. It's on the previous one.

Scroll back, please.

Well, let me ask you. So you stated that in addition to considering the 15- and 45-centimeter sea level rise projections, you said that sea level rise values were simulated using UnTRIM.

Do you recall that?

WITNESS MUNEVAR: I do, but if you could refer me to the specific lines, it would be helpful.

MS. DES JARDINS: I apologize because I thought I had that correct page in my notes.

WITNESS MUNEVAR: I think I can help you. It's on Page 33, Line 13 and 14.

MS. DES JARDINS: There it is. Yes. Okay. Yeah. So it said you considered higher -- besides the 15 centimeters, which is 6 inches; 45 centimeters, which is 18 inches, you considered several other sea rise values using UnTRIM; is that correct?

WITNESS MUNEVAR: That's correct. So for the -- what was termed the early long-term as part of the WaterFix was roughly the 2025-2030 time rise. And then the 15 centimeters or six inches was used as the best estimate of sea level rise at that time frame.

Out at the late long-term, 45 centimeters was used, and those were all simulated in both CalSim and DSM-2.

Then to look at broader ranges of sea level rise beyond those that would likely be in the next 50 years, we did consider -- I believe they were 60, 90, and 140 centimeters that were simulated with the UnTRIM model to capture the -- to capture the hydrodynamics and salt intrusion effects of the more extreme sea level rise. And those were done as a sensitivity analysis largely to look at whether the development of the North Delta intakes, whether they would be at risk under those more extreme sea level rise scenarios.

MS. DES JARDINS: I'd like to go to Appendix 5A -- SWRCB-4, Appendix 5A, Section D, Attachment 3. And there's questions I'd like to ask. Attachment 3, yeah. Thank you. And I'd like to go to Page 208.

Actually, can you scroll -- it's pdf Page 208, sorry.

So this shows the kind of salinity intrusion you saw at Rio Vista. And it shows that you're getting -- I think the yellow and red are the 1.4 meters of sea level rise, and you start to get very significant spikes in the middle graph in late fall; is that correct?

WITNESS MUNEVAR: Yeah, I don't know whether these are significant. The intent of doing this analysis was to just incrementally adjust sea level rise and determine what are the salinity effects at various locations along the Sacramento River in particular.

These were all done for the baseline scenario, and the only changes were adjusting sea level rise with the exception of the last scenario, which is called the 140-centimeter with amplitude change, and that had a 5 percent increase in the tidal amplitude.

MS. DES JARDINS: Can you bring up Exhibit DDJ-187, please?

There was a question in the Final EIR/EIS that I wanted to go to. And let's go to Line -- Page -- pdf Page 16, Line 34. Yeah.

It's highlighted.

So this says the location of the North Delta

diversion facility is further inland, making it less vulnerable to salinity intrusion.

And then on Line 40, you say Alternatives 1A to 2C, 3, 4 and 5 would allow the Delta to be managed in a number of different ways including maintaining salinity as it is currently managed or allowing salinity to fluctuate more freely in the Delta as it did prior to the development of upstream reservoirs. So, Mr. Munevar, are you familiar with this statement?

WITNESS MUNEVAR: I'm familiar with the statement. I don't believe I wrote these words, but --

MS. DES JARDINS: So at some point, if salinity intrusion got too high, you might consider not using -- not doing salinity control in the Delta?

MS. McGINNIS: Objection, calls for speculation. This is well beyond the scope of Mr. Munevar's testimony.

CO-HEARING OFFICER DODUC: That might be a question for Mr. Leahigh, as an operator.

MS. DES JARDINS: Yeah, actually, let me ask Mr. Leahigh.

Because, Mr. Leahigh, this is specifically with respect to the high sea level rise, and you have

said that the new tunnels would allow more flexibility.

So have you looked at these -- do you consider this kind of operating scenario?

WITNESS MUNEVAR: Can I respond to the first part of it first? Because I think the first highlighted section here relates to the exact findings that we determined from the UnTRIM modeling, which was that, if we had extreme sea level and we had salinity intrusion, the North Delta diversion facility is less vulnerable to salinity intrusion because of its -- both its inland location and its location on the Sacramento River, which has a large freshwater input that tends to combat some of the salinity intrusion.

The remainder of the alternatives, I'm not sure if John can -- can address those.

MS. DES JARDINS: I would like to ask you about this policy because -- about Lines 40 to 42 about allowing salinity to fluctuate more freely in the Delta.

MS. McGINNIS: Objection. This is not a policy. This is -- I think this is an EIR/EIS.

MS. DES JARDINS: This states that this could be a potential use. So Mr. Leahigh, I would like to ask -- a potential management. Mr. Leahigh, I believe,

is representing --

CO-HEARING OFFICER DODUC: I'm about to overrule Ms. McGinnis.

Do you have something to add, Mr. Bezerra?

MR. BEZERRA: In light of that, no.

CO-HEARING OFFICER DODUC: Thank you.

Overruled, Ms. McGinnis.

Please answer to the extent that you are able to, Mr. Leahigh.

WITNESS LEAHIGH: Well, I'm sorry. I'm not familiar with this language, and I really need a very clear, specific question.

MS. DES JARDINS: Have you considered -- Mr. Leahigh, let me break it down.

Have you considered the higher sea level rise, the higher salinity intrusion scenarios for operations of the State Water Project?

WITNESS LEAHIGH: Well, what I can tell you is yeah, we have to respond to whatever change in conditions are. And so with an increase in sea level, quite frankly, what that would do is, first of all, make it more expensive in terms of State Water Project water supply to meet existing criteria.

So, you know, there's been analyses done

showing that results in decrease in State Water Project yield as a result of that.

MS. DES JARDINS: So you have considered that this facility could be -- could be used in a way where you -- where you allowed salinity to fluctuate naturally in the Delta without releasing water to meet the current salinity requirements?

WITNESS LEAHIGH: I think it becomes very speculative as far as to the extent -- what changes would be made, depending on the magnitude of sea level rise. But as I said, just incrementally, the effects would be a reduction in State Water Project supplies in order to maintain -- if we were still responsible for maintaining the existing criteria, it would be -- come directly out of State Water Project supplies.

MS. DES JARDINS: And so you haven't -- that was my third question is you have not looked at what scenarios in terms of drier conditions, extended drought, salinity intrusion, that you would seek to change these requirements, or have you?

WITNESS LEAHIGH: No. Again, that's speculative. I think the modeling results show that there is a decrease in project delivery capabilities with these climate change effects.

CO-HEARING OFFICER DODUC: And we are now very close to the 70-plus minutes that you originally requested, Ms. Des Jardins. So I will ask you to ask your final questions and wrap up.

MS. DES JARDINS: Oh. I would like to pull up Exhibit DDJ-190, which is -- and I'd like to go to Page 14. This is a modeling of -- with 1.4 meters of sea level rise.

Never mind. It's not -- scroll down a little 10 bit, please. So this is the -- so there it is.

So this was early modeling for the project in 2010, and it shows the base scenario, the preferred project, and then the blue dotted line is the preferred project plus sea level rise. And it shows that you're having spikes in sea level rise to over 2.5 EC; 2,500.

MR. BERLINER: Object. This is for late long-term. This is not the project that's before the Board.

MS. DES JARDINS: Mr. Berliner, the permit you are seeking does not --

CO-HEARING OFFICER DODUC: Ms. Des Jardins, provide your response to me.

MS. DES JARDINS: Ms. Doduc, the permit that is being sought does not have an end date, and I

believe we're looking at a permit that was granted in 1960 and is still in effect 50 years later. Actually, CVP was '60; SWP was '68. And this change petition will be in effect for --

CO-HEARING OFFICER DODUC: But this analysis, this graph that you have presented, was this something that petitioners prepared?

MS. DES JARDINS: Yes.

CO-HEARING OFFICER DODUC: And your point is that they should be applying it to the project?

MS. DES JARDINS: This is 1.4 centimeters of sea level -- 1.4 meters of sea level rise, and this is planned operations. And I'm concerned that --

CO-HEARING OFFICER DODUC: So, okay. Mr. Berliner, I'm going to overrule you and let her ask her question so that we can finish this.

And whomever that can answer, please answer.

MS. DES JARDINS: Yeah, so I'm concerned that this shows --

CO-HEARING OFFICER DODUC: Your question, please, not your concern.

MS. DES JARDINS: I wanted to ask, so this shows very significant spikes in salinity with 1.4 meters of sea level rise.

So did you look at that?

WITNESS MUNEVAR: Yes. As I mentioned, so there is a base condition here. There is a late long-term, and then there are a number of island failure scenarios that are implemented here.

The purpose of RMA conducting this was to look at extreme levels of sea level rise. So the 140-centimeter was projected to be an estimate at 2100; so 2,100, not within the time frame that we are analyzing right now. But with these extreme sea level rise and some island failures, there were changes to salinity within the interior Delta.

MS. DES JARDINS: It says export adjustments are significant. What kind of export adjustments were those?

WITNESS MUNEVAR: I believe what this is referring to was when EC reached a certain value, you would be no longer able to divert or wouldn't want to divert that water from the South Delta facilities. So you would have to shut down the pumps for that period.

MS. DES JARDINS: In the South Delta. But you would still be able to pump from the North Delta facilities?

WITNESS MUNEVAR: Potentially.

MS. DES JARDINS: Mr. Leahigh, did you review any of this kind of operating scenario which is more as an isolated conveyance?

WITNESS LEAHIGH: No, I haven't looked at this analysis.

MS. DES JARDINS: Okay. Thank you. That concludes my questions.

CO-HEARING OFFICER DODUC: And with that, we will take our lunch break.

When we resume, Ms. Suard, do you still have cross-examination? Hold on.

MS. SUARD: Yes.

CO-HEARING OFFICER DODUC: And will Mr. Keeling again be assisting you?

MS. SUARD: I hope so, but I'm not sure. If needed.

CO-HEARING OFFICER DODUC: All right. So we will return at 1:15.

(Whereupon, the luncheon recess was taken at 12:18 p.m.)

AFTERNOON SESSION

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(Whereupon, all parties having been duly noted for the record, the proceedings resumed at 1:15 p.m.)

CO-HEARING OFFICER DODUC: All right. It is 1:15, and we are back in session.

Forgot to acknowledge that we -- this morning, that we are being assisted, well, then by Mr. Baker and Mr. Hunt. We now are being assisted by Ms. McCue and Mr. Hunt.

We will now turn to Ms. Suard, who once again is being assisted by Mr. Keeling for her cross-examination. And I don't see Ms. Womack. Okay. Well, she was the final cross-examiner for this panel, so we'll see if she still needs to conduct that cross-examination.

But in the meantime, I will turn to Ms. Suard, who had initially estimated 30 minutes for her cross-examination.

MS. SUARD: I -- Nicky Suard with Snug Harbor. I hope that it will be no more than that. It depends on if there's any objections or anything like that.

I'm mostly focusing on questions regarding

Dr. Nader-Tehrani regarding DWR-50, which was rebuttal testimony. Some particular pages, Page 58 and 41 and 40, actually; and then also DWR-8, Pages 26, 27, 28 and 39. And I do have some of my own graphics that I provided that may be helpful in my questioning.

So if we could start with --

CO-HEARING OFFICER DODUC: I'm sorry. All your questions will be for Dr. Nader-Tehrani?

MS. SUARD: Unless a different person -- I have questions regarding salinity impacts and DSM-2; that's it.

CO-HEARING OFFICER DODUC: Please proceed.

CROSS-EXAMINATION BY MS. SUARD

MS. SUARD: So DWR-50, Page 28.

MR. OCHENDUSZKO: Ms. Suard, did you want DWR-50 or DWR-50 Errata?

WITNESS NADER-TEHRANI: It would have to be 50.

MS. SUARD: I believe it's 50.

WITNESS NADER-TEHRANI: The errata just contained three figures that were corrected.

MR. OCHENDUSZKO: Thank you.

MS. SUARD: So it would be Page 58 of DWR-50.

So, Dr. Nader-Tehrani, the first line there,

the -- this hearing is about our water rights, and specifically I'm asking about water rights of -- on Steamboat Slough, Snug Harbor, particular. And we are waterfront not behind the levy. I think you've probably heard that before.

And the -- you have a statement here, "North Delta water quality upstream of Rio Vista including areas around Ryer Island should continue to remain fresh under WaterFix."

That's your opinion; is that right?

WITNESS NADER-TEHRANI: That's correct.

MS. SUARD: The word "should," could you explain that, please? What does that mean in this context?

WITNESS NADER-TEHRANI: I was relying on the observed data for 2014-2015. But I was also -- these were extreme dry periods. And I've looked at CDEC; I've looked at the exhibit, actually, that North Delta Water Alleges provided that clearly showed what the EC values were in that region. And I also have looked at model results that compared water quality results under various operational scenarios to the no action.

And based on all that analysis, that's the basis that I came up with for that.

MS. SUARD: So can I ask why you didn't use the word "will" continue to remain fresh?

WITNESS NADER-TEHRANI: Because there could be catastrophic events that could happen in the future that are not simply modeled; as examples would be levee failures, stuff like that.

MS. SUARD: So absent a catastrophic event, you would say that the water on Steamboat Slough will continue to remain fresh under WaterFix?

WITNESS NADER-TEHRANI: And I should add, you know, severe climate --

MS. SUARD: Wait. I asked a question. Sorry.

Would it be fair to say, in your opinion, that water on Steamboat Slough will continue to remain fresh under WaterFix absent a catastrophic event?

WITNESS NADER-TEHRANI: And my answer would be no, with an explanation that you should also add extreme drought conditions other than what has been experienced, more severe than that was experienced in 2014-'15. And under those kind of situations, whether or not you have California WaterFix, my opinion is that it would -- you know, it may affect the water quality in that area.

MS. SUARD: It may affect the water quality in

the area? Is that what you just said?

WITNESS NADER-TEHRANI: I said in case you have more severe droughts than those that were experienced in the 2014-'15, even in absence of California WaterFix, there may be water quality beyond what the -- you know, above what those that were experienced in the 2014-2015.

MS. SUARD: Okay. I'm going to bring some graphics up, but I -- your -- on Page 41 of this same document, if we could go to that.

The two bottom points, you said that water quality in and around Ryer Island -- this is actually responding to somebody else's evidence. But you said the water quality in and around Ryer Island has been fresh even during recent droughts; is that correct?

WITNESS NADER-TEHRANI: That's correct.

MS. SUARD: And is that something that you analyzed? Did you look at any data for that opinion?

WITNESS NADER-TEHRANI: I would refer to North Delta Water Agency Exhibit 18, for example.

MS. SUARD: That would be great. Can we look at that, please?

WITNESS NADER-TEHRANI: So this is the North Delta Water Agency exhibit that shows the water quality

observed, water quality at Steamboat Slough, at Sutter Slough, which is, you know, location in the -- near the location you're referring to.

And just forget the contract standard. Let's just focused on observed data.

You see that EC values -- and this is the year 2014, an extreme drought period. And you see that the EC results hover around 200. And by my expertise, that would be considered fresh.

There's a similar example we can look at for 2015 if you like, but it does show similar observation.

MS. SUARD: Could we look at the 2015 one as well?

WITNESS NADER-TEHRANI: Sure. Look at North Delta Water Agency Exhibit 25.

So once again, this is observed data at Steamboat Slough. This is, once again, a North Delta Water Agency exhibit. It does show observed data hovering around 200 EC.

