BEFORE THE

CALIFORNIA STATE WATER RESOURCES CONTROL BOARD

CALIFORNIA WATERFIX WATER RIGHT CHANGE PETITION HEARING	)))

Staff note: Strikeouts made pursuant to Hearing Officers' Rulings

JOE SERNA, JR. BUILDING

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

SIERRA HEARING ROOM

1001 I STREET

SECOND FLOOR

SACRAMENTO CALIFORNIA

PART 2

Thursday, March 15, 2018

9:30 A.M.

VOLUME 16

Pages 1 - 245

Reported By: Deborah Fuqua, CSR No. 1248

Computerized Transcription by ProCAT

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

Andrew Deeringer, Staff Attorney
Conny Mitterhofer, Senior Water Resources Control Engr.
Jean McCue, Staff

For California Department of Water Resources

Catherine Cavanaugh, Senior Attorney

Duane Morris, LLP
By: Jolie-Anne Ansley, Attorney at Law

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

State Water Contractors

Adam Kear
Becky Sheehan

(Continued)

APPEARANCES (continued)

Local Agencies of the North Delta
Osha Meserve

County of Sacramento
Aaron Ferguson

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

Delta Agencies and other parties
John Herrick
Dean Ruiz

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

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

Restore the Delta
Tim Stroshane

California Water Research
Deirdre Des Jardins

Clifton Court Forebay
Suzanne Womack

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I N D E X

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I N D E X
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PANEL 4 WITNESSES CALLED BY GROUPS 7, 19, 20, 21, 24

Kerry Schmitz, Laura Foglia, Steffen Mehl, Josef Tootle, John Lambie

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Thursday, March 15, 2018 9:30 a.m.

PROCEEDINGS

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CO-HEARING OFFICER DODUC: Good morning, everyone. It is 9:30. Welcome back to this Water Rights Change Petition Hearing for the California WaterFix project. I am Tam Doduc, and getting ready to sit down and be silent, to my right are Board Chair and Co-Hearing Officer Felicia Marcus, and to the Chair's right, Board Member DeeDee D'Adamo. To my left are Andrew Deeringer and Conny Mitterhofer. We are being assisted by Mr. Baker today.

All right. Usual three announcements, since I do see maybe one new face. First of all, please look around and identify the exit closest to you. In the event of an emergency, an alarm will sound. Please evacuate using the stairs, not the elevators, down to the first floor. If you're not able to use the stairs, flag down somebody, and you will be directed to a protective area.

Secondly -- oh, and one more thing, please take -- when we evacuate and take the stairs down, we will cross the street and meet across the street in the park and wait there for the all-clear signal to return. And please do not jaywalk as I saw Mr. Ferguson do this

morning. Right in front of the Hearing Officer, too. I was behind you, so I knew you were not running late.

Anyway, second announcement, please, as always, speak into the microphone because of the webcasting and recording of this hearing. And begin by identifying yourself and stating your affiliation. Our court reporter is back with us again.

I always thank you for not running away and for returning, Ms. Debbie.

Please make arrangements directly with her if you would like a copy of the transcript prior to the conclusion of Part 2.

And finally and most importantly, please take a moment and set all your noise-making devices to silent, vibrate, or do not disturb.

Couple of housekeeping matters I believe, before we begin. First of all, before I get to you, Mr. Bezerra, there was a motion from the Department of Water Resources yesterday at the conclusion of our hearing yesterday to strike the entirety of Mr. Burke's testimony.

That motion to strike is denied. I will refer you to a ruling of February 21st, 2017. That letter on Page 14 states a long and lengthy explanation with respect to this particular type of objection. I will

just summarize to say that, based on Evidence Code Section 210, a witness's testimony or exhibits may contain only a piece of information that is connected to the case a party intends to make through other testimony or evidence in the record or through an opening statement or closing brief.

I will also add that, in this context, testimony quantifying the extent to which the proposed project may increase salt loading and salinity in the Central and South Delta can inform our ultimate conclusions as to Part 2 key hearing issues.

We, as the Board and the decision makers, do not need he each witness or even each parties so provide complete self-contained theories as to their Part 2 key hearing issues for their testimony to be relevant from an evidentiary standpoint. And I will leave it as that.

Now, next housekeeping matter.

MR. BEZERRA: Yes, thank you very much. Ryan Bezerra. I will defer to Wes Miliband, the attorney for City of Sacramento start this discussion.

MR. MILIBAND: Thank you, Mr. Bezerra.

Good morning, Chair Doduc and Board Chair Marcus and Members of the Hearing Team. To follow on my e-mail from late yesterday afternoon regarding an

emergency, we have undertaken a lot of effort to -- assuming that we can affirm that there is unavailability of Water Forum testimony today or tomorrow, we have spoken with other counsel who have expressed a willingness to be able to fill any gap that might arise once we go through Group 3 and the order of direct testimony by group numbers, to bypass the Water Forum as Group 4, and then start with Group 5.

And I can defer to other counsel for Group 5 and otherwise, but my understanding is that there are a number of witnesses within Group 5 who can be here tomorrow should the need arise. And there might even be a logical break in the hearing to have an early Friday afternoon recess, if so pleases the Hearing Team.

But it does sound like we're in a good position to not lose hearing time unnecessarily.

CO-HEARING OFFICER DODUC: And will the Water Forum be prepared and ready and able to proceed next week?

MR. MILIBAND: Yes, Chair Doduc. We will be ready as of Monday morning.

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

MR. MILIBAND: Thank you.

CO-HEARING OFFICER DODUC: I don't see, hear any objections.

Ms. Ansley.

MS. ANSLEY: No, we've had a very good conversation with Mr. Bezerra and Mr. Miller as well as the counsel who are also here, Mr. Keeling, Ms. Meserve. And we do think that it's possible that these LAND parties will continue through till tomorrow possibly. And then it is our understanding, nicely, from Yolo County, County Sac, that some of their witnesses were already prepared -- the first two short panels were prepared to and on call to go up possibly tomorrow. But we do acknowledge that it may also be a good hearing break after the conclusion of the LAND testimony. So it will be at your preference, though we are in agreement.

CO-HEARING OFFICER DODUC: Thank you.

Mr. Bezerra, for once you come bearing good news.

MR. BEZERRA: For once.

CO-HEARING OFFICER DODUC: Did I speak too soon?

MR. BEZERRA: No, no. I just -- I don't have anything to add. I do want to state, for the record, this hearing looks a little chaotic at times, but I

really want to -- we've talked to many counsel in the last 18 hours, about this. And I just want to compliment absolutely everyone we've talked to. I want to compliment their professionalism in dealing with this not-so-easy situation.

So I just wanted to state that for the record because I think it does need to be stated. We look a little like cats being unable to be herded at times, but I have been very appreciative of counsels' efforts.

CO-HEARING OFFICER DODUC: Thank you. I, too, am very appreciative that this is not -- this is something that we do not have to hash out during the hearing. So I appreciate you all getting together.

MS. ANSLEY: Just one point of clarification, though. It is our expectation that, if indeed County of Yolo, et al. start tomorrow, that immediately following them would be the ARWA parties.

CO-HEARING OFFICER DODUC: Which would be?

MS. ANSLEY: So that it would just be a switch, if indeed that was your choice.

CO-HEARING OFFICER DODUC: Oh, the Water Forum. Yes, okay.

MS. ANSLEY: That there would be no other changes to the order of parties, according to the March 14th, schedule.

CO-HEARING OFFICER DODUC: Is that understood by everybody?

MR. MILIBAND: That is my understanding, assuming that the Water Forum doesn't start any sooner than Monday morning.

CO-HEARING OFFICER DODUC: Thank you.

MR. MILIBAND: And I do second those comments by Mr. Bezerra that the professionalism here and the understanding by the Board is much appreciated. Thank you.

CO-HEARING OFFICER DODUC: All right.

MR. BEZERRA: We will be here Monday morning.

CO-HEARING OFFICER DODUC: We will look forward to that, Mr. Bezerra.

All right. With that, then, Ms. Ansley, I believe you still have a cross-examination to conduct. And since we did not get to it yesterday, if you would go ahead and outline the topic areas you will be covering author both Mr. Neudeck and Mr. Burke.

CHRISTOPHER NEUDECK and TOM BURKE,

called as Panel 2 witnesses by Protestant Groups 7, 19, 20, 21, and 24, having been previously duly sworn, were examined and testified as hereinafter set forth:

CROSS-EXAMINATION BY MS. ANSLEY (resumed)

MS. ANSLEY: I have a shorter -- good morning. My name is Jolie-Ann Ansley for the Department of Water Resources. I have a limited set of questions for Mr. Neudeck on levee construction impacts, barge traffic, and risk of tunneling, which is directly off his topics in his testimony.