MS. SUARD: Is that at the North Delta Water Agency compliance point there on Steamboat Slough?

WITNESS NADER-TEHRANI: Correct.

MS. SUARD: Could we -- in looking at that, is it your opinion that -- well, let's see -- your opinion

that EC of around 180 to 200 would be the same all the way down Steamboat Slough, or would it change getting closer to Rio Vista?

WITNESS NADER-TEHRANI: I did not make any comment about that.

MS. SUARD: I'm asking if --

WITNESS NADER-TEHRANI: I would consider EC values below 300 as fresh. So as you can see, it did fluctuate between 150 and 250 due to various factors, including changes in Sacramento River flow, tidal conditions. So there could be changes. And typically, as you move upstream, things get fresher. Water quality gets fresher.

MS. SUARD: You said anything below 300, you would consider fresh? Is that what you just said?

WITNESS NADER-TEHRANI: In general, that -- yeah. Again, I'm not an ag expert, so I'm not making any opinion as to what's -- you know. But in my opinion, yes.

MS. SUARD: Okay. Can we go to DWR-901? I believe that's the correct one. That was introduced by DWR in all of this. Okay. There we go. That's it.

Could we go down to that Steamboat Slough EC? Well, we're going to -- wait a minute. Let's look at

the Rio Vista one. Sorry. Move up, and then we'll go to Steamboat Slough one. They weren't really in order.

So did you prepare this slide?

WITNESS NADER-TEHRANI: My staff did at my direction.

MS. SUARD: Okay. So it shows in September -- this is like an average over time; is that correct?

WITNESS NADER-TEHRANI: That's correct.

MS. SUARD: And I'm going to focus on September mostly because a lot of the people focused on that one too. And look at the EC. It's at 700 at Rio Vista, is that correct, for Boundary 1?

WITNESS NADER-TEHRANI: That's what I see, yes.

MS. SUARD: Okay. Can we slide down to find the Steamboat Slough one? There we go. Steamboat -- there we go.

So your modeling -- it appears to me that your modeling says that, on Steamboat Slough, doesn't matter, the no action alternative, Boundary 1, Boundary 2, everywhere, it's around 180; is that correct?

WITNESS NADER-TEHRANI: That's the monthly average EC results at this location, yes.

MS. SUARD: Okay. Are you aware that -- well,

I think I'd like to go on to another graphic at this point in time.

Could we pull up SHR-363, which is a compilation map that I created to try and make it easier to -- for comparative evidence. And I think I jumped ahead. I'd like to also pull up -- maybe we can do comparative -- SHR-350. I should have done that first so you can see where I got it.

So does this look familiar to you, sir?

WITNESS NADER-TEHRANI: I have not prepared this, so that's not -- I'm -- that's not my testimony.

MS. SUARD: Okay. This was handed to me by Mr. Mizell. Well, it was e-mailed to me and then a copy handed -- after I had requested the bottom line, how much flow will be left on Steamboat Slough. And Ms. Doduc had instructed DWR to respond to that.

WITNESS NADER-TEHRANI: Okay. Yes.

MS. SUARD: So this appears to me to be a graphic from -- is that from DSM-2, or does it appear to be CalSim? It doesn't say.

WITNESS NADE R-TEHRANI: I believe it's DSM-2, mm-hmm.

MS. SUARD: You believe it's DSM-2?

WITNESS NADE R-TEHRANI: Yes.

MS. SUARD: Okay. Because there's nothing on the graphic that was provided to me.

WITNESS NADER-TEHRANI: No.

MS. SUARD: This is a dry-year average.

WITNESS NADER-TEHRANI: CalSim does not deal with flows at Steamboat Slough.

MS. SUARD: Okay. So this must be DSM-2?

WITNESS NADER-TEHRANI: Correct.

MS. SUARD: Okay. So it shows Sacramento River -- let's see. We don't want to do that one.

Let's go down to the Steamboat -- yeah, let's go down a little bit to the Steamboat Slough upstream of Sutter confluence. So that really isn't exactly where the monitoring station for the salinity compliance is, but it's close. And I will show that to you on a map.

Do you -- I wanted you to see what the flows are. The purpose of this chart was to tell me and anybody else who wants to look at it what are going to be the minimum flows on Steamboat Slough. And you can see that the no action alternative, it looks approximately -- we have maybe 700 cfs of flow on average in September.

Does that look right to you? The Boundary 2?

Whereas the no action alternative has it more like 900? Can you see that?

I'm rounding it because I wasn't given the actual numbers. I was only given the chart.

WITNESS NADER-TEHRANI: Right. Let me make sure it is clear that what you're looking at is net flow which is very different from actual flow. And I can explain those differences if you like.

MS. SUARD: That would be great.

WITNESS NADER-TEHRANI: But those are the numbers that I see.

MS. SUARD: What's the difference between net flow and actual flow?

WITNESS NADER-TEHRANI: The observed flows are affected by the tide. So in a day-to-day, there could be large fluctuations in flow which are significantly higher than what you see here. And they can -- and that's just natural tide would do it.

But what these picture represents is just average over the month of September. So it would take out the high, take out the low, simply take the average of monthly flows at that location. So it doesn't necessarily mean at any given instance of time the flow is going to be 700 or a thousand.

MS. SUARD: Okay. But average net flow?

WITNESS NADER-TEHRANI: That's the average net flow, yes.

MS. SUARD: Okay. Thank you.

So now can we pull up SHR-363, please.

And this is a graphic that I compiled. The map comes from CDEC -- or "CDEC" as people say, and it shows the locations where there are compliance monitoring stations. And I circled them in red and actually made the labels larger in -- on the ones I'm talking about right now because I know that it's hard for some people back there to see, and I wanted to make it easy for everybody to see what I'm talking about.

And I use SHR-350 and DWR-901 to demonstrate -- I picked September, again. And September is that net 700 cubic feet of flow that we talked about. And the expectation -- see where it says "SSS"? That's a flow-monitoring station higher up on Steamboat Slough, and that's where the flow is monitored.

WITNESS NADER-TEHRANI: Okay.

MS. SUARD: Okay? And then the EC that you talk about with North Delta Water Agency compliance point, you see that "SUS"? Do you see that?

WITNESS NADER-TEHRANI: Yeah, I see that,

mm-hmm.

MS. SUARD: That's where it says "180."

The next monitoring station, do you see where it says the letters S and then X and S?

WITNESS NADER-TEHRANI: I see that, yes, mm-hmm.

MS. SUARD: So Snug Harbor is north of that about a mile?

WITNESS NADER-TEHRANI: Okay.

MS. SUARD: Okay. So I just want it for reference.

The next compliance below that is SOI. That's actually on the Sacramento River below Vieira's, but not all the way to Rio Vista. And then a compliance point that's always talked about is the Rio Vista one, and you see that circled in -- in your documents. There's the SRV. There's also -- it's also referred to as SRB in some of the monitoring.

So I just wanted to do this comparison that -- based on documents by DWR in September, I'm looking at that, you know, higher level. You see it's at 700 when the flow is, in Rio Vista, 700. It's 180 at that upper end of Steamboat Slough or Steamboat-Sutter confluence.

And did you analyze what the impact is at the

SXS and SOI, by any chance?

MR. BERLINER: Objection, beyond the scope of the rebuttal testimony.

CO-HEARING OFFICER DODUC: And overruled.

Mr. Nader-Tehrani can answer that he did not or if he did.

WITNESS NADER-TEHRANI: I have looked at specific model results. I cannot say specific to those locations. But I would say in the vicinity, and I did not see any evidence of salinity changes. And so I still think the model results reflect, you know, that -- the absence of salty water coming in.

MS. SUARD: Could we look at DWR-650, please.

CO-HEARING OFFICER DODUC: Ms. Morris?

MS. MORRIS: I wanted to clarify that that last exhibit that was up was just for demonstrative and is not being offered for evidence. If so, I object because it has a question on the top that's completely outside the scope. It's talking about drinking water.

CO-HEARING OFFICER DODUC: Ms. Suard?

MS. SUARD: Yes, it's demonstrative evidence.

CO-HEARING OFFICER DODUC: Thank you. Actually, it was quite helpful.

MS. SUARD: Thank you.

So we are at DWR-650. DWR did actually include -- this is -- let's go down the list, please.

September 2015, and I just -- can we take, for example, September 14th? Do you see what the EC level is there? And I realize you were doing averages.

WITNESS NADER-TEHRANI: I do see that, mm-hmm.

MS. SUARD: Okay. So -- and that says 1141?

WITNESS NADER-TEHRANI: Yeah, and I see that seems to be the highest number in that column. Yes.

MS. SUARD: If you look at September 26 -- well, 28, 29 also, you see those are over a thousand also?

WITNESS NADER-TEHRANI: Right.

MS. SUARD: So just roughly, if you averaged September 2015, the EC average would be 772. So that is higher than, basically, your averages graphics --

CO-HEARING OFFICER DODUC: Hold on. Hang on. Are you making an objection? There doesn't seem to be a question yet.

MS. MORRIS: I'm objecting because the question assumes facts not in evidence and Ms. Suard's testifying. This is a bunch of things. If she wants to ask him to calculate it, she can, but he can't verify without doing that. So it assumes facts not in

evidence.

CO-HEARING OFFICER DODUC: I believe this is a DWR exhibit that she just pulled up.

MS. SUARD: Yes, it is.

MS. MORRIS: But there's no average. She just testified as to the average.

MR. KEELING: We are happy to take the time to have Mr. Nader-Tehrani summarize -- average up, which will come to about 23,171 divided by 30. We can go through that exercise.

CO-HEARING OFFICER DODUC: No, let's not.

Objection overruled.

Ms. Suard, ask your question, please.

MS. SUARD: Mr. Nader-Tehrani, do you recognize that maybe EC at Rio Vista might be higher than what you modeled on -- in a -- just comparing a month to your own models?

WITNESS NADER-TEHRANI: Well, the plot that we were looking at earlier representing model results represented long-term monthly averages. What you're looking at is the EC results for an extreme dry period. So those are very different things, in my mind.

MS. SUARD: Okay. We need to go back to SHR-350, because that was what was handed to me for the

flow. And at the top of it, it says a dry year; I was also provided with a critical year.

So I just want to emphasize the flow numbers there. The upstream -- I want you to look at the net 700 flow.

Okay. I'm going to go on. Can we go to SHR-367, please? This is another compiled document, and I'm offering it for demonstrative purposes only. I wish you to note that the data is screen prints from CDEC again, and the links are actually provided.

For example, you'll see Steamboat Slough between Sutter Slough or below Sutter Slough. That's the compliance point that SUS -- no. Yeah, there it is, SUS. And the -- we look at September -- and I'm pointing out that -- sorry.

Do you -- Mr. Nader-Tehrani, can you look at September 1 through 13, roughly? Do you recognize what that EC is?

MS. McGINNIS: Objection, scope. This topic seems to be an attempt to understand CDEC data or the graphics that have been presented instead of trying to understand Dr. Nader-Tehrani's testimony.

MS. SUARD: Dr. Nader-Tehrani said that, I quote, "North Delta water quality upstream of Rio Vista

including areas around Ryer Island should continue to remain fresh under WaterFix."

CO-HEARING OFFICER DODUC: And what is it that you are attempting to question him on with respect to this particular document?

MS. SUARD: I -- okay. I will move on to -- I wanted to point out the -- what it was in September 2015.

CO-HEARING OFFICER DODUC: But what is your question?

MS. SUARD: My question was did you see the numbers? What is the EC?

WITNESS NADER-TEHRANI: I can't quite read the numbers. Perhaps you can read them for me.

MS. SUARD: Sorry. It goes as high as 220 EC. And this is probably where your averages come in. I can -- it went as high as 220 between the 1st down to the 13th, and then we went below the 180 thereafter.

WITNESS NADER-TEHRANI: Yes, I see that.

MS. SUARD: Okay. And do you possibly -- do you recognize that there are times when averages don't tell the whole story, on-the-water story?

WITNESS NADER-TEHRANI: That in general is true, but based on the numbers I see here, I would

still consider this as freshwater.

MS. SUARD: Okay. Thank you.

SHR-369, please.

So I believe that somebody in this hearing said -- I think might have been the Hearing Chair -- use of longer time frames sometimes masks the exceedances when it relates to specific locations or specific time frames.

So this is another compiled graphic, and it shows CDEC summary -- well, actually, the actual dates and the points that were recorded for that monitoring station below Snug Harbor, which is labeled S and then X and then S.

And do you see the high point of salinity in September of 2015?

WITNESS NADER-TEHRANI: Yes, I see that.

MS. SUARD: Can you read what that is?

WITNESS NADER-TEHRANI: No. It's 600-something.

MS. SUARD: It's 610.

WITNESS NADER-TEHRANI: Yes, I see that.

MS. SUARD: Do you believe -- I believe earlier you said that you believe anything under 300 is still freshwater; is that correct?

WITNESS NADER-TEHRANI: Yes, in general.

MS. SUARD: Okay. So would you consider 610 still freshwater?

WITNESS NADER-TEHRANI: My earlier comments was kind of a general statement and didn't necessarily mean at each and every day that's -- that's the observation going to be. This is a clear example of an extreme dry period, and this sort of thing will happen with or without WaterFix.

MS. SUARD: Okay. So over -- over to the right. Okay.

You said, "This will happen with or without WaterFix." Okay. Over to the right of the screen is another screen print, and you can see the -- is that the right link? It's the CDC link -- or the information is on this graphic. And I did -- I added to it the number "700" and the red dots to show --

No, go slower. You've got to go down lower. It's the graphic from -- that shows flow. And actually, in September of 2015, our net flow was over 700. If our -- if -- if EC near Snug Harbor at approximately 1,000 net flows per cfs results in over 610 EC, what would you expect WaterFix would do that sustains -- appears to sustain Steamboat Slough at 700

cubic feet per second for June, July, August, September, October?

WITNESS NADER-TEHRANI: The salinity --

MR. BERLINER: Objection. The question is vague and ambiguous.

CO-HEARING OFFICER DODUC: I would agree, Ms. Suard. I was having trouble following the question, too. What do you mean by WaterFix maintaining the 700?

MR. KEELING: As I understand it, Madam Chair, the purpose of this demonstrative exhibit and the testimony that Ms. Suard is attempting to elicit is to demonstrate that the relationship between flow and -- certain flow levels and certain EC levels in the modeling does not necessarily reflect that relationship historically. Here we have higher flows and higher ECs.

And I think the point is to assist the Hearing Officers in understanding the magnitude and nature of this discrepancy. And Ms. Suard can supplement --

CO-HEARING OFFICER DODUC: But wouldn't that discrepancy exist in both the no action as well as the with WaterFix and therefore going to look at things from a comparative purpose?

MR. KEELING: If the comparison -- I think what you're saying is that the only comparison that's relevant are the comparisons between the hypothetical unreal no action alternative and the hypothetical unreal WaterFix alternative, yes.

But I think Ms. Suard's getting down to the real world and real life and the real relationships historically between flows and EC at this location.

Perhaps you can add to that.

MS. SUARD: So can we go back to SHR-362 again, please?

CO-HEARING OFFICER DODUC: I'm sorry. Are you moving on, or are you trying to explain to me?

MS. SUARD: Explain to you.

CO-HEARING OFFICER DODUC: Thank you.

MS. SUARD: I'm trying to explain to you.