And then I have a lengthier cross for Mr. Burke regarding his salinity -- his salt loading analysis. And essentially it is the only topic; we are going to walk through his analysis.

If we could call up Mr. Neudeck's testimony, which is SJC-291. I think you're looking for San Joaquin County. This is Tributary Authority. If we go to Page 5, that would be great.

(Computer tone)

MS. ANSLEY: I promise that is not me.

Mr. Neudeck, on Page 5 to 6, you discuss concerns regarding settlement of levees due to construction truck traffic; is that correct?

WITNESS NEUDECK: That is correct.

CO-HEARING OFFICER DODUC: Is it your understanding that Environmental Commitment 3.3 in the Mitigation, Monitoring, and Reporting Plan addresses geotechnical monitoring for traffic-induced settlement?

MR. KEELING: Objection, foundation. Could we

put the relevant portion of 3.3 up or at least establish that this witness is familiar with it.

CO-HEARING OFFICER DODUC: Sure.

Do that, Ms. Ansley.

MS. ANSLEY: Are you familiar with the Environmental Commitments for the California WaterFix Project?

WITNESS NEUDECK: No, I'm not familiar with the subject matter you're speaking of.

MS. ANSLEY: Maybe we call up it real fast to see if it refreshes your recollection.

Could we call up SWRCB-111. And can go to Page 3-2.

MR. BAKER: Do you have a pdf page?

MS. ANSLEY: No, I don't. I usually -- this is 3-20, not 3-2. So if we can go up just 20 pages or 18 pages. Thank you. Actually, let's just go to the cover page. I can dispense with this.

Do you recognize this document, Mr. Neudeck?

WITNESS NEUDECK: No, I do not.

MS. ANSLEY: So to your understanding, you have not reviewed this document?

WITNESS NEUDECK: No, I have not.

MS. ANSLEY: Have you reviewed the Mitigation Measures in the FEIR?

WITNESS NEUDECK: No, I have not.

WITNESS NEUDECK: Or the Environmental Commitment in the FEIR?

WITNESS NEUDECK: No, I have not.

MS. ANSLEY: Okay. Thank you.

So in preparation of your testimony here today, which is SJC-291, you did not consider the mitigation measures adopted by the Cal WaterFix?

MR. KEELING: Asked and answered.

CO-HEARING OFFICER DODUC: Overruled.

Just answer, Mr. Neudeck.

WITNESS NEUDECK: No. I was very specific as to the two documents I referenced for the purposes of preparing my testimony, and that was not one of the ones that I reviewed.

MS. ANSLEY: And the ones that you reviewed were?

WITNESS NEUDECK: The 2016 EIR/EIS, specifically Chapters 19 related to traffic as it relates to this subject matter, and then the economic sustainability plan for Delta Protection Commission.

MS. ANSLEY: Are you familiar with Mr. Bednarski testimony in Part 1 of this proceeding?

WITNESS NEUDECK: No, I am not.

MS. ANSLEY: So did you not consider his

Part 1 testimony in preparing your testimony today?

WITNESS NEUDECK: I believe I just answered that. Since I'm not familiar with it, I certainly did not reference it in my testimony today.

MS. ANSLEY: Looking at Pages 6 to 9 -- or excuse me. Let's look at Page 7, Lines 3 through 4 of your testimony. Actually, 3 through about 10 is the area I want to focus on.

Do you see that there in front of you? Do you have it?

WITNESS NEUDECK: Yes, I do.

MS. ANSLEY: And in this section of your testimony, you discuss impacts to marine traffic from barge unloading facilities during construction of the Cal WaterFix; is that correct?

WITNESS NEUDECK: That's correct.

MS. ANSLEY: And looking here at Exhibits SJC-294 and 295, which are WaterFix YouTube videos, do you see those?

WITNESS NEUDECK: That is correct.

MS. ANSLEY: Did you use those YouTube videos to calculate the dimension of the barge off-loading facilities that you reference in Lines 4 to 5 there?

WITNESS NEUDECK: It's a general representation. I did not find the actual estimate --

well, there was general estimates as to what those barge loading -- off-loading facilities were. And this was a general representation.

If you note that the follow-on testimony speaks to the actual dimensions listed in text, the YouTube was not complete basis of my measurements. It was the actual text that follows in my testimony. It was part of the EIR/EIS.

MS. ANSLEY: So where you say "250 feet wide to 320 feet," where did you get that exact calculation?

WITNESS NEUDECK: The EIR/EIS. And if you follow through, you'll see that I established the seven locations and their general configurations within the testimony that I present.

MS. ANSLEY: So you did not take measurements from the YouTube video?

WITNESS NEUDECK: Correct. The YouTube video is for depiction, to give a representation of what the facility looked like in space.

MS. ANSLEY: So it was not used for any quantitative purpose?

WITNESS NEUDECK: That is correct.

MS. ANSLEY: Looking at Page 9 of your testimony, Line 1. You have that testimony in front of you?

WITNESS NEUDECK: Yes, I do.

MS. ANSLEY: And you reference the WaterFix EIR Map Sheets M15-1 through M15 -- Sheet 2 through M15-1 Sheet 6 of 7; do you see that?

WITNESS NEUDECK: Yes, I do.

MS. ANSLEY: And on Pages 7 to 9, you compared the channel widths at the temporary barge loading facilities in the text of Chapter 15 of the EIR to these -- to the channel widths that you feel are indicated on these map figures; is that correct?

WITNESS NEUDECK: That is correct.

MS. ANSLEY: And that was the basis of your conclusion that there was a substantial difference between these two sources in channel width; is that correct?

WITNESS NEUDECK: No. The nature of the substantial differences was that the location of the text -- excuse me -- the location of the barge loading -- unloading facilities different -- was different from the mapped version versus the text version. And that was --

MS. ANSLEY: Okay. I think we're saying the same thing.

WITNESS NEUDECK: Okay.

MS. ANSLEY: That you thought you saw a

substantial difference.

WITNESS NEUDECK: I saw differences in particular in the areas that were of a narrow nature having a -- having a very familiar -- very familiar with the Delta channels and their configurations, there was differences that caused me concern. Whether -- I understand this is -- this is still a very variable project, but there was differences.

MS. ANSLEY: And I just wanted to confirm you understand that the maps in the map book are not final engineering drawings; is that correct?

WITNESS NEUDECK: That is my understanding.

MS. ANSLEY: And that they are not drawn to scale for purposes of construction; is that correct?

WITNESS NEUDECK: It wasn't a matter of scale but rather location. If you change the channel, the channel widths vary substantially. Particularly, the bun I'm referring to, Old River to Victoria Canal, Victoria Canal has a channel island berm right down the middle of it. So overall, it might be a 400-foot-wide channel, but in fact, it's only about 150-foot-wide channel because the channel island berm runs down the middle of it.

So there's some pretty substantial differences when it comes to something like that. But I do

understand that there's variances, and these are preliminary drawings.

My intent in mentioning this was, dependant upon where you put this -- put these, there could be substantial impacts.

MS. ANSLEY: And you stated to me earlier that you had reviewed Chapter 19 of the FEIR; is that correct?

WITNESS NEUDECK: That's correct.

MS. ANSLEY: Is it your understanding that the FEIR in Chapter 19 analyzed disruption to marine traffic during construction?

WITNESS NEUDECK: They did to an extent, yes. And they address, as suggested, with regards to the dimensions of the channels. And there is several occasions where there's more than adequate room associated with the adjoining channel, substantial room in the range of 800 to 1,000 feet. And that would not be an area that I would be concerned with. That would be more than adequate room to navigate the adjoining barges.

But there were areas that were not mentioned that were shown on the map, so that gave rise to my concern.

MS. ANSLEY: And I believe you testified

earlier you are not aware of any of the Environmental Commitments of the Cal WaterFix?

WITNESS NEUDECK: That is correct.

MS. ANSLEY: So you have no understanding of the barge implementation plan that is one of the Environmental Commitments of the California WaterFix?

WITNESS NEUDECK: No, I've not.

MS. ANSLEY: Moving to Page 15 of your testimony. I guess starting on Page 13. Oh, I'm sorry. Paragraph 15 on Page 13. Excuse me.

In this section, you discuss risks associated with bored pipelines within the Delta; is that correct?

WITNESS NEUDECK: That is correct.

MS. ANSLEY: Do you have that testimony there in front of you?

WITNESS NEUDECK: Yes, I do.

MS. ANSLEY: You allege, based on two experiences with boring in the Delta that there are issues with boring in soft non-homogenous soil and thus the Cal WaterFix could be at risk; is that correct?