MR. HUNT: Can you repeat the exhibit, please?

MS. SUARD: 362.

CO-HEARING OFFICER DODUC: And how much do you have remaining?

MS. SUARD: I am almost done with the EC issue, and I have just a little bit on DSM-2, hydrology.

CO-HEARING OFFICER DODUC: So about another

ten minutes?

MS. SUARD: Yeah.

CO-HEARING OFFICER DODUC: All right. Let's give her ten minutes, and let me see if I can understand this.

MS. SUARD: Okay. So to explain that graphic SHR-369, my purpose is we've had lots of testimony of averages over a long amount of time, and my consistent testimony all along has been that what happens in real life on the water is different than what happens in computers and --

MR. BERLINER: Objection. This is testimony not a question.

MS. SUARD: Okay. Sorry.

CO-HEARING OFFICER DODUC: Hold on. She's trying to explain to me. Overruled for now.

MS. SUARD: So the -- the purpose of that particular -- the 369 is to see if Dr. Nader-Tehrani had actually looked at 2015, which he said he did. And to see if he'd actually looked at 2015 at my location, because I'm a legal user of water and this is a WaterFix hearing which could affect me.

CO-HEARING OFFICER DODUC: So let's -- let me -- let me see if I understand.

Dr. Nader-Tehrani as well as other petitioners' witnesses have, I think, consistently maintained -- in fact, Mr. Aladjem actually spent some time on this with Dr. Nader-Tehrani, exploring how model results do not necessarily reflect real results. I mean, I don't know if you were here for Mr. Aladjem's testimony and -- I'm sorry; Mr. Aladjem's cross-examination.

And Dr. Nader-Tehrani, as Mr. Aladjem pointed out, has testified in his written rebuttal testimony that operational -- realtime operational aspects would present a different outcome than what is reflected in the modeling.

So I think we all understand that, and I think Mr. Nader-Tehrani would accept that modeling results do not reflect actual historical water quality, and to not be used for that comparative purpose.

I'm paraphrasing you.

So I'm trying to seek the additional probative value that you are bringing to the record with this line of questioning.

MS. SUARD: Combined With SHR-362, which reflects my understanding, again, this was a document that was prepared by DWR in response to my request for

what are the minimum flows, net flows I can expect for Steamboat Slough and you had graciously instructed them to provide this information.

So I am looking at --

CO-HEARING OFFICER DODUC: But if your point, Ms. Suard, is that the modeling output do not reflect the historical data; then I think Mr. Nader -- Dr. Nader-Tehrani would agree.

WITNESS NADER-TEHRANI: Yes.

MS. SUARD: Okay. So I'll ask that. Do you feel like the modeling data reflects the historical data based on this information I just provided in SHR-369?

WITNESS NADER-TEHRANI: And the answer is no.

CO-HEARING OFFICER DODUC: No, the modeling data do not reflect the historical data?

WITNESS NADER-TEHRANI: That is not how models are designed for.

MS. SUARD: Okay. I am going to skip 370 because that's a different river. And I'm going to switch to the other topic, which is DSM-2.

And I assume that's going to be Dr. Nader-Tehrani again; is that right?

WITNESS NADER-TEHRANI: Yes, mm-hmm.

MS. SUARD: So I'm trying to go fast through.

Let's see. Could you pull up SHR-359, please.

I do have questions about calibration, the last calibration of DSM-2, and specifically as it applies to Steamboat Slough. So my questions are going to be about recalibration of DSM-2, Steamboat Slough.

This graphic that I -- you can see where it came from. And the little dots show water rights diversions along lower Steamboat Slough and upper Steamboat Slough, is what I'll call it. And it's from the water rights map from Water Board.

So I just wanted you to be aware of the location of Steamboat Slough and that that's the only purpose of that.

Can we go to the next page, please, of the same.

So, Dr. Nader-Tehrani, is the channel depths important -- an important factor in determining model accuracy in DSM-2?

WITNESS NADER-TEHRANI: It depends on which parameter you're requesting -- I mean, you're expecting.

MS. SUARD: Is it important for -- to determine flow accuracy if you have the correct depths

of the waterways, elevations?

WITNESS NADER-TEHRANI: In general, yes.

MS. SUARD: Okay. And I have a -- I'm showing a grid of DSM-2; is that correct, up there? Do you see that?

WITNESS NADER-TEHRANI: That looks familiar, yes.

MS. SUARD: Does DSM-2 also use average water depths rather than actual?

WITNESS NADER-TEHRANI: That question does not make sense. So, I mean, to be technical, so the water quality -- water flow and water levels are calculated at each and every one of those circles that you see.

MS. SUARD: Okay. And I should say I'm going to explain this graphic. It is screen shot that there is a DSM-2 user group, and there's a portal, and that -- and that's available online.

And to your understanding, the last time DSM-2 was updated for its bathymetry cross-sections, it was February 2016; is that correct? That's what it says.

WITNESS NADER-TEHRANI: I don't recall the specifics, if that's what it says. But that's not the version of DSM-2 that was used for this modeling.

MS. SUARD: What version of DSM-2 was used?

WITNESS NADER-TEHRANI: I believe it's the 2009, but I -- I need to refer to the EIR to be specific.

MS. SUARD: Okay. So let's -- can we go to the next page?

You're correct; it is 2009. And there were changes to DSM-2, I believe.

And could you explain how the cross-sections for DSM-2 are determined and why they are important, please?

MR. BERLINER: Objection, beyond the scope.

CO-HEARING OFFICER DODUC: I'm going to overrule because I want to see where she goes with this. I assume you do have a point you're trying to get to?

MS. SUARD: Yes, I do. I do.

CO-HEARING OFFICER DODUC: All right. Dr. Nader-Tehrani?

WITNESS NADER-TEHRANI: What's important in the model is that the cross-sections near those circles that are nodes that are two ends of each channel that connects those two nodes, those are what goes into the model for its calculations of, you know, of flow and water levels.

So there could be a number of cross-sections in between that may be available to the model, but the model actually calculates only the flow, typically, at the two ends of the channel.

There are -- depending on how long the channel is, there could be other locations within that channel that the flow gets calculated, but the point to consider is there could be some cross-sections in between that may be available, but the model does not necessarily use every cross-section that's in -- and the data provisions available.

MS. SUARD: Who decides which cross-sections to use?

WITNESS NADER-TEHRANI: The model does.

MS. SUARD: The modelers do.

WITNESS NADER-TEHRANI: No, not the modelers; the model.

MS. SUARD: The model itself?

WITNESS NADER-TEHRANI: Yes.

MS. SUARD. In action, I guess. Okay.

WITNESS NADER-TEHRANI: That's what I meant, yes.

MS. SUARD: Who decides where to take -- somebody created bathymetry for those cross-sections;

is that right?

WITNESS NADER-TEHRANI: Somebody did, yes.

MS. SUARD: Did somebody hand it to the modelers?

CO-HEARING OFFICER DODUC: And now, Ms. Suard, I want to know what that -- what the point is and the connection that you're making.

MS. SUARD: Okay. Dr. Nader-Tehrani, if cross-sections are used in DSM-2 that are incorrect, how does that affect flow? Specifically to Steamboat Slough, if the cross-sections -- if the elevations and cross-sections used are incorrect, how does that affect -- would that affect flow?

CO-HEARING OFFICER DODUC: I'm sorry --

MR. BERLINER: Again, I'm going to object. I don't know where we're going with any of this.

CO-HEARING OFFICER DODUC: Hold on. Hold on.

MR. BERLINER: If we could we have an offer of proof?

CO-HEARING OFFICER DODUC: I -- I'm trying to under- -- are you arguing that the cross-section used is incorrect?

MS. SUARD: Can -- yes.

Dr. Nader-Tehrani -- okay. Let's just go to

the next slide.

So I'm going to represent that -- don't take out the -- where I got this, please. Okay.

So the cross-sections used to be available online so that all -- anybody could see what the USGS was scanning or -- and it's been taken down now. But I had saved -- I've done screen prints. So you can still see a lot of the cross-sections at my website because I was following this data.

So, Dr. Nader-Tehrani, can you -- could you look at this graphic? There's one on the left, and then the one on the right, I just enlarged it.

Is this a fair representation of how these cross-sections are created that then get input into DSM-2?

MR. BERLINER: I'm going to object. This is the exact same path that we went down in Part 1A about -- I guess there's some sandbars in this area of the stream, and we went through this whole discussion in Part 1A.

Dr. Nader-Tehrani never discusses this in his rebuttal testimony. This is the kind of thing that should have come up in Part 1A if Ms. Suard wanted to do cross-examination. That was the appropriate time,

and we know she was aware of this issue because she testified about it.

CO-HEARING OFFICER DODUC: So, Ms. Suard, tie this back to his rebuttal testimony, please.

MS. SUARD: Okay.

CO-HEARING OFFICER DODUC: Otherwise, you might have a chance, depending on how things go, to present surrebuttal, if you wish to testify as to what you believe the errors are in his rebuttal testimony.

MS. SUARD: Okay. I'm trying to formulate how to say this.

Dr. Nader-Tehrani, if DSM-2 is based upon incorrect bathymetry due to cross-sections that were not taken that materially affect actual flow, would that impact the residual flow, first of all, in Steamboat Slough and, therefore, the salinity at the bottom end of Steamboat Slough? Is that too complicated?

CO-HEARING OFFICER DODUC: I think it is much broader than his testimony. And much -- it's both much broader and also much more narrow in scope in terms of the specificity to Snug Harbor.

MS. SUARD: Again, he did bring DSM-2 in his testimony.

CO-HEARING OFFICER DODUC: Ms. Meserve?

MS. MESERVE: Yes. Osha Meserve for LAND. I think that this relates to the rebuttal testimony, if I might offer. There is -- he's got a discussion regarding the water levels near the intakes, and Ms. Suard's resort is quite near there on the Steamboat Slough; it's right downstream.

So I believe this goes directly to the accuracy and usefulness of the outputs that Dr. Nader-Tehrani is discussing in his rebuttal testimony.

CO-HEARING OFFICER DODUC: Mr. Berliner?

MR. BERLINER: Well, we were talking about salinity inflow not water levels. So that's an entirely different subject.

And I think the Chair's point is well taken, which is we are not dealing with an individual spot on an individual stream at this point. And the mere fact that Dr. Nader-Tehrani is talking about DSM-2 doesn't open up the entire universe of sources of data for DSM-2. The cross has to be confined to where he testified about DSM-2.

CO-HEARING OFFICER DODUC: I am sustaining that objection, Ms. Suard.

MS. SUARD: I did -- okay. It was DWR-8. Okay. I'll to have take him on surrebuttal.

CO-HEARING OFFICER DODUC: Which we look forward to. All right.

Does that conclude your cross-examination?

MS. SUARD: Yes. Thank you for your patience.

CO-HEARING OFFICER DODUC: Thank you for your patience in trying to explain things to me.

I don't see Ms. Womack, so we're back to Mr. Berliner.

Do you have an estimate as to the time that you will need for redirect? And can you give me just a brief outline of what you intend to cover?

MR. BERLINER: Yes. My guesstimate is 30 to 40 minutes.

I have some questions for Dr. Nader-Tehrani concerning some issues that were raised last week regarding Dr. Bourez's testimony concerning DSM-2 model results and also significant reverse flow events; questions that we covered between Mr. Herrick and Mr. Aladjem today along those same lines, I won't repeat all of that.

We got -- again, what we covered earlier today on exceedances versus what in modeling are using the

nomenclature we've used as "not being real." So the question about realtime operations versus modeling.

I have some questions for Ms. Parker regarding modeling approaches in planning studies, as well as modeling conventions.

Couple questions for Mr. Munevar again regarding CalSim modeling. And then a couple of questions for Mr. Leahigh concerning -- there was a question that was asked by Mr. Cooper concerning a part of Mr. Leahigh's testimony regarding various factors and whether they involve perfect foresight.

And there was a question from Ms. Meserve about DWR Exhibit 10, Slide 19, and the purpose of that graphic. That was the one with the arrows on it on flow.

And then finally, a question for Mr. Leahigh 17 following up on Mr. O'Laughlin's cross-examination where we had, if you'll recall, the chart with lots and lots of columns and numbers, and there were some negative numbers. And Mr. Leahigh's had an opportunity to consider why those numbers were negative and wants to provide an explanation for that.

CO-HEARING OFFICER DODUC: All right. Thank you. That's quite a list, and that will take us to

3:00 o'clock. I assume we will have more than an hour of recross?

MR. BERLINER: Well, if it's helpful, I'm trying to ask as many of these questions in yes or no fashion as possible to try to speed this along.

CO-HEARING OFFICER DODUC: Okay.

MR. BERLINER: I can't guarantee I'll get all "yes" or "noes," but I'm trying.

CO-HEARING OFFICER DODUC: All right. I was trying to do a rough estimate to see if I could dismiss Ms. Nikkel's witnesses for today.

MS. NIKKEL: They'll be here anyway.

CO-HEARING OFFICER DODUC: They're going to be here anyway? All right. Then I won't worry about that.

Mr. Berliner, I would like to take a break for the court reporter somewhere between 2:30 and 2:45-ish, that time frame. So when you get to a natural break, we'll do so. And as a reminder, we will try to wrap up by 4:30 today.

MR. BERLINER: Great. I'll start with Dr. Nader-Tehrani.

REDIRECT EXAMINATION BY MR. BERLINER

MR. BERLINER: Dr. Nader-Tehrani, last week

Mr. Salmon for East Bay MUD asked you about DWR-50, Slide 29.

Do you recall that exhibit? Or would you like to see it up on the board?

CO-HEARING OFFICER DODUC: Actually, I would like to see it up on the board.

MR. BERLINER: Yes. If we could please have DWR-50, Slide 29.

There was testimony that Dr. Bourez modified his DSM-2 results in his analysis. As presented by Dr. Bourez, do you have enough information to fully understand how he modified DSM-2 results using his analysis?

WITNESS NADER-TEHRANI: No.

MR. BERLINER: And since you don't, what additional information would you need to have that would make clear how he modified the DSM-2 results?

WITNESS NADER-TEHRANI: Specifically, what is missing here is what time period did he consider for his bias correction and specifically also what version of -- calibrated version of DSM-2 he used for his analysis.

MR. BERLINER: And why are you concerned about which calibrated version of DSM-2 he used?

WITNESS NADER-TEHRANI: Because the first important part -- I mean, fact about DSM-2 is to make sure it's using the consistent version that the petitioners used because, if he's using a model to do a -- do a bias correction, it has to be the same version of the model, and I don't know that.

MR. BERLINER: And why does the version of the model matter?

WITNESS NADER-TEHRANI: The petitioners used the 2009 version of the model, and that was part -- at that time period, the DSM-2 model was adjusted to reflect the fact -- in addition to a number of things, with the Liberty Island, which is a large body of water in North Delta that got flooded. And that, in my -- I recall it happened during the year 2000. So that was reflected in the model, and it was calibrated based on that factor.

What we do see here is, though, it seems like he's using the information in the 1990s to -- so we know that Dr. Bourez used his analysis in the 1990s results for his bias corrections.

So the issue here is the 1990s, the Liberty Island was not flooded; whereas, the model reflects a calibration that includes that Liberty Island that got

flooded. And the island flooding has been shown that it would dampen the tidal effects. As a result, it would affect the velocities.