MR. KEELING: Objection to the term "allege." I think he testified to that effect.

MS. ANSLEY: Okay. Thank you.

Is that what you testified to, that the Cal WaterFix could be at risk?

WITNESS NEUDECK: That's correct.

MS. ANSLEY: And you provide us with two examples in your experience. What is the depth of the sewer line, the City of Stockton Municipal Utilities District department tunnel that is referenced in your testimony?

WITNESS NEUDECK: The City of Stockton's Municipal Utilities sewer line was probably a depth of 10 to 15 feet below ground surface.

MS. ANSLEY: And the same question for the interconnect pipeline to the Contra Costa Water District, second Delta intake on Victoria Canal, what was the depth of that?

WITNESS NEUDECK: 40 to 50 feet deep.

MS. ANSLEY: And what is your understanding of the depth of the Cal WaterFix tunnels that are currently proposed?

WITNESS NEUDECK: My understanding, is it's set to be at 140 feet depth from the ground surface.

MS. ANSLEY: You also mention jack and bore and directional boring techniques; is that correct?

WITNESS NEUDECK: That is correct.

MS. ANSLEY: Isn't it true that jack and bore and directional boring tunneling do not utilize face pressure control to stabilize the soil?

WITNESS NEUDECK: That is a different methodology. The purpose of demonstrating those two tunneling methods was to demonstrate that I was familiar with the profiles of the soil types that the tunneling was going through. Granted it is not earth-pressure-balanced boring, but I didn't speak to all of the earth-pressure-balance projects that I was familiar with. But I just want to demonstrate that there is other methodologies crossing these soil types within the Delta region as well.

MS. ANSLEY: Thank you, but I think that I didn't hear an answer to my original question.

Is it your understanding that jack and bore tunneling do not utilize face pressure control?

WITNESS NEUDECK: That's correct.

MS. ANSLEY: And the same question with directional boring. Does it utilize face pressure control?

WITNESS NEUDECK: No, it does not.

MS. ANSLEY: Is it your understanding that the Cal WaterFix will utilize face pressure control?

WITNESS NEUDECK: That is my understanding, that there's a pressure balance machine that does plan on using face pressure control, correct.

MS. ANSLEY: Thank you, Mr. Neudeck.

That is my questions for Mr. Neudeck.

WITNESS NEUDECK: Thank you.

MS. ANSLEY: I'm going to shuffle paper for a second.

Good morning, Mr. Burke.

WITNESS BURKE: Good morning.

MS. ANSLEY: I'd like to, obviously, ask you a number of questions regarding your salt loading analysis on Pages 10 to 11 of your testimony.

Go to Mr. Burke's testimony, which is SDWA-291 and scroll to Page 10, please.

Looking at Page 10 of your testimony, Mr. Burke, do you have it there in front of you, or can you see it on the screen?

WITNESS BURKE: I do have it in front of me, yeah.

MS. ANSLEY: Great. Oh, I do have a preliminary question.

Yesterday you made a number of errata changes to your testimony.

WITNESS BURKE: That's correct.

MS. ANSLEY: Has an errata been submitted for your testimony yet?

WITNESS BURKE: I'm not sure about that.

MS. ANSLEY: So we don't have corrected

tables?

CO-HEARING OFFICER DODUC: Ms. Ansley, I recall Mr. Ruiz saying yesterday they would not be submitting an errata, which is why we spent the time with him reading those corrected numbers into the record.

MS. ANSLEY: I just wanted to make sure before I introduced corrected tables that there were no corrected tables being introduced at this time to --

MR. RUIZ: Correct.

MS. ANSLEY: -- to correct the changes.

MR. RUIZ: Right. The few changes that Mr. Burke went through yesterday have not been submitted in an errata by us at this point in time.

MS. ANSLEY: So -- I'm sorry for the interruption. Looking back at Page 10 of your testimony.

WITNESS BURKE: Yes.

MS. ANSLEY: On Pages 10 to 11, you provide equations with which you used to convert EC to chloride; is that correct?

WITNESS BURKE: That's correct.

MS. ANSLEY: Did you personally develop Equations 3, 4, and 6?

WITNESS BURKE: Equation 3, I did not create.

Equation 4 I believe I did create.

And I don't believe there is an Equation 6.

I'm sorry. I was looking at the number. I -- yes, I did create Equation 3. I created Equation 4, and I created Equation 6.

MS. ANSLEY: For those equations 3, 4, and 6 where can I find the data and calculations you used to develop them?

WITNESS BURKE: The data that was used for creating those equations were taken from the DWR CDEC website as well as the DWR Water Quality Data Library.

MS. ANSLEY: And you did not provide data that you extracted to create these equations?

WITNESS BURKE: No. We didn't provide the Excel spreadsheet that that data was accumulated into.

(Reporter interruption)

WITNESS BURKE: We didn't provide the spreadsheet that that data was put into.

MS. ANSLEY: And I believe you testified yesterday that you used data for the time period from 1951 to 2001 to develop these equations?

WITNESS BURKE: I believe the time period changed for each of the different equations, based on the availability of data from the CDEC website and the Water Quality Data Library.

MS. ANSLEY: So it's possible that Equations 3, 4, and 6 were developed from different time periods?

WITNESS BURKE: They were based on the available data from the CDEC website. And they did cover different time periods. And within each time period, they may have covered different years as well.

MS. ANSLEY: Okay. To make sure I have that right, so the time periods that these equations were developed from were not necessarily the same for each of the --

WITNESS BURKE: That's correct.

MS. ANSLEY: But sitting here today, you do not know the time periods that you used to create these equations?

WITNESS BURKE: I didn't put the time periods to memory of what I used for each of the locations. But I used available data to characterize the water quality as it is at each site.

MS. ANSLEY: I understand that you used available data. Is there a reason why you didn't choose to use the same time period for each equation?

WITNESS BURKE: Since we were looking at a longer time period for the run from 1922 through 2003, I thought that using all of the available data would best characterize the water quality over that period.

MS. ANSLEY: Is the measured data you used to develop the equations, if you recall, instantaneous daily averages or monthly averages or annual averages? What was the data specifically that you input?

WITNESS BURKE: The data were instantaneous graph measurements collected at the stream.

MS. ANSLEY: For all of the equations you developed?

WITNESS BURKE: For all of the equations I developed.

MS. ANSLEY: And as well -- okay.

In your testimony, you provide Tables 2, 3, and 4, Correct? These are the tables of your results.

WITNESS BURKE: That's correct.

MS. ANSLEY: Did you provide the underlying data -- and I assume it's a spreadsheet -- that went into creating these tables?

WITNESS BURKE: No, the underlying spreadsheet was not provided.

MS. ANSLEY: So no one can check the accuracy of your calculations?

WITNESS BURKE: The data from those spreadsheets was extracted explicitly from the output of the DSM-2 analysis that was submitted by DWR. So the basic data is on the website. Just the

spreadsheets that we used to tally the data was not submitted.

MS. ANSLEY: Yes, I understand that. But then you used your chloride conversion. So we don't have your data to run your entire calculations; is that correct?

WITNESS BURKE: That would be correct.

MS. ANSLEY: Is there a reason why you didn't provide these spreadsheets as an exhibit to your testimony?

WITNESS BURKE: No, there wasn't a reason. We can provide them if necessary

MS. ANSLEY: Yes, we would like the Hearing Officers to order that these spreadsheets be provided so that we can check the veracity of these calculations.

CO-HEARING OFFICER DODUC: Since Mr. Burke has offered, I don't think there's any need for me to order.

Do I, Mr. Ruiz?

MR. RUIZ: No. You do not need to order that.

MS. ANSLEY: Thank you very much.

Now, I'd like to step back and take a look at your results. Can we look at Figure 1 on Page 8 of your testimony. Do you have that in your testimony or

up on the screen there, Mr. Burke?

WITNESS BURKE: Okay. I see that figure.

MS. ANSLEY: Yes, and I acknowledge that the right-hand screen is the one you should be looking at because the colors are different on the two screens.

The red line -- the red line on this figure denotes the area of your analysis; is that correct?

WITNESS BURKE: That's correct.

MS. ANSLEY: And your analysis encompasses only the South Delta as denoted here by this red line; is that correct?

WITNESS BURKE: That's correct.

MS. ANSLEY: So you are not drawing conclusions about salt loading for other parts of the Delta or the Delta as a whole; is that correct?

WITNESS BURKE: The analysis just looked at the South Delta. Whether that same type of result would be applicable to other parts of Delta, we don't know at this time.

MS. ANSLEY: You did not look into it?

WITNESS BURKE: No, I did not.

MS. ANSLEY: Okay. So looking at this figure -- and I'll admit I had to spend some real time with your analysis -- the arrows denote the potential direction of flow; is that correct?

WITNESS BURKE: That's correct, in a general context.

MS. ANSLEY: So if you look on the --

CO-HEARING OFFICER DODUC: I'm sorry. Did you finish, Mr. Burke, your answer?

WITNESS BURKE: Oh, it's correct in a general context.

MS. ANSLEY: So if you look at San Joaquin River at Vernalis, which is the bottom right portion of this screen, it shows only inflow; is that correct?

WITNESS BURKE: That's correct.

MS. ANSLEY: Into your area.

Likewise, the three export locations in your analysis -- which would be the SWP exports, the CVP exports and the CCWD intake -- show only outflow because they are export points; is that correct?

WITNESS BURKE: That's correct.

MS. ANSLEY: And then the other locations, Old River, Middle River, and San Joaquin River -- I believe that's at Burns Cut -- shows potential direction either direction?

WITNESS BURKE: We were giving a double arrow like that to show two potential directions because they are much more likely to have flow going in either direction than the other components would.

MS. ANSLEY: Okay. Can we turn to Table 1 now on Page 6 of your testimony. Okay. Do you have that in front of you?

WITNESS BURKE: Got it.

MS. ANSLEY: I'd like to confirm the way these components and the directional arrows in your figure are then used in your analysis as depicted in this table.

So in your result, the positive numbers that we will see in your charts denote the default direction, as you note here in Table 1; is that correct?

WITNESS BURKE: That would be correct. It would denote a downstream direction of the flow in that particular component.

MS. ANSLEY: So San Joaquin River at Vernalis, the inflow to the South Delta will be positive because that is the default direction?

WITNESS BURKE: When the water is flowing into the South Delta, it will be positive; that's correct.

MS. ANSLEY: And for the rest of the components of your water budget, 2 through 6 there, outflow from the South Delta will be denoted by positive numbers; is that correct?

WITNESS BURKE: That's correct.

MS. ANSLEY: Now can we turn to Table 3 on Page 17 of your testimony.

Yesterday this is what we looked at to form your errata, the final row in this table; is that correct?

WITNESS BURKE: That's correct.

MS. ANSLEY: And this is -- this table is the mean salt flux under the No Action Alternative in your analysis; is that correct?

WITNESS BURKE: It's the salt -- mean salt loading on a monthly basis for each of the seven different locations that we had in our analysis.

MS. ANSLEY: Okay. Under the No Action Alternative; is that correct?

WITNESS BURKE: For the No Action Alternative, correct.

MS. ANSLEY: And so the bottom row as depicted here -- and I understand that your errata is the mean of the columns above it.

WITNESS BURKE: It was incorrectly calculated as a mean, and it should have been a sum of those numbers, which was part of the errata that we provided yesterday.

MS. ANSLEY: Right. And we're walking through this slowly to make sure there's absolute clarity.

On the bottom right corner, as noted yesterday I believe by the Hearing Officer, the negative 48,693, that is the total chloride in metric tons. It's the sum of the last column; is that correct?

WITNESS BURKE: That is the residual from the water budget after taking the in -- the salt that comes into the South Delta and subtracting the salt that was leaving the South Delta.

MS. ANSLEY: And it is the sum of that final column; is that correct?

WITNESS BURKE: That's correct.

MS. ANSLEY: And now on Table 4, which is the next page, I assume, this is a similar table, obviously. But here the bottom row is the sum of the columns above it, is the sum metric tons of salt at each of those water component locations?

WITNESS BURKE: That's correct.

MS. ANSLEY: At this time, I'd I like to pass out Exhibit DWR-1152. It is a cross exhibit. I have copies for the Hearing Officers and the panel as a whole. I also have copies for the attorneys and the witness. And we have provided an electronic copy to -- that you see now on the screen.

Now, I'm sorry, Hearing Officers, this is going to be a little slow, like I said, because this

can get confusing and we have corrected numbers to work through.

Mr. Burke, let's look at DWR-1152, for which I provided you a copy. I represent that we've taken your two tables and the information they've provided and including what would be the missing information from your Tables 3 and 4, which would be -- on Table 3, we provided the totals now, and on Table 4 we provided the average. It's just to complete all the information that you previously provided.

Could you please confirm that Tables 3 and 4 on DWR-1152 is the same as your Table 3 and 4 except for the corrected rows that we have inputted the correct numbers? And I'm sorry, but that may take a moment. I represent that, you know, we accurately did it, but --

WITNESS BURKE: I would have to take a look at this for a minute to review it.

MS. ANSLEY: That's fine. I think it's important.

CO-HEARING OFFICER DODUC: Why don't we take an early short break.

Would ten minutes due, Mr. Burke?

WITNESS BURKE: I think that should be sufficient.

MS. ANSLEY: And I'm also going to ask him to confirm the sums. And I don't believe we need the averages, but you know, if you'd like to average really fast to make sure that we've accurately done our spreadsheet -- but I'm going to be asking you about the total chloride summing, so please confirm that as well.

CO-HEARING OFFICER DODUC: Given those additional requests, do you need more time?

WITNESS BURKE: Yeah, maybe an extra five minutes, ten minutes.

CO-HEARING OFFICER DODUC: All right. Why don't we reconvene at 10:30.

WITNESS BURKE: Okay.

CO-HEARING OFFICER DODUC: All right.

MR. RUIZ: Thank you.

(Recess taken)

CO-HEARING OFFICER DODUC: All right. It is 10:30. We are back.

And, Mr. Burke, have you had a chance to look at this?

WITNESS BURKE: Yes, I have.

CO-HEARING OFFICER DODUC: All right.

WITNESS BURKE: Sorry. Yes, I've reviewed the tables that they provided.

CO-HEARING OFFICER DODUC: All right. Then

I'll turn this back to Ms. Ansley.

MS. ANSLEY: Mr. Burke, so you have confirmed that the data in Tables 3 and 4 on DWR-1152 is the same as your Tables 3 and 4 except for the corrected bottom rows?

WITNESS BURKE: The bottom row looks to be the sum as we have tallied up in our tables as well, but they differ a little bit from our tables because we had more decimal places in the numbers that we used in the Excel spreadsheet. So they're off by sometimes a 1 or 2.

MS. ANSLEY: That's correct. We could only add the numbers that you provided us on these tables.

Other than those minor -- the minor rounding differences I'll call them, you did not see any differences between your Tables 3 and 4 and our -- you did not see any differences in the data on your Tables 3 and 4 and our Tables 3 and 4?

WITNESS BURKE: We didn't check the averages of each source because we didn't use that in our analysis. But we checked the totals, and the totals match up with our numbers.

MS. ANSLEY: Okay. So we're confirming that our totals are also correct on our corrected Tables 3 and 4 on DWR-1152. Great.

So let's look at the totals in DWR-1152, Tables 3 and 4, which we -- if you turn to the next page of DWR-1152, we've actually --

(Reporter interruption)

MS. ANSLEY: I sure can. I get excited.

THE REPORTER: "DWR-1152"?

MS. ANSLEY: I don't remember.

So looking at the second page of DWR-1152, we've extracted the total so that we can make some easy comparisons. Do you see that there on the screen or in the copy in front of you, Mr. Burke?

WITNESS BURKE: Yes, I do.

MS. ANSLEY: Okay. Starting on the left side with the SJR at Vernalis column, the No Action Alternative and the proposed action show approximately the same result in "Total Chloride" totals; is that correct?

WITNESS BURKE: Yes, that's correct.

MS. ANSLEY: And because it is a positive value, this is showing salt loading into the South Delta; is that correct?

WITNESS BURKE: That's correct.

MS. ANSLEY: And then let's bump over to -- skipping the San Joaquin River at Burns Cut, let's look at the Middle River. Here, both the No Action

Alternative and the proposed action show negative value in the "Total Chloride" rows for the Middle River, correct?

WITNESS BURKE: That's correct.

MS. ANSLEY: And negative values here means salt is moving into the South Delta at Middle River under both scenarios; is that correct?

WITNESS BURKE: That's correct.

MS. ANSLEY: Isn't it true that, using your analysis totals, that there is less salt moving into the South Delta under the processed action than under the No Action Alternative at Middle River?

WITNESS BURKE: For that one component, that's correct.

MS. ANSLEY: Thank you.

Moving to Old River, both the scenarios NAA and PA also show negative values; is that correct?

WITNESS BURKE: Yes, that's correct.

MS. ANSLEY: Excuse me. In the "Total Chloride" rows?

WITNESS BURKE: For the total chloride rows, that's correct.

MS. ANSLEY: And negative values at Old River, in your analysis, means salt is moving into the South Delta at Old River; is that correct?