And that's why it's important to know that -- if he used in fact the 2009, that would -- that version of the DSM-2, that would be a considerable flaw if he's comparing his result against the 1990s where Liberty Island was not flooded.

MR. BERLINER: Thank you.

Mr. Salmon also raised an issue about your estimate of the probability of significant reverse flow events during 2014-'15, and he indicated that one of his witnesses stated that there were eight such events. And your testimony was that there had been -- you analyzed four such events.

Mr. Salmon also pointed out that East Bay MUD 17 was not operating its Freeport facility during the entire period of the 2014-'15 time frame.

So all of -- the implication of this is that it makes the probability of the significant reverse flow events higher than your estimate of 1.1 percent. Let's just assume that's correct for the moment.

In any case, does that change your opinion that Dr. Bourez is overestimating the frequency of

significant reverse flow events?

WITNESS NADER-TEHRANI: No.

MR. BERLINER: Is that answer based on the testimony that you offered the other day?

WITNESS NADER-TEHRANI: Yes.

MR. BERLINER: Thank you. Earlier today and in response to questions from Mr. Aladjem and previously to Mr. Herrick, you were asked a series of questions about the best use of DSM-2. You've indicated that it was -- that using it for long-term analysis was the best use, correct?

WITNESS NADER-TEHRANI: Yes.

MR. BERLINER: You also said that one should rely upon exceedance plots of short-term DSM-2 outputs, correct?

WITNESS NADER-TEHRANI: Can you repeat the question, please?

MR. BERLINER: Yes. Isn't it true that you also said that one should rely upon exceedance plots of short-term DSM-2 outputs?

WITNESS NADER-TEHRANI: Yes, that's correct.

MR. BERLINER: Can you use DSM-2 to assess modeled exceedances of 1641 under the WaterFix?

WITNESS NADER-TEHRANI: Yes.

MR. BERLINER: If you wanted to use DSM-2 to assess the comparative exceedances of 1641 for the different alternatives, could you do it?

WITNESS NADER-TEHRANI: Yes.

MR. BERLINER: Is it appropriate to use DSM -- sorry.

Is it appropriate to use DSM-2 to assess exceedances for a given 15 minutes or a specific day under the no action alternative or the project scenario?

WITNESS NADER-TEHRANI: No.

MR. BERLINER: Is DSM-2 the appropriate tool to use to investigate potential impacts to legal users of water that are based on specific thresholds such as those under D1641 which are typically described in shorter time frames such as a day or 14-day averages?

WITNESS NADER-TEHRANI: It is appropriate, yes.

MR. BERLINER: I'd like to --

CO-HEARING OFFICER DODUC: I'm sorry. Is it?

WITNESS NADER-TEHRANI: Yes.

MR. BERLINER: All right. I'd like to give you an example to see if we can illustrate how DSM-2 would be used. Let's use the standard in D1641 of 250

milligrams per liter. That's from daily average chloride concentration at the Contra Costa Canal.

Madam Chair, could I just have a minute? I --

CO-HEARING OFFICER DODUC: Shall we take a break? Okay. Let's go ahead and take our 15-minute break now, and we will resume at 2:45. I'm sorry. That's way too much. 2:35.

(Recess taken)

CO-HEARING OFFICER DODUC: All right. It is 2:35. We are back in session. And I will turn to Mr. Berliner to continue his redirect.

MR. BERLINER: Thank you very much. Appreciate the break.

Dr. Nader-Tehrani, I was about to give you an example to see if we can illustrate how DSM-2 would be used. And I was referring you to the 250-milligram-per-liter maximum daily average chloride concentration at the Contra Costa Canal under D1641.

So you've already told us that DSM-2 provides 15-minute outputs. You've also told us that the model can calculate daily average chloride concentrations by doing an EC-to-chloride conversion. Correct so far?

WITNESS NADER-TEHRANI: Yes, that's correct.

MR. BERLINER: Now you've also told us that it

would be wrong to judge the results of this model by comparing a specific day of one scenario against a specific day of another, correct?

WITNESS NADER-TEHRANI: That's correct.

MR. BERLINER: And think you've also told us that the best way to illustrate the ability to meet this daily criteria is by comparing the probability of exceedances between the two alternatives, correct?

WITNESS NADER-TEHRANI: Yes.

MR. BERLINER: So if we could please pull up DWR Exhibit 513 and go to Figure C5.

You've seen this figure before?

WITNESS NADER-TEHRANI: Yes.

MR. BERLINER: Now regarding this figure, these are the DSM-2 modeling results for the various WaterFix alternatives, correct?

WITNESS NADER-TEHRANI: That's correct.

MR. BERLINER: And includes the NAA alternative, correct?

WITNESS NADER-TEHRANI: That's correct.

MR. BERLINER: And this is for the Contra Costa Canal Pumping Plant, correct?

WITNESS NADER-TEHRANI: Yes.

MR. BERLINER: As I understand it, this chart

shows daily averages and the probability of meeting the D1641 standard on a daily basis, correct?

WITNESS NADER-TEHRANI: Yes.

MR. BERLINER: So I know there's some mathematics involved, but as I understand it, each curve represents 5,844 data points, one for each day, each year assuming 16-year period, correct?

WITNESS NADER-TEHRANI: Basically 365 times 16; I assume your math is correct. Sounds right, yes.

MR. BERLINER: All right and we've all discussed how modeling results are not equivalent to realtime operations, correct?

WITNESS NADER-TEHRANI: Yes.

MR. BERLINER: And what I think that means simply is that, while the model might show an exceedance, for reasons that you've explained on Tuesday, we would expect operators to respond in real-time and make adjustments to try to avoid the exceedance, correct?

WITNESS NADER-TEHRANI: Yes.

MR. BERLINER: So Mr. Herrick had asked you a question, and I'm going to try to ask it with a little bit more clarity.

If you want to investigate potential impacts

to legal users of water that are based on specific thresholds described in shorter time frames such as those under D1641, is DSM-2 the appropriate tool to use for that investigation?

WITNESS NADER-TEHRANI: Yes.

MR. BERLINER: So if I'm a legal user of water and I want to check whether the WaterFix will meet the D1641 requirements as compared to the no action alternative, are the probability curves using short-term DSM-2 results that you have created the appropriate way to do that?

WITNESS NADER-TEHRANI: Yes.

CO-HEARING OFFICER DODUC: Hold on, Mr. Berliner.

Mr. Bezerra?

MR. BEZERRA: Just an objection, these are calling for legal opinions. He's asking Mr. Nader-Tehrani how to reach a conclusion regarding effects on legal users of water.

CO-HEARING OFFICER DODUC: My understanding of his question is he was asking Dr. Nader-Tehrani of the use of the modeling, not on the legal determination itself but just that the model could be used.

Is that correct, Mr. Berliner?

MR. BERLINER: That is correct.

CO-HEARING OFFICER DODUC: Overruled, Mr. Bezerra.

MR. BERLINER: Now, there was some discussion about how you know exceedances that are shown in a model are not real. And that use of that word or phrase "not real," frankly, bothers me, Dr. Tehrani. Could you explain what that means to you so we can have some context for that? And then I want to ask you some questions.

WITNESS NADER-TEHRANI: The model DSM-2 in this case, used in conjunction with CalSim II -- you know, CalSim II is basically a monthly flow model, and it's using that model. There is nothing in the model designed in DSM-2 to recognize specific salinity intrusion events as the -- you know, the operators would have access to that information.

So -- and therefore, the model is not designed to respond to those -- to, you know, salinity intrusion events. And it might a different result might indicate that there would be those salinity intrusions whereas the realtime operators would do the proper day-to-day adjustments when they anticipate a particular, you know, salinity event that's coming through.

And therefore, that is one of my opinion as to why you would see -- you know, an example of why you would see an exceedance in the model where, in the real world, you may not see it.

MR. BERLINER: And you got some questions earlier from Mr. Aladjem about your testimony and how you know that operators would, on a real-time basis, which I think is what you're saying, would make adjustments that would result in a different result than what is shown in a model. And you indicated that you did not confer with Dr. -- with Mr. Leahigh in preparing your testimony, correct?

WITNESS NADER-TEHRANI: Yes.

MR. BERLINER: You have 27 years of experience as a modeler at DWR, correct?

WITNESS NADER-TEHRANI: Yes.

MR. BERLINER: In your work, you have occasion to confer the operations staff as to how realtime operations are conducted?

WITNESS NADER-TEHRANI: Yes.

MR. BERLINER: Have you conferred in the past with Mr. Leahigh about how he does realtime operations aside from your testimony?

WITNESS NADER-TEHRANI: Yes.

MR. BERLINER: And have you also observed the difference between modeled exceedances and no action alternatives?

WITNESS NADER-TEHRANI: Yes.

MR. BERLINER: Does that observation tell that you the modeled exceedances which might not show up in the no action alternative in turn means that the operators have addressed the exceedances that might otherwise occur if you look at the model?

WITNESS NADER-TEHRANI: Can you repeat the question, please?

MR. BERLINER: Sure. That probably wasn't the most well stated. Let me just back up.

So you've observed the differences between modeled exceedances and no action alternative, correct?

WITNESS NADER-TEHRANI: Yes.

MR. BERLINER: Does that observation tell you that the modeled exceedances that do not show up in the no action alternative means that the operators have addressed the exceedances that might otherwise be shown in a model? Is that not clear?

WITNESS NADER-TEHRANI: Yeah.

MR. BERLINER: All right. Let me move on. I think we've probably covered enough.

All right. There were some questions from Mr. Aladjem concerning Dr. Paulsen's plots showing chloride exceedances. Do you recall that?

WITNESS NADER-TEHRANI: Yes.

MR. BERLINER: You talked about using a conversion from EC to chloride. Do you recall that?

WITNESS NADER-TEHRANI: Yes.

MR. BERLINER: And when you make -- when using a conversion factor from EC to chloride, do you need to make the same conversion factor in the CalSim model and the DSM-2 model to get an accurate result?

WITNESS NADER-TEHRANI: Specifically with regards to compliance at Contra Costa, yes, it's important that those conversions be the same.

MR. BERLINER: And why is that?

WITNESS NADER-TEHRANI: I think in last year, when I was explaining about CalSim, CalSim is the model that determines the flow -- among other things, the flows that are required, certain water quality constraints that are defined in CalSim.

A number of constraints are describing EC, but the -- specifically the Contra Costa compliance objectives of the 250 and the 150 are both described in terms of chloride concentrations. And so in order to

qualify the amount of water needed, CalSim relies on that conversion.

And for DSM-2 to be able to replicate that, it's important that they use the same conversion that was used in CalSim, otherwise this would not be an appropriate comparison. So -- and, again, this is strictly with respect to compliance at Contra Costa. It is extremely important that the same conversion EC-to-chloride is used both in CalSim and DSM-2. And we have done it.

MR. BERLINER: And did Dr. Paulsen use the same conversion factor between CalSim and DSM-2?

WITNESS NADER-TEHRANI: Based on what I read from the testimony, the answer is no. And, again, this is specifically at Contra Costa Canal.

MR. BERLINER: Thank you. Just before we took the break, I kind of rushed through a little bit at the end of your testimony regarding Dr. Bourez overestimating -- Dr. Bourez's overestimation of the frequency of the significant reverse flow events.

Why do you conclude that he overestimated the frequency of these significant reverse flow events?

WITNESS NADER-TEHRANI: I would ask the East Bay MUD Exhibit 152, if you can turn to Page 31,

Exhibit East Bay MUD 152, Page 31. That's Figure 4.

So I want to explain. This is Dr. Bourez's exhibit, Figure 4. This analysis, Dr. Bourez, my understanding is that he used actual observed data, velocity data, at Freeport for the years 1987 to 2016. So that's a 29-year window. And this is not model. This is purely observed data.

And my understanding is he used this information to compute how often the -- those reverse flows, significant reverse flows would occur. And so the -- the numbers on the vertical bar -- you know, the vertical axis, described the frequency.

So for example, January, it shows seven. So that means in that 29-year window there are seven incidences of SRFEs were occurring. So seven incidences of SRFEs would occur in the month of January. Doesn't say which year. It just says seven incidences in January.

So if you add up all those incidences, you would add up to about 39 incidences in 29 years. So just doing a simple math, that would be 39 divided by 29, and you would get a number that's less than 1.4 events per year, SRFE events per year.

Also note there is no incidences in the entire

29 years. This is actual observed data for the July, August, September, and October.

Now let's turn to Page 35, Figure 8. So this is a similar plot. Now he's using the DSM-2 with the applied bias correction to determine the frequency of the SRFEs under no action and other California WaterFix operational scenarios.

So the first thing you would notice that the frequencies are much higher than what those observed data is. And while, on one hand, I would agree that it would be inappropriate to use the model results versus observed data, but it's the -- the large difference in the frequency that that is a question.

So if you -- now turn to Page 46. So now focusing on 1977, month of October -- so that's Month 10. And let's just focus on no action; I'm not even looking at California WaterFix.

So according to Dr. Bourez' analysis using the bias corrected DSM-2, he is reporting here that 35 events would occur in the month of October alone. That means there were at least four days that two SRFEs would occur on the same day.

And then, if you go back one page to Page 20, Table 3. So let's just focus on the 16 years. So the

16 years, that's the DSM-2, there are 596 events. You do the math, 596 SRFE events based on no action results versus -- so you do the math, divide by 16. You get 37. So that's the SRFE event frequency probability based on DSM-2.

So couple of things that are very different. Obviously the period is very different. And but in terms of the mix you have several dry periods in his -- in the 29-year window that he included, including the '87 to '92, 2007 to 2009 and 2014-115. So there are plenty of dry periods included in the 29-year.

So while it's correct that the periods are not the same, while it is correct that climate change assumptions are different, while it is correct that there is six inches of sea level rise associated with the no action where it's not included, all those things together would not explain to me that large variation in his expected SRFEs -- which is 37 per year based on no action -- versus the 1.4 that you actually base it on observed data.

Again, I make it clear: It's typically -- it's not appropriate to compare historical with simulated, but I'm just illustrating the large discrepancy that is between those two numbers.

MR. BERLINER: Thank you. I have some questions for Ms. Parker.

Ms. Parker, could you please explain whether, in the context of planning study, the petitioner's modeling approach was appropriate?

WITNESS PARKER: Yes, it was.

MR. BERLINER: Why is that?

WITNESS PARKER: The petitioner's modeling approach being the comparison of a proposed action to a no action alternative and keeping model logic consistent between the two scenarios, other than the implementation of the WaterFix and logic associated with that, and the petitioner's presentation of model results as comparing a distribution of storage and delivery conditions, either with exceedance plots or water-year-type-based averages, is consistent with the normal practice that petitioners typically work with.

MR. BERLINER: And you're putting that in the context of your experience as an experienced modeler with the Bureau of Reclamation?

WITNESS PARKER: Yes, that is in the context of normal use of CalSim as a long-term planning model depicting water supply reliability for the projects.

MR. BERLINER: Regarding the modeling that

showed reductions in storage, you were asked a number of questions about those modeling results. What is the significance of any individual modeling result showing dead pool conditions?

WITNESS PARKER: So any modeling results showing dead pool conditions is indicative of what we've discussed as stressed conditions experienced by the system.