WITNESS BURKE: That's correct.

MS. ANSLEY: And it is occurring under both scenarios; is that correct?

WITNESS BURKE: It is.

MS. ANSLEY: And isn't it true that, for Old River, less salt is moving into the South Delta under proposed action as compared to the No Action Alternative in your analysis?

WITNESS BURKE: For that one component of the seven totals, that's correct.

MS. ANSLEY: Okay. So looking at this -- looking at the extracted totals and the three components that we just looked at -- SJR Vernalis, Middle River, and Old River -- these are the three components under your analysis that are adding salt to the South Delta; is that correct?

WITNESS BURKE: That's correct.

MS. ANSLEY: And we have marked them here in blue. And you're confirming that those are the three, for lack of a better word, I'll say input in the South Delta in your analysis?

WITNESS BURKE: That's correct.

MS. ANSLEY: And we have confirmed that your analysis indicates that there is less salt being added to the South Delta under the proposed action than the

No Action Alternative; is that correct?

WITNESS BURKE: That's correct.

MS. ANSLEY: Okay. Now, moving to San Joaquin River at Burns Cut, both the scenarios -- the NAA and the proposed action -- show positive values in the "Total Chloride" rows; is that correct?

WITNESS BURKE: That's correct.

MS. ANSLEY: And this means that, at San Joaquin River at Burns Cut, under your analysis, salt is leaving the South Delta under both scenarios?

WITNESS BURKE: That's correct.

MS. ANSLEY: And isn't it true that more salt is leaving the South Delta at Burns Cut -- San Joaquin River at Burns Cut under the proposed action as compared to the No Action Alternative?

WITNESS BURKE: For that one component, that's correct.

MS. ANSLEY: Looking across at the -- at the end, at the Contra Costa Water District diversion, this also denotes salt leaving or export -- being exported from the South Delta; is that correct?

WITNESS BURKE: Yes, that's correct.

MS. ANSLEY: And can we agree that these numbers, these totals are roughly similar at the Contra Costa Water District diversion?

WITNESS BURKE: They're very similar, that's correct.

MS. ANSLEY: So looking at your analysis and at the exports from the South Delta and looking at the exports from the projects, your analysis indicates that the difference between the NAA and the PA is that, at the export locations, the PA's removing less salt from the South Delta than the NAA; is that correct?

WITNESS BURKE: Yes, that's correct.

MS. ANSLEY: And this is because exports from the South Delta are less under the proposed action; is that correct?

WITNESS BURKE: Yes, that's correct.

MS. ANSLEY: So less pumping equates to less salt removal in your analysis?

WITNESS BURKE: Yeah, the reduction in pumping will also have a concurrent reduction in the removal of salts from the South Delta.

MS. ANSLEY: I'm sorry. Could you repeat that?

WITNESS BURKE: The reduction in pumping in the preferred alternative has a concurrent reduction in the amount of salts that's removed from the South Delta.

MS. ANSLEY: Okay. I think I heard you

correctly that the reduction in pumping means a reduction in exports at the export pumps, a reduction in salt leaving the Delta at those pumps.

WITNESS BURKE: That's correct.

MS. ANSLEY: Okay. We're still on the same page.

Now let's look at the totals in the last column, Mr. Burke. Would you agree that -- oh, but along with us confirming that exports of salt from the export pumps are less under the proposed action, we have also confirmed that there is salt being added to the South Delta by the proposed action in your analysis; is that correct?

MR. RUIZ: Object, that misstates his testimony.

MS. ANSLEY: I'm asking him to confirm that.

WITNESS BURKE: Where the salt is coming in through Vernalis, Middle River, and Old River, there is less salt coming into the South Delta in the proposed alternative than in the No Action Alternative.

MS. ANSLEY: Thank you. And those are the only inputs in your water component analysis; is that correct?

WITNESS BURKE: That's correct.

MS. ANSLEY: Okay. So now let's look at the

totals in the last column.

So would you agree that the values in the last column are net chloride computed based on your Equation 2, which we've also excerpted and shown in the lower right here, from your testimony? Or lower left, excuse me, the lower left.

WITNESS BURKE: That's correct.

MS. ANSLEY: And don't the negative values in the last column indicate that there was more salt leaving the South Delta channel than what is coming in under both the NAA and the proposed action?

WITNESS BURKE: No, it doesn't.

MS. ANSLEY: Okay.

WITNESS BURKE: What that last column represents is residual, the difference between the influx of salt into the South Delta and the outflow of salt from the south Delta. It's not necessarily the total of salt. It just represents the residual from the budget because the internal use of salt and irrigation, drainage, seepage and return flows is not part of this calculation -- just the salt coming into or leaving the South Delta.

MS. ANSLEY: I hear what you're saying, and we're getting there. I just want to confirm something, however. The fact that both of these numbers, the NAA

total and the PA total, indicates in your analysis that under both scenarios, at least, more salt is leaving the South Delta there is an export of salt

MR. RUIZ: I'm going to just object. That was vague and ambiguous.

MS. ANSLEY: More salt in the flux, more salt is leaving than is coming in, which is why these numbers are negative?

WITNESS BURKE: No, I --

MR. RUIZ: Hold on for a second --

CO-HEARING OFFICER DODUC: Hold on. One --

MR. RUIZ: The objection is that may have been a clarification, but it's still vague and ambiguous. And it was a statement, not a question. So I'm not sure exactly what the statement is or the question is at this point.

CO-HEARING OFFICER DODUC: Ms. Ansley, please try again.

MS. ANSLEY: Let's just concentrate on the NAA total, which is negative 48,692 metric tons. Do you see that there?

WITNESS BURKE: Yes, I do.

MS. ANSLEY: Does a negative number, using your Equation 2, indicate that there is more salt leaving the South Delta than entering the South Delta

in your analysis?

WITNESS BURKE: Not necessarily because this isn't an evaluation of just the salt that's leaving the South Delta. It's the residual of the salt budget. Not all components have been taken into account for the salt budget. We don't have the internal concentration of the channels. We don't have the irrigation and drainage return flows. We don't have seepage.

All we're doing is looking at a net flux from the boundaries of the South Delta.

MS. ANSLEY: So -- okay. I understand you're saying this is a simplistic net flux. But a negative number on your --

WITNESS BURKE: No --

MR. RUIZ: I'm going to object and ask that that be stricken. That misstates his testimony. He didn't say it was a simplistic analysis.

MS. ANSLEY: All right. I understand you're saying it's a net flux. Looking at your Equation 2, would you agree that any resulting negative number means that there is a net flux of salt leaving the South Delta or --

WITNESS BURKE: I don't think you could make that conclusion based on that number alone. It's more of a comparative analysis using one scenario against

another just to look at the change in flow characteristics.

There are other factors that determine what salt is contained within the channels. That is not part of this budget, since we're only looking at salt coming into or leaving the system.

MS. ANSLEY: I understand that. I'm just trying to confirm what a negative value in the end means under Equation 2.

WITNESS BURKE: All you can do is look at that as being a residual of the budget. You can't really state that that's necessarily an outflow from the system. It's just a residual of the budge after the inflows and the outflows have been subtracted.

MS. ANSLEY: But looking at your Equation 2, the right side of the equation is a -- I guess it's a -- it's -- you're minusing inputs and outputs; is that correct?

WITNESS BURKE: That's correct.

MS. ANSLEY: Okay. So looking at the proposed action total, which is negative 18,369, this is similarly negative, correct?

WITNESS BURKE: That's correct.

MS. ANSLEY: And this was also based on your Equation 2?

WITNESS BURKE: Yes, that shows the net residual chloride after you look at all the inflows and outflows from the South Delta defined area.

MS. ANSLEY: The negative 18,369 itself is not a residual; it is an indication that -- the negative number means that there is more leaving than entering the South Delta under your water component analysis, with the understanding that we are only talking about the components of your water analysis; is that correct?

WITNESS BURKE: If there's --

MR. RUIZ: Hold on. I'm just going to object as compound and vague and ambiguous.

MS. ANSLEY: So looking at your Equation 2, do you see that?

WITNESS BURKE: I do.

MS. ANSLEY: And if we have sort of the inputs minus the outputs, isn't the only way that the result can be negative is if the amount flowing out of the Delta in your flux equation is more than the inputs? Just looking at your Equation 2, simplistic.

MR. HERRICK: If I may, I just want to object to asked and answered. I don't want to interrupt the efforts to clarify. But we've now had five questions that asked, "Doesn't the negative number mean less or more salt left the area," and for five times he says,

"No, you can't look at it that way."

So if the Board -- if the Hearing Officers would like to go forward with that, that's fine. But I think he's answered this five times now.