Typically in drought conditions, the ability of modelers to depict realtime decisions that are made by regulatory and policy-level entities are not possible to represent in the long-term planning model because the droughts that occurred during the period of record -- we view each drought as being unique in either its -- in the timing of flow or the timing of precipitation and runoff and the type of precipitation in many cases due to the localization of hydrology in California with different conditions being possible in the San Joaquin Basin relative to the Sac Basin and even localized within the Sac Basin or the San Joaquin. Each drought is unique. And it's not possible for a modeler to generalize and use a consistent set of logic to depict specific decisions that would be made to get through each of those droughts.

MR. BERLINER: And is it correct that, once the model reaches a point where water service contractors have been severely curtailed or allocated zero that the model still has to meet senior water rights and regulatory criteria?

WITNESS PARKER: That is correct.

MR. BERLINER: And are the conditions where water service contractors would be severely curtailed or allocated zero likely to be reached sooner rather than later under the climate change and sea level rise conditions --

CO-HEARING OFFICER DODUC: Hold on, Ms. Parker.

Mr. Bezerra?

MR. BEZERRA: Objection, vague and ambiguous. Mr. Berliner's using the term "water service contractors," which is a particular kind of contractor. I'm not entirely sure what that means in this context, particularly, for instance, in relation to Folsom Reservoir where, if you reach dead pool, you also have settlement contractors that can't get water.

CO-HEARING OFFICER DODUC: Mr. Berliner, can you be more specific?

MR. BERLINER: Sure.

For purposes of these questions, Ms. Parker, the CVP has what I'll call junior contractors and senior contractors. Could you characterize who the junior contractors are?

WITNESS PARKER: Would be the CVP ag service contractors and the M and I service contractors.

MR. BERLINER: And is the use of the term "service contractor" a term that has definition within the CVP?

WITNESS PARKER: That's my understanding.

MR. BERLINER: So are your answers in the context as to how the term is typically used under CVP operations and allocations?

WITNESS PARKER: That was characterizing my previous response, yes.

MR. BERLINER: And would an example, for instance, of a water service contractor be an agency such as the Westlands Water District?

WITNESS PARKER: Yes.

MR. BERLINER: And would an M and I water service contractor be an agency such as the City of Tracy?

WITNESS PARKER: Yes.

MR. BERLINER: And when you answered my

questions, were you answering it with that in mind?

WITNESS PARKER: Yes, I was.

MR. BERLINER: When you are in these stressed conditions which, as I understand it and for purposes of these questions, are conditions that we would typically consider to be extended drought and the model has difficulty depicting the decisions that operators may have to make at that time, does CalSim meet the needs the remaining need of the system such as senior contractors and regulatory criteria by draining the reservoirs to dead pool?

CO-HEARING OFFICER DODUC: Mr. Bezerra is about to voice something.

MR. BEZERRA: Yes, again, an objection. We're talking about senior contractors and settlement contractors being satisfied by releases from reservoirs. There are, at least at Folsom, two settlement contractors that divert their water directly from the reservoir.

So I guess to some degree it's an incomplete hypothetical; it's also vague and ambiguous as to "settlement contractors."

CO-HEARING OFFICER DODUC: Mr. Berliner, specificity?

MR. BERLINER: You know what? I think I'll just move on.

CO-HEARING OFFICER DODUC: Thank you.

MR. BERLINER: Are you familiar with -- strike that.

Does the modeling provided by MBK violate basic modeling conventions?

CO-HEARING OFFICER DODUC: Mr. Bezerra is about to object to something.

MR. BEZERRA: Objection, vague and ambiguous as to "basic modeling conventions."

MR. BERLINER: I will get there.

THE COURT: All right. Overruled for now. Actually, my counsel may frown at that. Overruled.

WITNESS PARKER: Could you repeat the question?

MR. BERLINER: It's a yes-or-no question.

WITNESS PARKER: Could you just repeat it so that I have the specific words?

MR. BERLINER: Yes. Does MBK's modeling violate basic modeling conventions?

WITNESS PARKER: Yes.

MR. BERLINER: Could you please define for us "basic modeling conventions," what you mean by "basic

modeling conventions"?

WITNESS PARKER: In the context of the studies that petitioners have done, it would be the use of consistent logic between both studies that -- other than the logic that is necessary to change to implement the California WaterFix.

CO-HEARING OFFICER DODUC: I'm sorry. I did not understand that.

WITNESS PARKER: So we -- for this proceeding, there was a no action and a proposed action that was provided -- models of a no action and a proposed action. Both of those studies used identical allocation logic that is consistent between both of the models, able to respond to conditions as they present themselves within the -- the forecasting, the allocation period.

CO-HEARING OFFICER DODUC: And do you mean consistent between the various scenarios?

WITNESS PARKER: Yes, between the two scenarios that I'm speaking about specifically, the no action and the proposed action. So --

CO-HEARING OFFICER DODUC: Hold on.

Mr. Bezerra?

MR. BEZERRA: We have at least five different

proposed action scenarios present in this hearing. We have Boundary 1, Boundary 2, H3, H4, and the BA proposed action scenario. So to talk about the proposed action scenario doesn't -- is not clear and really isn't evidence of any kind.

CO-HEARING OFFICER DODUC: I would assume that was an objection, and Ms. Parker, I assume you indicated that you were about to answer that.

WITNESS PARKER: I apologize. I should have broadly explained that --

CO-HEARING OFFICER DODUC: Okay. So hold on. Objection sustained.

And Ms. Parker, you will explain.

MS. PARKER: Okay. All of the action scenarios that depict a WaterFix alternative use identical allocation logic, allocation logic that is identical to the no action alternative. In that sense, I believe those studies are appropriate and do not violate basic modeling conventions.

The differences between those scenarios are characterized by the specific implementation of the WaterFix and attendant criteria associated with each of those implementations of the WaterFix -- additional environmental criteria, additional exports, additional

Delta outflow criteria. But those are all functions of a specific implementation of the WaterFix. Other than that, the logic within those models is consistent with respect to project decisions on project allocations. And I believe that is an acceptable implementation of the modeling that does not violate basic conventions.

And the -- so does that answer the question, Mr. Berliner?

CO-HEARING OFFICER DODUC: I believe it was my question that answered. Yes, thank you.

WITNESS PARKER: Oh, I'm sorry.

MR. BERLINER: And if -- I believe you have characterized in your testimony the MBK modeling as being more aggressive or risky than the approach that Reclamation takes to its modeling.

If you were to model a more risky, aggressive operational approach such as that adopted by MBK, would you use the modeling approach that they used?

WITNESS PARKER: I would not.

MR. BERLINER: Why not?

WITNESS PARKER: Because it is not consistent. The methodology that they used to depict their allocations was to predetermine a number of allocations in each of their scenarios, and this led to a skewed,

in my opinion, depiction of the impact of the WaterFix relative to the no action.

If I were to choose to depict a more aggressive allocation strategy in either the no action or the proposed action, I believe that I, as a Reclamation employee, or anyone with DWR would try to do that using consistent model logic between the two alternatives.

My impression is that it would be difficult to achieve the same level of difference between the proposed action and the no action doing that because it would be generalized logic.

My opinion is that MBK was able to achieve such a large discrepancy by virtue of literally affecting 80 percent of the years in the period of record by hand selecting allocations in one run or the other. That is not consistent logic. It is not reproducible logic. It's a person deciding what the allocations would be in either one run or the other or both. So if I were to try to achieve the same aggressive curve for CVP allocations, I would try to do it using a more aggressive WSIDI curve or a more aggressive delivery carryover curve. I would not elect to do it by hand-entering allocations for specific years.

MR. BERLINER: Thank you.

I have some questions for Mr. Leahigh. Could we please have DWR-78, Page 2.

Mr. Leahigh, this is your testimony that we are bringing up. If you could scroll down to probably about there.

Do you recall that you were asked some questions -- actually, if we could scroll up a little bit or shrink the page a little bit maybe so we can see the paragraph above this. There you go.

Mr. Leahigh, do you recall your testimony that's on Page 2 of DWR-78?

WITNESS LEAHIGH: Yes.

MR. BERLINER: And do you recall being asked questions the other day by Mr. Cooper, one of the Sac Valley attorneys related to this testimony?

WITNESS LEAHIGH: Yes, I do.

MR. BERLINER: You were asked about your testimony in the first -- in this first paragraph that starts, "Mr. Bourez contends," correct?

WITNESS LEAHIGH: Yes.

MR. BERLINER: And then you were asked some questions about your testimony in the second paragraph starting on Line 14, correct?

WITNESS LEAHIGH: That's correct.

MR. BERLINER: Is the testimony that you offer in the first paragraph starting on Line 5 intended to be related to the point that you're making in the paragraph commencing on Line 14 that concerns the State Water Project allocation variables?

WITNESS LEAHIGH: Well, part of that, yes, part of the paragraph -- so starting on Line 6 and 7, the statement by Mr. Bourez that "operators have a lot more information at their disposal to make these decisions," so that was really what the next paragraph was addressing in terms of all those items that I listed.

And I was just describing the uncertainty -- yes, the project operators do have information available to them, but I was trying to describe what that level of uncertainty was with the information that we do have available to us.

What I was not -- that second paragraph starting on Line 14 was not addressing the statement that I made in terms of the utilizing unreasonable foresight. That, I was relying on the DWR modeling witnesses on their statement regarding that, regarding Mr. Bourez's modeling assumptions for the SWP

allocations.

MR. BERLINER: Thank you.

If we could have DWR Exhibit 10.

CO-HEARING OFFICER DODUC: I guess you need more than --

MR. BERLINER: I have two questions left.

CO-HEARING OFFICER DODUC: All right.

MR. BERLINER: Mr. Leahigh, do you recall this graphic on Delta hydrodynamics?

WITNESS LEAHIGH: Yes, I do.

MR. BERLINER: You were asked about this slide by Ms. Meserve in the context of the diversions at the proposed North Delta intake. What's the purpose of this graphic?

WITNESS LEAHIGH: Yeah. So the purpose of this graphic was to conceptually illustrate the kind of macro-level changes to the Delta hydrodynamics. This figure is correct in that it -- there are no additional reverse flows in the Sacramento River due to the California WaterFix, given that the North Delta diversion requires minimum of 5,000 cfs before any diversions can take place.

And, as I stated in my testimony, I don't see these changes as fundamentally different with the

proposed project as compared without the proposed project. If anything, they represent an improved efficiency in the movement of the project stored water to the export locations by requiring less carriage water.

MR. BERLINER: So is it accurate or fair to say that the graphic was not intended to show, on a more micro level, all aspects of the operation of the WaterFix including flows that would be diverted by tunnels and flows that would then remain in the Sacramento River?

WITNESS LEAHIGH: That's correct. It was not intended for that purpose.

MR. BERLINER: If we could please have the San Joaquin Tributaries Authority Exhibit 905, please.

This will be my last question, two questions but last subject -- I'm sorry, DWR-905, the one used by the SJTA. And if you could scroll down to July of 2015.

Mr. Leahigh, are you familiar with this chart?

WITNESS LEAHIGH: Yes, I am.

MR. BERLINER: There are some negative values for July of 2015 in the third column over. And when you were testifying, you were uncertain about what

these negative values were associated with. Have you had an opportunity to consider why those negative values occurred?

WITNESS LEAHIGH: Yes. So Mr. O'Laughlin was right in pointing out what appeared to be inconsistency in this table in terms of this column, which is labeled as "SWP Exports." I was able to confirm with the staff member that put this together that -- this was data for DWR Exhibit 850. And the staff member did -- was able to confirm that these numbers were in error for this particular time period in the summer of 2015.

Now, the magnitude of that error essentially was about 24,000 acre-feet of SWP export that was removed that was essentially part of water transport water that was removed from the "SWP Export" column inadvertently. So that did affect -- did result this these negative numbers in the "SWP Export" column.

It also affected the third column from the left, which was minimum Feather River flows that eventually went to export, so also show negative numbers there as well.

But the 24,000 acre-feet of error, given that the total volume of exports for that year was well over 800,000 acre-feet, does not have any material -- does

not result in any material change to the bottom line point of that particular stacked bar graph, which was DWR-850.

MR. BERLINER: Thank you very much. I have no further questions.

CO-HEARING OFFICER DODUC: You had indicated in your summary at the beginning that you had questions with respect to CalSim modeling for Mr. Munevar.

MR. BERLINER: Yes, I did. But in reviewing them, I think we covered the material that I was going to ask him.

CO-HEARING OFFICER DODUC: All right.

MR. BERLINER: I'm sure that won't make Mr. Munevar unhappy.

CO-HEARING OFFICER DODUC: Let's -- do you have an objection or --

MR. HITCHINGS: I was just going to -- Andrew Hitchings for Glenn-Colusa, Biggs-West Gridley.

I was going to request that the Hearing Officer consider maybe a 10 to 15-minute break. I know it would help our Group 7 to coordinate our questions. I think it would make it possibly more efficient and less time consuming, if that's okay with the --

CO-HEARING OFFICER DODUC: Thank you. That

actually is an excellent suggestion.

Why don't we take a break until 3:30, and at that point, I will ask people to come up and give me indication and estimates of their recross.

(Recess taken)

CO-HEARING OFFICER DODUC: Thanks, Mr. Hitchings, for that excellent suggestion. We are now back in session, and let me ask parties who intend to conduct recross, please come up, identify themselves, and give me a time estimate. And if you could provide me with your group number, that will help facilitate things

MR. HERRICK: John Herrick, South Delta parties, Group 21. At most, just ten minutes.

CO-HEARING OFFICER DODUC: Okay.

MR. BEZERRA: Ryan Bezerra for Group 7, 15 minutes to half an hour.

CO-HEARING OFFICER DODUC: Okay.

MR. HITCHINGS: Andy Hitchings for Group 7. It will depend upon the answers to Mr. Bezerra's questions, but probably just several follow-up questions, five minutes, ten minutes at most.

CO-HEARING OFFICER DODUC: Okay.

MR. ALADJEM: David Aladjem, City of

Brentwood. I think five, max ten minutes.

CO-HEARING OFFICER DODUC: And you are Group 9?

MR. ALADJEM: Group 10.

CO-HEARING OFFICER DODUC: 10, thank you.

MR. WASIEWSKI: Tim Wasiewski for the San Joaquin Tributaries Authority, that's Group 18, probably ten minutes.

MS. DES JARDINS: Deirdre Des Jardins, Group 38.And I will be conservative and say 15 minutes, but it could take less than ten.

MR. OCHENDUSZKO: I'm sorry, Ms. Des Jardins. Were you representing yourself in Group 37, or were you representing Group 38?

MS. DES JARDINS: Oh, yeah, sorry. I'm representing myself in Group 37, yeah.

MR. OCHENDUSZKO: Thank you.

CO-HEARING OFFICER DODUC: Thank you.

MS. NIKKEL: Meredith Nikkel, for North Delta 20 Water Agency, Group 9. And I estimate approximately ten minutes. I also have been in touch with counsel for East Bay MUD, which is Group 15. And they're reviewing the video, and they would like to reserve the possibility of conducting recross tomorrow morning if

the panel is called back.

CO-HEARING OFFICER DODUC: If they're called back.

MS. NIKKEL: Yes.

MS. MESERVE: Osha Meserve for LAND, Group 19. I estimate ten minutes.

MR. JACKSON: Michael Jackson for CSPA. If it would get people out of here earlier, I really could waive recross. If -- are we going to start another group after cross? I mean, are --

CO-HEARING OFFICER DODUC: At the time estimates that I'm given, we will not start another group today, no.

MR. JACKSON: Okay. Then I'm going to waive recross.

CO-HEARING OFFICER DODUC: Are you absolutely sure that your rights have not been infringed upon, Mr. Jackson?

MR. JACKSON: Yes.

CO-HEARING OFFICER DODUC: Thank you.

MS. McGINNIS: I have a question, Madam Hearing Officer. We did not ask any redirect of Mr. Munevar. And I'm wondering if the other parties can think about it and let us know if he -- if any of

their questions on recross will be for him because --

CO-HEARING OFFICER DODUC: If you did not redirect, then how can we recross him?

MS. McGINNIS: That's great for me, thank you.

CO-HEARING OFFICER DODUC: In that case, Dr. -- Mr.?

WITNESS MUNEVAR: Mister.

CO-HEARING OFFICER DODUC: Mr. Munevar -- did I say that right finally?

WITNESS MUNEVAR: Perfect.

CO-HEARING OFFICER DODUC: You may stay if you are riveted to the discussion, or you may also take your leave. And thank you very much for your contribution.

WITNESS MUNEVAR: Thank you.

MR. BERLINER: We will have him stick around for a while. He has a plane that he's trying to catch to get back home to his family. So if he can go, that's great. But we'll ask him to stay as long as he has time without missing his plane.

CO-HEARING OFFICER DODUC: All right.

MR. BERLINER: Thank you.

CO-HEARING OFFICER DODUC: Thank you. And with that, Group 7, I assumed you were going to be the

kick-off cross-examiner.

MR. BEZERRA: Yes. Unless Lucy pulls the football out, I will be with kick-off questioner. Not referring to anyone in this room as Lucy.

CO-HEARING OFFICER DODUC: Thank you for clarifying that.

MR. BEZERRA: Yes, I realized that was necessary. So yes, thank you very much.

RECROSS-EXAMINATION BY MR. BEZERRA

MR. BEZERRA: So, Ms. Parker, my questions are for you.

First, if we could please pull up Ms. Parker's testimony, Exhibit DOI-33 Errata.

MR. HUNT: I'm sorry. Can you repeat that?

MR. BEZERRA: Sure. Exhibit DOI-33 Errata. If we could please refer to Page 2. Thank you.

Ms. Parker, we've discussed this before, so I'll try to cut through this relatively quickly.

Do you see the sentence on that page, the four plots and figures, 1.A, 1.B, 1.C, 1.D?

WITNESS PARKER: I see that.

MR. BEZERRA: So those exceedance plots reflect, as the sentence indicates, reservoir storage results for Trinity, Shasta, Folsom, and Oroville,

correct?

WITNESS PARKER: Correct.

MR. BEZERRA: And they are exceedance plots of the entire modeling record, every month in the modeling record spread as an exceedance plot by end-of-month storage, correct?

WITNESS PARKER: Correct.

MR. BEZERRA: And in this paragraph, your testimony states, "But the BA blue results also show that, for each facility, WaterFix results are generally not lower than the no action conditions which demonstrates petitioner's claim that the WaterFix can be operated without causing reduced carry-over storage. That is your testimony, correct?

WITNESS PARKER: That is my testimony.

MR. BEZERRA: So your testimony is that those storage plots demonstrate that California WaterFix can be operated without causing reduced carryover storage, correct?

WITNESS PARKER: Correct.

MR. BEZERRA: In your redirect testimony, you testified about the role of modeling of stressed water supply conditions, correct?

WITNESS PARKER: Correct.

MR. BEZERRA: And in these exceedance plots that you are citing to support your opinion, have you included results from conditions that you would call stressed water supply conditions?

WITNESS PARKER: They include all storage conditions, including stressed storage conditions.

MR. BEZERRA: Thank you. Scrolling down further on Page 2 under the paragraph with the heading "Storage Condition Conclusions" -- there you go. Ms. Parker, do you see the sentence, "Petitioners maintain that BA modeling rerun with historical no cc hydrology results in storage conditions comparable to the MBK no action and better than MBK for the WaterFix scenario"? Do you see that sentence?

WITNESS PARKER: I do.

MR. BEZERRA: And in that sentence, are you referring to the storage -- the reservoir storages depicted in Figures 1.A, 1.B, 1.C, and 1.D?

WITNESS PARKER: Yes.

MR. BEZERRA: In making that conclusion, you are including the modeling of conditions that you have called stressed water supply conditions, correct?

WITNESS PARKER: Correct.

MR. BEZERRA: And based in part on your inclusion of modeling of those stressed water supply conditions, your opinion is that the no cc hydrology demonstrates storage better than MBK for the WaterFix scenario, correct?

WITNESS PARKER: Correct.

MR. BEZERRA: Thank you. And, again, just in summary, your general redirect testimony was that modeling for stressed water supply conditions should not be taken as indicating what would actually occur in those conditions in the future, correct?

WITNESS PARKER: Correct.

MR. BEZERRA: Thank you. Okay. I'd like to move on to discuss your redirect testimony concerning MBK's assumptions in its modeling.

I believe -- and correct me if I'm wrong because I'm operating here relatively quickly -- your testimony was that MBK, by changing assumptions between the no action scenario and the proposed action did not comply with basic modeling conventions, correct?

WITNESS PARKER: Not quite.

MR. BEZERRA: Okay.

WITNESS PARKER: I think that MBK did not comply with basic modeling conventions by fixing

allocations in both of their studies. That predisposed the outcome of their study in 80 percent of the years that were studied. And if petitioners had done that, I don't think that would have been acceptable, so I don't think that it should be acceptable for MBK to do that.

MR. BEZERRA: Okay. Thank you. I believe you testified that it was necessary to keep modeling logic consistent except for the logic necessary to implement California WaterFix. You did testify to that, correct?

WITNESS PARKER: Yes.

MR. BEZERRA: Okay. Thank you. Could we please pull up Exhibit BKS-101.

Ms. Parker, we discussed this exhibit previously. It is excerpts of Appendix 5A from the Biological Assessment. The Biological Assessment is Staff Exhibit SWRCB-104. This is, again, excerpts from Appendix 5A. If we could please refer to the next-to-the-last page.

Ms. Parker, do you see the highlighted 20 heading?

WITNESS PARKER: Yes.

MR. BEZERRA: And that heading is "5.A.5.2 CalSim II Assumptions for the Proposed Action," correct?

WITNESS PARKER: Correct.

MR. BEZERRA: So all of the statements within Section 5.A.5.2 are assumptions used in the proposed action modeling, correct?

WITNESS PARKER: Correct.

MR. BEZERRA: If we could please go to the next page and scroll down to the bottom, please. This is Page 5.A-30 out of Appendix 5A. Do you see the heading "5.A.5.2.5.4 San Luis Operations"?

WITNESS PARKER: Yes.

MR. BEZERRA: And that paragraph states the San Luis rule curve assumptions for the proposed action modeling the BA, correct?

WITNESS PARKER: Correct.

MR. BEZERRA: And this paragraph states generally that petitioners changed the San Luis rule curve between the proposed action model -- excuse me -- between the no action alternative and the proposed action in the Biological Assessment modeling, correct?

WITNESS PARKER: Correct.

MR. BERLINER: Objection, beyond the scope of redirect.

CO-HEARING OFFICER DODUC: Mr. Bezerra, I will allow you to respond, though I believe -- go ahead.

MR. BEZERRA: The witness's statement in redirect was changing the modeling logic between the no action alternative and proposed action violated basic modeling conventions.

MS. AUFDEMBERGE: Objection, that misstates her testimony. She corrected the word from "assumptions" to "fixed allocations."

CO-HEARING OFFICER DODUC: Regardless, I see where Mr. Bezerra is going with this and both objections are overruled.

MR. BEZERRA: Thank you.

In particular, Ms. Parker, in this paragraph 13 it states that additional modifications to the rule 14 curve were included to preserve upstream carryover storage conditions, correct?

WITNESS PARKER: Yes, it says that.

MR. BEZERRA: And previously you testified that Biological Assessment modeling results demonstrated that implementation of California WaterFix would not adversely affect upstream storage, correct?

WITNESS PARKER: Correct.

MR. BEZERRA: So just to summarize this paragraph on Page 5.A-30, the petitioners' change in the San Luis rule curve between the no action

alternative and the proposed action, quote, "were included to preserve upstream carryover storage conditions," correct?

WITNESS PARKER: Correct.

MR. BEZERRA: And then the next sentence states, "Sensitivity analyses indicated that using the NAA's more aggressive rule to move water south earlier in the water year than in the BA would yield a little more delivery but would be at the expense of upstream storage," correct?

WITNESS PARKER: Correct.

MR. BEZERRA: So if -- as I understand this sentence, if petitioners had retained the no action alternative's San Luis rule curve, the Biological Assessment modeling would not show the same level of upstream storage in the proposed action, correct?

WITNESS PARKER: Correct.

MR. BEZERRA: Thank you.

WITNESS PARKER: Can I add something to that?

CO-HEARING OFFICER DODUC: Yes.

WITNESS PARKER: Very briefly, I would suggest that modifying the rule curve is part and parcel of depicting the operation of the WaterFix. We have discussed ad nauseam that the rule curve is a mechanism

in CalSim that -- and I'm not going to use the same good language that Armin did, but it's a mechanism that helps to depict operator decisions on how to move water from the north to the south.

That operation is different if you have a WaterFix than if you don't, so I think that logic is part of a WaterFix operation.

MR. BEZERRA: Okay. Thank you very much. I'd like to pull up the transcript from the 10 August 11th, 2016 session in this hearing. And if we could please turn to Page 165, which is pdf Page 170. If we can please scroll down to Line 12.

This was cross-examination by Mr. Salmon of East Bay MUD, and I'll read it for the record.

"Mr. Salmon: Did you offer" --

This is cross-examination of Mr. Leahigh.

"Mr. Salmon: Did you offer an opinion at any time to the modelers on what an appropriate rule curve would be under the WaterFix or if the WaterFix comes into operation?"

"Witness Leahigh: Not

specifically on the WaterFix. As it relates to State Water Project operations, I think it would be similar as far as for WaterFix as without WaterFix."

Do you disagree with Mr. Leahigh's opinion that it would be appropriate for the State Water Project to maintain the same San Luis rule curve with project as in the no action alternative?

MS. AUFDEMBERGE: Objection, he's asking about the State Water Project. She's not presented any testimony about the State Water Project.

MR. BEZERRA: I believe her testimony was that MBK's modeling, in toto, violated basic modeling conventions by changing certain assumptions. So I believe it's well within the scope.

WITNESS PARKER: That's not what I said either.

CO-HEARING OFFICER DODUC: Hold on. Ms. Parker, would you like to clarify something?

WITNESS PARKER: My statement about MBK's modeling not following basic conventions is almost

entirely about them fixing allocations in both the no action and in the proposed action in a way that doesn't use any logic at all. Those are manual inputs. It's the decision of a person, not of a model, not of an algorithm, not using any kind of a rule curve.

And that predisposed their results to characterize an impact to North of Delta water users and to North of Delta CVP storage conditions with which Reclamation disagrees.

Petitioner's modeling is consistent in its application of allocation logic for every run and does not show an impact to legal users of water.

MR. BEZERRA: Okay. Could we please pull up Exhibit SVWU-110.

CO-HEARING OFFICER DODUC: If I may summarize as that's being pulled up, Ms. Parker, your criticism of the MBK modeling boils down to the fact that you disagree with its allocation logic; you don't believe it represents -- you're not the State Water Project -- the Bureau's operations, and therefore, in your world, it is not logical?

WITNESS PARKER: Almost. So my rebuttal testimony, which really focused on three things, was there's a claim of storage injury. Petitioners'

modeling doesn't show storage injury. Okay?

Even though MBK's modeling does, we disagree with their modeling because, A, they achieved that storage condition impact and that North of Delta delivery impact by, number one, fixing allocations, which is --

CO-HEARING OFFICER DODUC: But you achieved your result by fixing a rule curve as well.

WITNESS PARKER: We didn't fix a rule curve. The rule curve is not input. It's calculated.

There are strategies that the model can follow to calculate that rule curve, but it's not like a time series or anything.

CO-HEARING OFFICER DODUC: I am failing to see the difference.

WITNESS PARKER: So do you remember what a WSIDI curve is?

CO-HEARING OFFICER DODUC: Okay.

WITNESS PARKER: Think about a same concept for a rule curve for the San Luis rule curve. Depending on Shasta conditions --

CO-HEARING OFFICER DODUC: But that is still someone generated the curve.

WITNESS PARKER: That's true, but nobody went

in and specifically said, "On this month and this year, you will try to meet this amount of storage in San Luis." It's something that's dynamically calculated based on what the allocation is that year, based on what the export estimates are for that year -- which are also estimated, not predetermined.

CO-HEARING OFFICER DODUC: And that logic is applied throughout the entire simulation?

WITNESS PARKER: Right. Right. And it's consistent for each -- for all of the runs that were done.

CO-HEARING OFFICER DODUC: All right. Thank you for clarifying that for me.

WITNESS PARKER: But we have different guidelines for different scenarios to me is logical because the export capability is different with the WaterFix. So you can fill up San Luis at different points of the year or you can get more water south at different points of the year than the we currently can, being constrained by the specific set of environmental criteria that we have in the Delta.

So the other thing beyond fixing allocations was the use of Joint Point of Diversion. So it's three things.

MR. BEZERRA: This is well beyond redirect testimony now.

WITNESS PARKER: You asked me to clarify.

CO-HEARING OFFICER DODUC: Yes, it is. Let's stop there, and let's turn back to Mr. Bezerra for his recross.

MR. BEZERRA: Thank you. Just one quick question. I believe this was captured on previous cross-examination. Petitioners did not change the export estimate between the no action alternative and the proposed action, correct?

WITNESS PARKER: So I was scolded earlier for talking about a proposed action. I have not looked at every export estimate table in all of the runs.

MR. BEZERRA: And I apologize. That's my lack of clarity. In the Biological Assessment modeling, petitioners did not change the export estimate from the no action alternative to the proposed action, correct?

WITNESS PARKER: Which is H3-plus?

MS. AUFDEMBERGE: I'll object. This is beyond the scope of --

WITNESS PARKER: I'm just trying to --

MR. BEZERRA: That's fine.

WITNESS PARKER: Are you asking as to H3,

H4 --

CO-HEARING OFFICER DODUC: Let's hold on.

Mr. Bezerra, you had estimated 15 to 30 minutes?

MR. BEZERRA: Yes.

CO-HEARING OFFICER DODUC: Okay. I think you're going to need that extra 15 minutes.

MR. BEZERRA: Yeah. I don't think it's the whole 15 but, yes, some extra time.

So we're now on Exhibit SVWU-110, which is MBK's PowerPoint summary of its testimony. If we could please move to -- first of all, let me ask a preliminary question.

I think, Ms. Parker, a bit ago you said that you reviewed the modeling for all runs that petitioners have presented in this hearing, correct?

WITNESS PARKER: I don't know if I said that. Did I really say all runs? I mean, my rebuttal testimony focused on the H3-plus scenario and the no action and not specific comparison. Does that help?

MR. BEZERRA: Okay. So let me straighten that out then. So none of your rebuttal testimony applies to how MBK analyzed the effects of Boundary 1, Boundary 2, H3, or H4, correct?

MR. BERLINER: Objection, this is beyond the scope of redirect. We're not on rebuttal anymore. We're on redirect.