CO-HEARING OFFICER DODUC: He has.

Ms. Ansley --

MS. ANSLEY: I don't believe he's answered my last question about his Equation 2.

CO-HEARING OFFICER DODUC: All right. Let's try again.

MS. ANSLEY: Looking at your Equation 2, is the right side of the equation a series of inputs and outputs?

WITNESS BURKE: That's correct.

MS. ANSLEY: And the only reason a net chloride result would be negative here is if the -- if the output would be greater than the inputs?

WITNESS BURKE: That's correct.

MS. ANSLEY: Okay. And we've confirmed that both the NAA total and the PA total and the proposed action total in your analysis are negative; is that correct?

WITNESS BURKE: That's correct.

MS. ANSLEY: So to reach your conclusion of 30,000 metric tons of more salt being brought in and

left behind in the Delta under the proposed action than the No Action Alternative, you subtracted the residual for the proposed action from the residual from the No Action Alternative, correct?

MR. RUIZ: I'm just going to object that that mischaracterizes and misstates his testimony.

MS. ANSLEY: I believe he does say that there's more salt, the 30,000 is the salt -- there's more salt brought into the Delta.

Do you not, Mr. Burke?

WITNESS BURKE: The 30,000 represents the difference between residuals from the No Action Alternative and the preferred alternative. So under the preferred alternative, there is 30,000 metric tons less being removed from the South Delta than under the No Action Alternative.

MS. ANSLEY: Can we look at your Opinion 1 on Page 3, please, Lines 17 through 19. Do you see that testimony?

WITNESS BURKE: Yes, I do.

MS. ANSLEY: And do you see where you conclude that, on average, there will be an increase of roughly 30,000 metric tons brought into the South Delta each year under the CWF proposed action?

WITNESS BURKE: I see that.

MS. ANSLEY: Okay. So I'm asking now, to reach your conclusion of 30,000 metric tons of more salt being brought into the South Delta under the proposed action than the NAA, what you did was subtract the residual for the proposed action from the residual for the No Action Alternative; is that correct?

WITNESS BURKE: That's correct.

MS. ANSLEY: And to make sure we're crystal clear, you subtracted negative 18,369 from negative 48,692; is that correct?

WITNESS BURKE: That's correct.

MS. ANSLEY: And you are claiming this is because of reduced South Delta exports under the proposed action as compared to the No Action Alternative?

WITNESS BURKE: One of the elements of that is the reduction in South Delta exports that, under the No Action Alternative, removes -- will remove 485,000 metric tons and, under the proposed alternative, will only reduce to 259 metric tons.

MS. ANSLEY: But to make this comparison between the No Action Alternative and the proposed action, for which we've confirmed that you've subtracted the totals one from the other, isn't it true that, to arrive at your conclusion of a residual, the

inputs or the loads coming into the Delta would have to be the same under the No Action Alternative and the proposed action?

WITNESS BURKE: I'm not sure I understand the question.

CO-HEARING OFFICER DODUC: Thank you. I'm not sure I understand it either.

MS. ANSLEY: So we just confirmed that it's your opinion that 30,000 metric tons of more salt are being brought into the South Delta under the proposed action than the No Action Alternative.

WITNESS BURKE: No, I --

MR. RUIZ: Hold on.

I'm just going to object. That's a statement, not a question of his testimony. I'm going to object to that based on those grounds. There needs to be a question posed.

MS. ANSLEY: Have -- isn't it true that you have concluded that there is an increase of roughly 30,000 metric tons of salt brought into the South Delta each year under the CWF proposed action?

MR. RUIZ: I'm just going to object as asked and answered.

CO-HEARING OFFICER DODUC: Ms. Ansley, actually, we can all see it right there.

MS. ANSLEY: Sure. I --

CO-HEARING OFFICER DODUC: Right?

MS. ANSLEY: Okay.

And isn't it true that, when you compare the total from your Equation 2 to assume that 30,000 -- that 30,000 metric tons are brought into and, as you say, are residual in the South Delta under the proposed action, to make that simple comparison between the two results of the equation, don't you have to assume -- aren't you assume that the inputs are the same?

MR. RUIZ: Objection, compound, vague and ambiguous.

CO-HEARING OFFICER DODUC: Mr. Burke, what is the assumption in your analysis regarding the input of salt into the triangle?

WITNESS BURKE: The input comes from the different sources of salt coming into the South Delta -- the San Joaquin River, Middle River, Old River, south -- leaving the San Joaquin River in the north end of the South Delta. And the numbers that I've presented here in my testimony represent the residual of the budget for the No Action Alternative and the preferred alternative. I would not state --

CO-HEARING OFFICER DODUC: Hold on, hold on.

Because of this being residual, did you make

the assumption that the inputs are the same for the No Action Alternative as well as the preferred alternative?

WITNESS BURKE: I'm not sure what you mean by "inputs." The locations that water flows into the South Delta are all the same for each alternative.

CO-HEARING OFFICER DODUC: The salt loading coming into --

WITNESS BURKE: No. The salt loading, the flow and salinity concentration as computed with the DSM-2 model are different from each model at each different location for each scenario.

MR. HERRICK: If I may, that's the chart showing differences under the No Action and the preferred alternative. And they're -- each of the inputs, whether it's an outflow or inflow, are different, as I understand it. So they're not the same -- if that helps clarify the question or what the answer is.

MS. ANSLEY: All right.

So I'm not asking about the totals under each scenario. I'm asking about the propriety of taking the results of those two equations and doing a simple subtraction in your final column -- or as shown in the final column, our DWR-1152, where you subtracted

negative 18,369 from 48,692 to assume that 30,000 metric tons were being added to the Delta. Aren't you making an apples-and-oranges comparison?

Since the inflow of salt is different under the two scenarios, you can't simply subtract or compare the resulting net residuals for each scenario to reach a conclusion about increased salt loading, in other words, the salt brought in?

MR. RUIZ: I'm going to object as compound. There's several questions and several layers of testimony there.

MS. ANSLEY: All right.

Since the inflow of salt is different under two scenarios, isn't it true that you can't simply subtract or compare the resulting net residuals for each scenario to reach your conclusion?

WITNESS BURKE: No, I would disagree with that completely. That's exactly the purpose of a budget is to look at the changes that occur from one scenario to the next.

MS. ANSLEY: Looking at your results on this table, doesn't your analysis show that the proposed action is bringing in approximately 169,000 metric tons less salt than the No Action Alternative into the South Delta?

WITNESS BURKE: I'm not sure where you're getting that 169,000 number from.

MS. ANSLEY: We're adding up the -- do you see the third row in DWR-1152, Page 2 on the Table on the top, where we subtracted the PA and the NAA of your totals? Do you see that?

WITNESS BURKE: I see that row.

MS. ANSLEY: And we have marked the inputs, under your analysis, of salt to the South Delta in blue. Do you see that?

WITNESS BURKE: That's correct.

MS. ANSLEY: And if you added those three blue numbers -- or if you added those three numbers, it would be approximately 169,000 metric tons less salt than the NAA.

MR. RUIZ: Is that a question or --

MS. ANSLEY: Is that correct? I'm asking you to take a look.

WITNESS BURKE: The tally of the influx or the change in influx from those three sources is correct as you're stating. But that's only half the story. You have to look at what's also leaving in order to balance that budget out and evaluate what the net flux actually is.

MS. ANSLEY: Right. I agree, but I am asking

you only doesn't your analysis demonstrate that there is 169,000, approximately, metric tons less salt being brought into the South Delta under proposed action than the NAA?

MR. RUIZ: Objection, asked and answered.

MS. ANSLEY: I don't believe I got an answer.

CO-HEARING OFFICER DODUC: Hold on.

Mr. Burke, let's answer as straightforward as you can.

WITNESS BURKE: Could you repeat the question, please?

MS. ANSLEY: Looking at the three totals in blue, which we have agreed are the inputs under your analysis to the South Delta, isn't the total there approximately 169,000 metric tons?

WITNESS BURKE: I haven't added it up, but it looks approximately like that number.

MS. ANSLEY: And doesn't this show that there is approximately 169,000 metric tons less salt being brought into the South Delta under the proposed action in your analysis?

WITNESS BURKE: There is 169,000 metric tons less salt being brought into the Delta under the proposed alternative, but yet there's 225,000 metric tons --

CO-HEARING OFFICER DODUC: Let's stop. Let's stop and just answer the question that she asked you for now.

MR. HERRICK: And I would just add to that, the witness -- you said "brought into the Delta." We're not talking about the Delta. We're talking about the Southern Delta as delineated on your figure. So just to be clear.

WITNESS BURKE: I'm sorry. I guess I went a little too far. Could you repeat the question, please?

MS. ANSLEY: I think I got the answer.

CO-HEARING OFFICER DODUC: You answered it.

MS. ANSLEY: Per the direction of your counsel, he was clarifying that you mean the South Delta whenever you're speaking under your analysis; is that correct?

WITNESS BURKE: Yes, that's correct.

MS. ANSLEY: So we have confirmed -- and I have two points. That's it.

MR. HERRICK: Objection, argumentative. If you start --

CO-HEARING OFFICER DODUC: I can't hear you, Mr. Herrick. I'm sorry.

MR. HERRICK: We constantly have this "we've confirmed." All we have to do is ask a question and

not start testifying and injecting our opinions. Thank you.

MS. ANSLEY: All right.

CO-HEARING OFFICER DODUC: All right, Ms. Ansley.

MS. ANSLEY: All right.

And if you look at the row for the proposed action independently, looking at the negative 18,369 number -- do you see that?

WITNESS BURKE: I do.

MS. ANSLEY: This is your analysis. There is more salt leaving the South Delta under the proposed action than what is being brought in; is that correct?

WITNESS BURKE: If we're looking at just the external sources, that's correct.

MS. ANSLEY: We're looking at the components of your water analysis. So I'd prefer an answer that is -- under your analysis, there's -- under the proposed action, there is more salt leaving the South Delta in total than what is coming in?

MR. RUIZ: I'm going to object. It Mischaracterizes his testimony. It was answered. She didn't like the answer. That's fortunate, but he provided the answer. So the commentary on what she would like, I think, is inappropriate.

MS. ANSLEY: No, I'm actually asking --

CO-HEARING OFFICER DODUC: Hold on.

MS. ANSLEY: Oh, excuse me.

CO-HEARING OFFICER DODUC: You guys are giving me a headache. I'm sure Mr. Burke is -- all right. Let's ask the question again, Ms. Ansley. Let's leave out the commentary.

MS. ANSLEY: I am focusing solely on the proposed action analysis. So that would be the second row in the table. And these are my last two questions.

So your analysis for the -- independently of the No Action Alternative, your analysis for proposed action indicates that there is more salt leaving the South Delta than what is coming into the South Delta even when the level of South Delta exports are lower; is that correct?

WITNESS BURKE: That's correct.

MS. ANSLEY: I have no further questions.

CO-HEARING OFFICER DODUC: Thank you, Ms. Ansley.

I believe the State Water Contractors requested 30 minutes. Do you still need that Ms. Morris?

MS. MORRIS: I don't think I have any questions. Thank you.

CO-HEARING OFFICER DODUC: Thank you, Ms. Morris.

We then have Ms. Meserve, who requested 20 minutes.

Do you need a break after that, Mr. Burke?

WITNESS BURKE: No, I'm fine.

CROSS-EXAMINATION BY MS. MESERVE

MS. MESERVE: Good morning. Osha Meserve for Local Agencies of the North Delta, et al. I just have a few questions for Mr. Neudeck regarding earthquake risk and levees. And I think that 20 minutes should be fine, give Mr. Burke a rest.

Let's see, Mr. Neudeck, on Page 10, Line 14 of your testimony, you reference -- I think maybe going to your PowerPoint is easiest because your figures are all together in that.

So that would be SJC-315. And on Slide 17, there is a figure regarding seismic risk to the levees.

And are you -- and here on this figure, was the purpose of this figure to show that you were concerned about -- well, let me just ask you.

What was the main purpose of this figure, to begin with?

WITNESS NEUDECK: Well, as it's identified on the exhibit, this is an historic earthquake map. It

was something I believe was developed by the United States Geological Survey. And it demonstrates the magnitude of earthquakes. I don't know over what period. I think it was over about a 50-to-75-year, maybe longer, period.

And it was to demonstrate that California, in particular, west of the Delta, is an active seismic zone. And this demonstrates the degree with which those earthquakes resulted in certain magnitude earthquakes and was a demonstrative exhibit to demonstrate that this area is active in seismic nature -- from a seismic nature. Excuse me.

MS. MESERVE: And are you concerned as -- you've described your experience as an engineer in the Delta for various RDs.

Are you concerned about risk to levees from earthquake from a flood control perspective?

WITNESS NEUDECK: As stated in my direct, it's not a high priority concern. We represent both urban -- those levees that protect homes as well as rural levee that protect farmland.

With regards to urban levees, seismic risk is a much more heightened consideration because the nature of level of protection is much more substantial when protecting lives, health, and safety to that degree,

much more dense populations.

But with regards to addressing seismic risk in a rural sense, it's a lower priority. We have in the Central Sacramento-San Joaquin Delta, we have a lot of other risks that we face on a routine basis that are more substantial, risks such as I mentioned in my direct testimony's associated with static stability, just from the high water and sub-sea level conditions behind these levees, issues such as rodent activity, issues such as general consolidation and settlement.

We're not ignoring it. We're actually accomplishing some mitigation by virtue of how we're constructing these levees. We're moving the levees landward as time develops. And by flattening slopes, adding toe berms. We're adding lateral strength in the event of an earthquake.

Furthermore, if an earthquake were to occur, you'd generally get vertical settlement, in some cases substantial vertical settlement. If you're adding material to the levee back slope, it would also serve as an immediate source of fill to re-raise the levee, provided you did not have an overtopping.

So say an earthquake occurred at a low tide, one could immediately use that material that you placed on the land side of the levee to raise the levee back

up to its preexisting condition prior to the earthquake.

MS. MESERVE: And so if there was an earthquake, do you believe that in general the levees could be -- any levee damage could be relatively quickly restored?

WITNESS NEUDECK: That's been my general experience. I've been in the field for 35 years. We are very cautious and very reactive to any event, regardless if it's in the near vicinity. Every time an earthquake occurs, we have people out on our levees within an hour's time.

We recently this past fall had an earthquake on Twitchell Island, right in the middle of it. Had someone on the island within 15 minutes. We've yet to see any distress, deflection, cracking, anything related to a seismic event really probably in the last hundred years.

I've looked into this beyond my term in doing work and talked with some of the historic families that exist in the area to ask if they've seen anything. The Delta in general is fairly ductile and does not seem to be a rigid structure. And it seems to do well in earthquake matters.

MS. MESERVE: Could you explain the term

"ductile" you just used?

WITNESS NEUDECK: Yes. "Ductile," from that perspective, it's not a rigid rupture-type structure. It's more of a -- if I were to use analogous -- as a rubber band. The soil will not shear or crack, as much anticipated.

And the sand lenses, which typically are what causes settlement and subsidence due to general liquefaction -- so think about shaking wet sand and recognizing it tends to spread -- because the Delta was formed in a manner with dredgers, there's nothing realistically consistent in the foundation materials. It's very inconsistent. So you don't have these through-levee sand lenses throughout your system.

You do on the upper reaches, rivering systems, the upper San Joaquin and the upper Sacramento, you'll get into where you have layered sand lenses but not so much in the Sacramento-San Joaquin Delta, where it was dredged.

MS. MESERVE: And are you aware of studies that have tried to simulate earthquake effects on levees in the Delta?

WITNESS NEUDECK: Yes, there was one. And thus far, the studies have not been conclusive. The nature of -- there's a lot of scientists trying to

predict whether the organic matter in the Delta -- and I'll use the term peat. So think of peat moss that you'd use in your garden -- whether that accelerates or dampens the seismic action.

And they've done shake studies, and thus far, the results have been inconclusive.

MS. MESERVE: And are you aware that seismic risks are cited as a reason why the Delta tunnels should be built to preserve export water supplies in the event of an earthquake?

WITNESS NEUDECK: Yes, that's my understanding.

MS. MESERVE: And do you agree with that position?

WITNESS NEUDECK: Well, in comparison to the prior conveyance suggested, which was the open canal system, the open canal system would be at risk similar to our levee system. Therefore, supposedly by burying the tunnels you can mitigate some of that seismic risk. There's still -- you're still putting a rigid structure, a tunnel, in a seismically active zone.

MS. MESERVE: And do you believe it would be possible to maintain the existing levee system to provide a pathway for the water supplies to go through the South Delta in the event of an earthquake?

WITNESS NEUDECK: Yes, I believe so. I -- that is my profession, my business. And I've been doing it for, like I said, the last 35 years, and I plan on doing it for the next 20 years.

This is a -- this practice of maintaining and operating levee systems within the Sacramento-San Joaquin Delta I believe we've been very successful with, and we've proven that it's feasible.

MS. MESERVE: What's the biggest challenge as a district engineer in being able to maintain the levees?