CO-HEARING OFFICER DODUC: I understand, Mr. Berliner. But that's a clarification I need to get as well.

WITNESS PARKER: I don't understand how that's relevant. My rebuttal was to MBK's protestant exhibits.

CO-HEARING OFFICER DODUC: Ms. Morris?

MS. MORRIS: Mr. Bezerra asked about the 12 petitioner model runs. Now he's asking about MBK's model runs. So I think he needs to be clear in his questions.

CO-HEARING OFFICER DODUC: Hold on.

Mr. Bezerra, please ask your questions again.

MR. BEZERRA: I'm trying to clarify the scope of Ms. Parker's rebuttal testimony.

CO-HEARING OFFICER DODUC: I understand that.

MR. BEZERRA: We have in this hearing, five different with-project model runs that petitioners have presented -- Boundary 1, Boundary 2, H3, H4, and the BA's proposed action, which is also called H4A-H3, I believe, Alternative 4A-H3.

If Ms. Parker's rebuttal testimony only deals with the Biological Assessment modeling, I want to get that clear because MBK's modeling analysis also dealt with the other four proposed action scenarios.

CO-HEARING OFFICER DODUC: That's my understanding of his question.

WITNESS PARKER: My specific rebuttal concerns MBK's analysis of their no action and their Alt 4A. Those are the results. The results of those runs I have contrasted with the results of petitioners' modeling of the no action and the -- what I've heard referred to as the proposed action for the H3-plus scenario. That's the distinction that I drew in my rebuttal testimony. Does that help?

MR. BEZERRA: Okay. Yes, thank you. I appreciate that. Okay.

So back to Exhibit SVWU-110. And if we could please go to Page 8. Now, I'll summarize MBK's testimony just for context. MBK's testimony indicated, as indicated on this page, that petitioners' modeling, excluding the BA modeling, included different export estimates for different runs or -- excuse me -- different alternatives.

Do you have any knowledge of this?

WITNESS PARKER: I have limited knowledge of this. I am aware.

MR. BEZERRA: So you are aware that, in the modeling alternatives reflected on Page 8 of this exhibit, petitioners selected different export estimates, correct?

WITNESS PARKER: It's a different export estimate table which guides export estimates used in setting South of Delta allocations.

MR. BEZERRA: So in these -- in two of these four scenarios presented by petitioners, they selected a different export estimate than in the no action alternative, correct?

MS. MORRIS: Stefanie Morris.

MR. BERLINER: I --

CO-HEARING OFFICER DODUC: Stop. One at a time, please.

Mr. Berliner?

MR. BERLINER: I never asked any questions about this on the redirect of Ms. Parker.

CO-HEARING OFFICER DODUC: But you opened the door with respect to questioning her in terms of basic modeling convention and her answer with respect to the consistency in modeling allocations and assumptions

between the no action alternative and the project alternatives. And I believe that's what he is exploring.

MR. BEZERRA: Yes.

MS. MORRIS: And I'm going to join in the objection and also note that this is looking at H3, H4, Boundary 2, Boundary 1, which is outside the scope of her rebuttal testimony as she just testified and Mr. Bezerra just made a huge deal about.

CO-HEARING OFFICER DODUC: Hold on.

Mr. Bezerra, I would caution you to not get into the specifics of these boundary conditions and modeling and stick to the general concept which I believe you are trying to explore. And that is the -- the principles that Ms. Parker voiced in objecting to MBK's modeling, how that, in your opinion, was reflected in petitioners' modeling.

MR. BEZERRA: Yes, that's correct. All I'm intending to do here is explore what Ms. Parker views as violations of basic modeling conventions. Her testimony was MBK did certain things with allocation logic. I'm wanting to understand if that's consistent, in her opinion, with what petitioners have done with allocation logic.

CO-HEARING OFFICER DODUC: Understood.

MR. BEZERRA: And I think I'm just about done.

CO-HEARING OFFICER DODUC: With that, Mr. Berliner --

MS. AUFDEMBERGE: I'm going to object to that characterization of her testimony. He keeps referring to allocation logic. What I heard Ms. Parker say was exactly the opposite.

CO-HEARING OFFICER DODUC: Was modeling convention.

MS. AUFDEMBERGE: Thank you -- is fixed allocation, no logic at all. Thanks.

CO-HEARING OFFICER DODUC: On that note, all objections are overruled.

Mr. Bezerra, please proceed.

MR. BEZERRA: I think it's one question.

Ms. Parker, is it your understanding that petitioners, in the modeling alternatives reflected on Page 8 of this exhibit, altered the export estimate for some with-action alternatives relative to the no action alternative?

WITNESS PARKER: It's my understanding that they did, based on the operation of the WaterFix in those alternatives, which included differences in

export criteria and Delta outflow standards.

And in order to accommodate the impacts of those on water supply, the export estimate curves, which are in no way a predetermination of allocation, were adjusted so that the model could use those rules as a basis upon which to make allocation decisions in the spring that involve a certain amount of imperfect foresight.

MR. BEZERRA: Thank you. I think I have about two more questions.

On this topic of allocation logic, those parameters are inputs to the model, correct?

WITNESS PARKER: Correct.

MR. BEZERRA: Those parameters are discretionary decisions by the modeler, correct?

WITNESS PARKER: So the WSIDI curves are not really discretionary decisions by a modeler. It's something that -- it's a relationship that's trained based on a water supply and a demand and a set of facilities.

But the -- the tables are developed by a modeler, but, again, they're -- they're a rule that the model has to use that as a guide that is -- so information from that table just goes into the

decision. It's an algorithm that the model follows.

The model calculates an allocation based on --

MR. BEZERRA: And in operating the CVP and the SWP, the operators are not required to follow any of those allocation curves, correct?

WITNESS PARKER: That is correct.

MR. BEZERRA: And I have one -- this is just clarification. You referred to the WSIDI curve as being trained?

WITNESS PARKER: Yes.

MR. BEZERRA: What does that mean?

CO-HEARING OFFICER DODUC: I think that might have been an answer to my question, which was outside the scope of redirect.

Do you wish to object, Mr. Berliner?

MR. BERLINER: If it's helpful to the Board to get an explanation of WSIDI --

CO-HEARING OFFICER DODUC: No, it is not.

MR. BERLINER: Then I will object.

CO-HEARING OFFICER DODUC: Thank you, Mr. Berliner. Objection sustained.

MR. BEZERRA: Thank you. That completes my cross-examination.

CO-HEARING OFFICER DODUC: Thank you, Mr.

Bezerra.

Mr. Hitchings, was Mr. Bezerra helpful to you in terms of keeping your cross to five minutes?

MR. HITCHINGS: Mr. Bezerra is always helpful. I think I can stay within that, just depending on the answers.

RECROSS-EXAMINATION BY MR. HITCHINGS

MR. HITCHINGS: Andrew Hitchings for Glenn-Colusa Irrigation District and Biggs-West Gridley Water District.

Ms. Parker, good afternoon. I just have a few follow-up questions. At the end of your questioning on redirect by Mr. Berliner, there were some questions about how to achieve more aggressive operations using the modeling to simulate that. Do you recall that line of questioning?

WITNESS PARKER: I do.

MR. HITCHINGS: And I believe you testified that, if you were to achieve the same aggressive CVP curve allocations as MBK, you would model it using a more aggressive WSIDI and a more aggressive delivery carryover. Is that an accurate characterization?

WITNESS PARKER: Yes, those are two options.

MR. HITCHINGS: And in performing that type of

modeling, would you also adjust the export estimates?

WITNESS PARKER: I suppose I could, yes.

But let me qualify that because the export estimate table really is intended to reflect limitations to exports. So that's -- that's a -- it's a limit that we put on South of Delta allocation based on export limitations associated with the RPAs. So I don't know the answer to that question.

MR. HITCHINGS: But is it -- would that be reasonable, if you're trying to achieve that more aggressive operations, to adjust the exports estimates in addition to adjusting the WSIDI in the delivery carryover?

WITNESS PARKER: I don't know. I'm sorry.

MR. HITCHINGS: After the petitioners performed initial modeling runs to look at the different scenarios of the project, did the petitioners make any manual adjustments to any inputs and then perform further modeling runs with those adjustments inputted?

MR. HITCHINGS: Objection, beyond the scope of redirect.

CO-HEARING OFFICER DODUC: Mr. Hitchings, I think I know where you're going, but please state your

response for the record.

MR. HITCHINGS: Yeah, I mean, this goes back to the basic modeling convention. And one of the key disputes in the rebuttal testimony that ties into the basic modeling convention is that these manual adjustments were made in the MBK modeling.

CO-HEARING OFFICER DODUC: Thank you. Overruled.

WITNESS PARKER: Can you restate your question one more time?

MR. HITCHINGS: Yeah. After the petitioners performed initial modeling runs of the various scenarios, did they make any manual adjustments to any inputs and then perform further modeling runs with the model with those adjustments inputted?

WITNESS PARKER: I have no specific knowledge of those activities. I was not involved with any of that modeling. My rebuttal focused on rebutting testimony that MBK gave for Sac Valley water users which specifically used CalSim studies that did not use any logic or that used the -- I mean, the use of the actual allocation logic in their models was limited to the point where nobody --

CO-HEARING OFFICER DODUC: So you do not know,

in response to Mr. Hitchings's question?

WITNESS PARKER: Right, I don't know.

CO-HEARING OFFICER DODUC: Thank you.

MR. HITCHINGS: Okay. That's all I have. Thank you very much.

CO-HEARING OFFICER DODUC: Ms. Nikkel? Oh, we have switched. Ms. Meserve.

MS. MESERVE: If it is acceptable, I have asked to go in front of the other parties, since I can't be here tomorrow and I just have a few questions.

CO-HEARING OFFICER DODUC: All right, Ms. Meserve.

RECROSS-EXAMINATION BY MS. MESERVE

MS. MESERVE: I just have a couple of questions for Mr. Leahigh.

To follow up on the discussion regarding the Delta hydrodynamics figure that is in DWR-10, Page 19, I wanted to confirm, did you state in response to Mr. Berliner that there would be no additional reverse flows in the Sacramento River as a result of the North Delta diversions that are proposed?

WITNESS LEAHIGH: I didn't say there would be any reverse flows in the Sacramento River. I didn't -- if you'd restate your question, please?

MS. MESERVE: I thought I heard you say there would be no additional reverse flows in the Sacramento River as a result of the North Delta diversions.

WITNESS LEAHIGH: I don't believe there's any net reverse flows currently in the Sacramento River, so no. There wouldn't -- there would continue not to be any net reverse flows in the Sacramento River with the California WaterFix.

MS. MESERVE: Can we bring up LAND-111 and go to Page 3.B-81. And I have highlighted language at the bottom of that page.

Are you aware that, in the Final EIR -- this is the "Environmental Commitments" chapter of the EIR. Can you review the language that's highlighted, please?

And do you disagree with this portion of the Final EIR that states that there may be an increase in frequency of reverse flows on the lower Sacramento River?

MS. McGINNIS: Objection, Ms. Meserve's asking question about a statement that Mr. Leahigh just said he didn't make about reverse flows on the -- net reverse flows on the Sacramento River. So it would be outside the cope of his redirect.

CO-HEARING OFFICER DODUC: My recollection was

that we were looking at the Delta hydrodynamics slide and Mr. Leahigh was explaining that it's a macro-level view of changes to hydrodynamics. I -- and that it shows a reduction in carriage water that would be needed. I don't recall a statement regarding reverse flows

MS. McGINNIS: Correct. So, now, if we're opening up another document that's talking about reverse flows, it's clearly outside the scope of his redirect.

CO-HEARING OFFICER DODUC: Mr. Herrick is jogging to get up. Ms. Morris was up first, so Ms. Morris.

MS. MORRIS: I'm objecting, outside the scope as well as this document is talking about tidal flows, and I think Mr. -- the testimony, if any, Mr. Leahigh gave was net flows.

CO-HEARING OFFICER DODUC: Mr. Herrick? And before you say anything, Mr. Herrick, 20 because this may address the issue, my excellent counsel, who takes much better notes than I do, has noted that Mr. Leahigh said "no additional reverse flows in Sacramento River."

MR. HERRICK: John Herrick for South Delta.

Whether he said "no additional flows" or "no reverse flows," he did touch on that topic, which is what's being addressed here.

CO-HEARING OFFICER DODUC: All right. Objection overruled.

MS. MESERVE: Back to my question, then.

Do you disagree with the statement here in the Final EIR/EIS for that Alternative 4A may increase the frequency of reverse flows according to the modeling done for this project?

WITNESS LEAHIGH: I have no opinion on this. But just to be clear, we're conflating two different things here. I was clearly talking about daily average or net flows on the Sacramento River.

This statement is clearly referring to within the day. It's talking about flood tides, two flood tides per day, two ebb tides per day. So, yes, during certain portions of the day, there are reverse flows. That's clear. But that's not what I'm talking about. I'm talking about the bigger scale, daily average flows, net flows, and those are positive.

MS. MESERVE: And are you aware that water users within the Delta, including East Bay MUD and

other smaller diversions, are not operating on a one-day average?

MR. BERLINER: Objection, beyond the scope of redirect.

MS. MESERVE: I will continue.

CO-HEARING OFFICER DODUC: Sustained.

MS. MESERVE: In going back to your additional statement on redirect, you stated that the figure Slide 19 in DWR-10 illustrates macro-level changes.

CO-HEARING OFFICER DODUC: I got something right.

MS. MESERVE: I was correct with my other assertion as well.

CO-HEARING OFFICER DODUC: No, I meant I got something right. Thank you, Ms. Meserve.

MS. MESERVE: Oh. Okay. Ms. Heinrich and I agreed in that case.

Let's see. If we could look briefly at LAND-112 that I have provided to Mr. Hunt. And I'm just offering this for just demonstrative purposes. There is a figure on Page 28, and it shows -- this is from the scientific review of the BA from 2016. And this is just a handy figure that shows the percent of Freeport flow that would be exported under the North

Delta diversions in the proposed action.

And Mr. Leahigh, wouldn't you think that a diversion of up to 40 percent in November of the flow in a below normal water year such as shown in this example would be a major change to the hydrodynamics of the Delta?

MR. BERLINER: Objection.

CO-HEARING OFFICER DODUC: Even at a macro level?

MS. MESERVE: Even at a macro level.

MR. BERLINER: Still beyond the scope. We didn't talk about diversions at the North Delta diversion point.

CO-HEARING CHAIR DODUC: Diversion is part of the hydrodynamics that was depicted in that photo, so overruled.

MS. McGINNIS: I think we're talking about Slide -- are we still talking about the diagram or had we moved to the table?

MS. MESERVE: I'm still talking about the diagram.

MS. McGINNIS: Oh, sorry. My mistake. Strike all that, please.

CO-HEARING OFFICER DODUC: It is overruled in

any case.

MS. MESERVE: I think there's a question pending.

WITNESS LEAHIGH: I am completely lost.

CO-HEARING OFFICER DODUC: You should repeat the question, Ms. Meserve.

MS. MESERVE: Thank you. Wouldn't you think, Mr. Leahigh, that diversion of up to 40 percent in November of the flow in a below normal water year such as that shown in this example would be a major change to the hydrodynamics of the Delta?

WITNESS LEAHIGH: I think this is the first time I've ever seen this graph, so I can't comment something I've never seen before.

MS. MESERVE: If you were to assume, Mr. Leahigh, that this showed that, at times in a below normal year, 40 percent of the water in the Sacramento River would be diverted, would you think that would be a major change to the hydrodynamics of the Delta?

MR. BERLINER: I'm going to object again. The purpose of showing the diagram was because Ms. Meserve made a point of arguing that the diagram was incomplete because it did not show intake flows at the North Delta diversion.

The only point of Mr. Leahigh's redirect testimony was to demonstrate the purpose that he used that picture for. And the fact that it didn't suit Ms. Meserve's purpose was because it suited Mr. Leahigh's purpose in explaining his testimony.

Now, all of a sudden, we're going to a whole other subject here.

CO-HEARING OFFICER DODUC: All right.

MS. MESERVE: Mr. Berliner has misstated my objection. He said "intake flows." I'm discussing reverse flows on the Sacramento River which would be introduced for the first time by this project.

CO-HEARING OFFICER DODUC: Ms. Meserve, I'm sorry, you now just have lost me.

MS. MESERVE: He said "intake flows" in his -- what he just said. So I'm correcting the record.

I'm not talking about intake flows. I'm talking about -- but that -- the objection was based in a couple of things and which he was attempting to resurrect the slide on redirect. But there were at least two issues.

One was whether the reverse flow should be shown up on the Sacramento River near the diversions, which I believe was what Mr. Berliner was getting at.

And then, in addition, about whether it was -- and defense to using this particular slide is that it's showing the overall hydrodynamics. And now I've shown this slide which shows that 40 percent would be diverted. So I'm objecting to that basis as well.

CO-HEARING OFFICER DODUC: Regardless, I don't believe that Mr. Leahigh -- actually, Mr. Leahigh has said that he's not familiar, cannot speak to this graphic and therefore is not able to answer questions. Is that correct, Mr. Leahigh?

WITNESS LEAHIGH: That is correct.

MS. MESERVE: Okay. Just for the last question, could we please put up the DWR-10 Slide 19, just -- and I will conclude with...

So going back to your assertion, Mr. Leahigh, that -- that this is supposed to be a -- although it is not labeled that way, this is looking at macro-level changes, wouldn't you think that diversion of up to 40 percent in a low water year, if that was to occur, would be a major change to the hydrodynamics of the Delta that should be depicted as well on this slide?

MR. BERLINER: Calls for speculation. He was presenting this slide for one purpose and not talking about this -- this is a different subject of testimony.

MS. MESERVE: I believe the purpose of this slide --

CO-HEARING OFFICER DODUC: Hold on, Ms. Meserve.

Mr. Leahigh, in this figure that you've shown which you have testified to be not to scale. But if inflow were to be reduced by 40 percent, how would that affect the remaining arrows?

WITNESS LEAHIGH: Well, it -- you know, it depends on a lot of things. Depends on what the starting flow was. In some circumstances, it could result in -- in no diversions through the tunnels at all.

CO-HEARING OFFICER DODUC: And so there is no -- no obvious answer that you can provide?

WITNESS LEAHIGH: No.

MS. MESERVE: With the -- if the 40 percent or up to 9,000 cfs was being diverted, wouldn't you think that the river, the blue part on the with-cfs slide should be smaller after the diversions when trying to show --

CO-HEARING OFFICER DODUC: And I can hear an objection of asked and answered, and it is sustained.

MS. MESERVE: Thank you. I continue my

objection to acceptance of this slide as evidence.

It's not marked for what it's -- he's said and it stands for, and it misleads more than it informs.

CO-HEARING OFFICER DODUC: Thank you Ms. Meserve. You are our graphics critic after all.

Ms. Nikkel?

RECROSS-EXAMINATION BY MS. NIKKEL

MS. NIKKEL: Good afternoon, Meredith Nikkel on behalf of North Delta Water Agency. I believe we can wrap up in ten minutes. My questions are directed to Dr. Nader-Tehrani.

CO-HEARING OFFICER DODUC: And as you're preparing, since my estimate after Ms. Nikkel, we still have at least an hour of other recross, we will adjourn after Ms. Nikkel is done, and we will resume with recross of this panel 9:30 tomorrow, here in this room with Mr. Aladjem.

MS. NIKKEL: Dr. Nader-Tehrani, other than exceedance plots, are there other ways that would be appropriate to display the model results to analyze compliance with objectives such as D1641?

CO-HEARING OFFICER DODUC: I'm sorry. I totally missed that question. Could you ask it again?

MS. NIKKEL: I will.

Other than exceedance plots, are there other ways that would be appropriate to display the model results to analyze compliance with objectives such as those in D1641?

WITNESS NADER-TEHRANI: I assume there may be. But based on my past experience, I believe the exceedance plots are the best approach in terms of showing compliance to water quality objectives.

MS. NIKKEL: Is your redirect testimony that operators would make adjustments to deal with particular salinity events based on your understanding of the project's historical compliance with D1641 objectives?

WITNESS NADER-TEHRANI: Yes.

MS. NIKKEL: Does that historical compliance account for climate change in the future?

WITNESS NADER-TEHRANI: No.

MR. BERLINER: Objection, the question was a general question, not with any time frame. So his answer was in that context. This is an entirely different context.

CO-HEARING OFFICER DODUC: Ms. Nikkel?

MS. NIKKEL: I'm asking about the historical compliance analysis upon which Dr. Nader-Tehrani's

testimony is based, and my question is whether that analysis that -- of historical compliance, whatever the scope of that was, accounted for climate change in the future.

CO-HEARING OFFICER DODUC: Overruled.

WITNESS NADER-TEHRANI: And I think my testimony is the operators will continue to do whatever they've been doing before, which is respond based on changes in day-to-day operations in response to salinity events, whether it's due to climate change or anything else.

MS. NIKKEL: I understand that. I don't think I heard a question -- or an answer to my question, which is whether the analysis that you conducted based on the project's historical compliance accounts for climate change?

WITNESS NADER-TEHRANI: All scenarios include the effects of climate change. So I'm -- I guess I'm not getting --

MS. NIKKEL: But I think I'm asking about a different part of your analysis. Let me back up a bit. So I'm focused on the testimony that operators would make adjustments to deal with particular salinity events. So I'm not talking about the modeling results

here. And my understanding is your conclusion there is based on the -- your understanding of the projects's historical compliance with 1641 objectives.

WITNESS NADER-TEHRANI: Or in general, not just in -- yeah, of course, yes.

So, again, the main reason I brought that up was that, in context of why the model exceedances I believe are not real, the fact is, there is nothing in the model that would be in response to specific events such as big salinity intrusions where the operators would have a lot more information and can -- then can respond based on day-to-day operations instead of antici- -- in response to anticipated events, that they clearly have more information.

MS. NIKKEL: Dr. Nader-Tehrani, have the adjustments that operators are expected to make in realtime operations, have those adjustments been quantified?

MR. BERLINER: Objection, vague. Quantified as to what?

MS. NIKKEL: Quantified in an analytical sense; quantified as into how much water it would require to avoid those exceedances.

MR. BERLINER: Objection, vague, ambiguous.

CO-HEARING OFFICER DODUC: I would have to agree because I can't follow your question.

MS. NIKKEL: I'll ask the question again.

Have the adjustments that operators are expected to make in a realtime operations to avoid exceedances been quantified in terms of the amount of water that would be required to avoid the exceedance.

MR. BERLINER: Objection. Is this a cumulative amount of water over some historical time or one time?

MS. NIKKEL: In any fashion, quantified in any way, the amount of water over the period of the 16-year record or on a smaller time scale in any fashion.

WITNESS NADER-TEHRANI: I don't know the answer to that.

MS. NIKKEL: So you don't know if you conducted that type of an analysis to quantify the amount of water that would be required by realtime operators to avoid these exceedances?

WITNESS NADER-TEHRANI: Not the way you just described it, no.

MS. McGINNIS: And also object as beyond the scope of his redirect. I don't remember hearing anything about the amount of water.

CO-HEARING OFFICER DODUC: I think there's a tenuous linkage to the issue of realtime operation.

MS. NIKKEL: So the objection is overruled or would you like me to argue?

CO-HEARING OFFICER DODUC: The objection is overruled.

MS. NIKKEL: Okay.

CO-HEARING OFFICER DODUC: You should never let an engineer play attorney.

MS. NIKKEL: So what I heard your redirect testimony to be is that the modeled exceedances that are in the project scenarios and not in the no action alternative will be addressed by operators in realtime, correct?

WITNESS NADER-TEHRANI: In any modeling scenario, what I was trying to get at is there are indications that -- by the model that there will be exceedances. And in my testimony was, in realtime, operators would have access to a lot more information, and none of that went into the modeling, so -- which is the reasons for my basis for my opinion that those exceedances are mostly not real.

MS. NIKKEL: So I'm interested in whether your testimony is changing from your -- and I doubt that it

is, so I just want to understand because previously I heard that the modeled exceedances are not real due to the existence of modeling anomalies or artifacts in the model and not due to the ability of operators to operate in realtime. So which is it? Or help me understand the difference.

WITNESS NADER-TEHRANI: I think it's all tied in together.

MS. NIKKEL: Can you explain how that's tied together? Is it that operators will operate in realtime, or is it that there's modeling anomalies contained within the model?

WITNESS NADER-TEHRANI: Like I said, they're all mixed in together. And I can explain.

MS. NIKKEL: So are you saying take some are due to modeling anomalies and some are due to project operations and the realtime ability of operators to respond to salinity events?

WITNESS NADER-TEHRANI: I'm saying there are modeling exceedances that are due to modeling artifacts based on the different assumptions in the model. And the second is there are model exceedances because the model is not aware of -- you know, it cannot anticipate salinity events the way -- the same way that the

realtime operators would do.

MS. NIKKEL: Okay. And have you quantified which of the modeled exceedances are the result of modeling anomalies and which are those that would be addressed by operators in realtime?

WITNESS NADER-TEHRANI: Often it's hard to distinguish one from the other because they are so intertwined.

MS. NIKKEL: So the answer is no?

WITNESS NADER-TEHRANI: No.

MS. NIKKEL: Thank you. I have nothing further.

CO-HEARING OFFICER DODUC: Thank you, Ms. Nikkel.

With that, I think it's time to call it a day. We will reconvene in the morning.

Mr. Munevar, thank you again. I don't expect that we will see you tomorrow. And we will see everyone else at 9:30 tomorrow for Mr. Aladjem's recross.

I see someone coming up.

MR. WASIEWSKI: Tim Wasiewski. If we could get an estimate as to how long some of the panels might go tomorrow so we can figure out when our witnesses

need to be ready? We're the fifth group, so I don't know how quickly they'll go or how long cross will go but I just want to have people prepared.

CO-HEARING OFFICER DODUC: We will have at least an hour or so of recross for this panel, and then I'm looking at who's left of Group 7.

Group 7 actually has two panels. The first panel consists of Mr. Walter William Bourez and Mr. Easton. Their direct, I was told, was going to be about 15 minutes.

I expect there will be cross-examination, if by no one else, then, by petitioners.

Do you have an estimate at this time, Mr. Berliner or Ms. McGinnis or Ms. Aufdemberge, of cross-examination time for Mr. Bourez and Mr. Easton?

MR. BERLINER: Five to ten minutes.

CO-HEARING OFFICER DODUC: Oh, that's all? Okay.

Anyone else anticipating?

MS. MORRIS: Stefanie Morris, State Water Contractors, not more than 15, probably less.

CO-HEARING OFFICER DODUC: Mr. Herrick?

MR. HERRICK: John Herrick, South Delta Agencies, Group 21, again, short term, maybe ten

minutes.

CO-HEARING OFFICER DODUC: Okay. So I'm guessing, then, that we will definitely get to your second panel of Group 7. And given that your conflict was for tonight, I expect that your witnesses will be ready tomorrow.

MR. BEZERRA: That's a fair expectation. We expect to have that panel here tomorrow. I don't believe that direct will take any more than 40 minutes on the outside.

CO-HEARING OFFICER DODUC: And your estimate, Mr. Berliner, of cross-examination of Group 7's second panel?

MR. BERLINER: An hour.

CO-HEARING OFFICER DODUC: So that takes us -- one, two, three, four -- at least five hours already.

Ms. Des Jardins.

MS. DES JARDINS: Yeah I just didn't get a chance to say I anticipate maybe 15 with Mr. Bourez.

CO-HEARING OFFICER DODUC: Okay. Anyone else planning on conducting cross-examination of group's seven's second panel.

MS. AKROYD: Rebecca Akroyd, for the San Luis and Delta-Mendota Water Authority. We anticipate 30 to

40 minutes.

CO-HEARING OFFICER DODUC: Okay.

MS. MORRIS: Stephanie Morris, State Water Contractors. An hour, depending on what's covered before me. I'll try to keep it shorter.

CO-HEARING OFFICER DODUC: All right. Let's do that then. I think, because we would like to -- because we would -- oh, Mr. Aladjem, you want to add?

MR. ALADJEM: Yes, Chair Doduc. My partner, Mr. O'Brien, has I believe about 30 minutes of cross-examination.

CO-HEARING OFFICER DODUC: All right. Because we would like to adjourn at 4:00 o'clock tomorrow. I don't expect then we will get to -- is it Group 5? Who's up next? I'm sorry.

MR. OCHENDUSZKO: So after Group 7's second panel we will be going to North Delta Water Agency, which is Group 9, and they have three people -- excuse me two people.

CO-HEARING OFFICER DODUC: I believe we will hold them until next week because the cross-examination of Group 7's second panel seems to be adding up to quite a number of hours.

MR. BEZERRA: Yes, and -- Ryan Bezerra.

In relation to that cross, I do have one request if at all possible. We have another unique timing issue. One of our witnesses, Keith Durkin, tomorrow is his last day of employment at San Juan Water District before he retires. So he would very much like to be done tomorrow if at all possible.

CO-HEARING OFFICER DODUC: You know, Ms. Sergent returned as a retired annuitant.

MR. BEZERRA: Yes, I observed that with dismay. But in any case, it would be lovely if we could get Mr. Durkin out of here tomorrow.

CO-HEARING OFFICER DODUC: We will see if we can do that. And he's on the second panel, so what we might to is ask everyone who has questions for him to conduct their cross first.

MR. BEZERRA: I would greatly appreciate that. And Mr. Durkin would appreciate it even more.

CO-HEARING OFFICER DODUC: All right.

MR. BERLINER: We would be happy to give way to those that have questions.

CO-HEARING OFFICER DODUC: Thank you.

With that, let's go ahead and tomorrow, someone I'm sure will remind if I forget, before we break tomorrow, we will go through this sort of

planning discussion again to make sure that we have our witnesses for the following week lined up.

And I believe we only have two days together next week. So I'll have to miss all of you for three days. Oh, I'm not smiling. With that. Thank you all. We'll see you in the morning.

(Whereupon, the proceedings recessed at 4:32 p.m.)

STATE OF CALIFORNIA)
) ss.
COUNTY OF MARIN)

I, DEBORAH FUQUA, a Certified Shorthand Reporter of the State of California, do hereby certify that the foregoing proceedings were reported by me, a disinterested person, and thereafter transcribed under my direction into typewriting and is a true and correct transcription of said proceedings.

I further certify that I am not of counsel or attorney for either or any of the parties in the foregoing proceeding and caption named, nor in any way interested in the outcome of the cause named in said caption.

Dated the 17th day of May, 2017.

DEBORAH FUQUA

CSR NO. 12948