WITNESS NEUDECK: Unfortunately, it's most like everything; it's money. It -- where we have a greater resource of funds, we have a higher level of protection. So if you were to compare urban levees to rural levees, where we have a lot more homes, we can produce a lot safer levee. Where we have we have less homes and more crops, we produce a slightly less safe levee.

Now, the risk goes along with the reward. If we were to flood out 10,000 homes, that's a pretty significant impact. The cost and recovery of that is much more substantial than the cost and recovery of flooding out 10,000 acres of farmland. So it's not that it's an immeasurable matter. It's just that, with

more funding, we can do greater things. I don't think it's an extensive amount of greater funding, but we're doing what we can with what we have.

MS. MESERVE: Are you aware of estimates of the amount of funding that would be required to bring the levees, say, for instance, to the PL 84-99 level in the Delta?

WITNESS NEUDECK: Yes, my firm, along with another engineering firm known as MBK -- MBK is another similar firm that does the other about 50 percent of the reclamation districts in the Delta -- have done analysis over time. And it's somewhere in the $600 million range.

And the PL 84-99 was what we call our base level of protection, provides a foot and a half of freeboard, certain configurations on the land side slope and the water side slope.

There's another standard that we're now applying, what's known as the Bulletin 192-82. And that is the Department of Water Resources standard. And it's of a similar nature, similar factors of safety. And it's what we would like to see as our base-level protection. We think if all levees within the Sacramento-San Joaquin Delta were to reach that standard, then we'd basically have a good foundation

for flood fight and maintenance and operation into the future.

MR. KEELING: Mr. Neudeck, you used the word "freeboard," which you used yesterday. Could you, for the record, define that, tell us what you mean?

WITNESS NEUDECK: Certainly. The freeboard is the portion of levee that's above the 100-year flood elevation. It's also referred to as the base flood elevation. The Federal Emergency Management Agency wants to move away from the term "100-year floodplain" because it infers that it only happens once every hundred years, so they've renamed it the base flood elevation. It's one and the same.

So nevertheless, it's the amount of levee above the 100-year flood, recognizing that the studies that go into developing that 100-year flood are not perfect. So we want some level of protection and height above the highest anticipated water elevation.

MS. MESERVE: And in your experience, would maintaining and improving the levee to meet the Bulletin 192-82 standard you referenced be the best way to preserve water supplies for export?

WITNESS NEUDECK: Yes, and I think we're well along our way in achieving that. We're in the process of, now, farm water resources is now requesting what

they call a five-year plan update to determine whether or not -- what degree and what level the districts have sought and achieved that standard.

But, yes, I believe that that standard will get us to a reasonable position in maintaining the levees well into the future and certainly maintain the configuration as it exists today and provide adequate water quality to the southern diversion points.

MS. MESERVE: And would construction of the tunnels help protect water supplies for those people in cities and industries that rely on water locally, that's not for export?

WITNESS NEUDECK: Well, from my perspective, we do have intakes within the Central Delta that I believe could potentially be harmed by the diversions north of there if they were to take adequate supplies for their needs and then therefore that freshwater would no longer pass through the Delta.

MS. MESERVE: So just to clarify, would you agree then that construction of the tunnels wouldn't help protect local water supplies in the event of an earthquake?

WITNESS NEUDECK: Yes.

MS. MESERVE: And then your testimony on Page 10 at the bottom of the page talks about

considering impacts to -- of levee risk from construction.

Do you have any specific concerns about tunnel construction in wintertime conditions when precipitation is occurring and water tables in the islands are very high?

WITNESS NEUDECK: I have concerns with regards to construction of this tunnel that are at the heart of my engineering understanding of this. Tunnels of this size and this nature and these soil types have never been completed anywhere in the world, and where they have similar sizes and major failures.

These tunnels are not only going through high water, high groundwater areas, they're going through underground gas fields. There's a number of impacts that create a problem for the tunneling, such as I suggested in my testimony on the soft soils, but also access to these tunnels.

During the winter conditions, many of the roads that lead to and from these sites, both from a levee perspective and internal perspective, are not what we consider all-weather road access. So rain conditions many times shuts down, for extended periods of time, access throughout this region just because we do get heavy rainfall on what otherwise is just dirt

roads.

MS. MESERVE: And on -- could we go scroll down to the slide that's marked SJC-311.

And on Page 11 of your testimony toward the bottom you refer to this figure. Can you explain with this figure what your specific concern was with ruptures of the tunnel?

WITNESS NEUDECK: The purpose of this was to demonstrate that the Clarksburg end to the forebay, Clifton Court Forebay, is in a downstream condition. So there is pressure, gravity pressure head. The water's higher as it enters in in Clarksburg, and that's what's causing the water to flow to the south.

If the pipeline were to rupture and the ground above it were to rupture, that water could escape upwards and flood the ground above it, provided you're at the lower end.

MS. MESERVE: And what do you think would cause such a rupture?

WITNESS NEUDECK: The only thing that would likely cause that would be a major earthquake with a shearing action that would create a rupture in the tunnel.

CO-HEARING OFFICER DODUC: Ms. Ansley.

MS. ANSLEY: I'm going to object that this

lacks foundation and is beyond the established expertise of this witness.

In direct, he testified that he only had experience with shallow tunnels or boring efforts. I believe that they were all less than 40 feet. There's been no establishment that he has experience with tunnels of this magnitude and to render opinion on what would cause a rupture of a tunnel such as California WaterFix at 150 feet.

CO-HEARING OFFICER DODUC: What is your expertise in this area, Mr. Neudeck?

WITNESS NEUDECK: I am not a tunneling expert. I'm a registered civil engineer that has experience in -- such as I the evidence to date. It was my opinion that this was a potential.

CO-HEARING OFFICER DODUC: Goes to weight.

Proceed, Ms. Meserve.

MS. MESERVE: Thank you. I actually just had a couple of short questions for Mr. Burke here, at the end of my notes. So if I might just have an additional like three or five minutes?

Mr. Burke, on Page 19 of your testimony, Lines 16 and 17, you state that the increase in salt could be problematic for the ecosystem. Are you aware that salinity in water and soils could also be

problematic for agriculture in the Delta?

WITNESS BURKE: Yes, I am.

MS. MESERVE: And are you aware of some of the testimony presented in Part 1 with respect to salt loading and soils and applied irrigation water, for instance?

WITNESS BURKE: I've reviewed some of that testimony, yes.

MS. MESERVE: Do you think additional studies should be undertaken to determine what the amount of salt loading would be in the Southern Delta and perhaps elsewhere under the proposed tunnel project?

WITNESS BURKE: I do have concerns over the nature of using a long-term averages for determining the changes in salt loading from the No Action Alternative to different projects, and looking at a shorter time frame might provide a better perspective of whether or not salt loading in any particular year or period of years could adversely affect aquatic ecosystems or agriculture or other municipal uses.

MS. MESERVE: Are you aware of whether such studies have been undertaken by petitioners in this hearing?

WITNESS BURKE: I haven't seen any such studies.

MS. MESERVE: Would you think that those kinds of studies should consider impacts both on the ecosystem and on agricultural and community uses of water as well?

WITNESS BURKE: Yes, I do.

MS. MESERVE: And do you think that those kind of studies are feasible to undertake?

WITNESS BURKE: Yes, they're very feasible.

MS. MESERVE: Thank you.

No further questions.

CO-HEARING OFFICER DODUC: Thank you, Ms. Meserve.

Mr. Jackson, you are up.

CO-HEARING OFFICER DODUC: Mr. Jackson -- oh.

MR. JACKSON: As you know, I used the word "reserve." I believe my questions have been asked and answered, and so I don't have any at this point.

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

Let me ask Ms. Des Jardins and Ms. Womack. Ms. Des Jardins had requested 60 Minutes, Ms. Womack, 45.

Ms. Womack, do you think you can finish your cross-examination by the noon hour? And if so, would Ms. Des Jardins mind if we swapped the two of you? I'd

rather do that than break Ms. Des Jardins's cross-examination for our lunch break.

Ms. Womack, are you prepared to go?

MS. WOMACK: I would rather go in order.

CO-HEARING OFFICER DODUC: All right, then, Ms. Des Jardins. So we'll find a good time to break, Ms. Des Jardins.

And if we had donuts, Mr. Jackson, I would bring you one today.

MR. JACKSON: Thank you.

CROSS-EXAMINATION BY MS. DES JARDINS

MS. DES JARDINS: I'm Deirdre Des Jardins with California Water Research, and I primarily have questions for Mr. Neudeck. I -- can we bring up Mr. Neudeck's testimony at SJC-291, Page 14, at 7/8.

So your testimony, you consider boring in soft, nonhomogeneous soils as very challenging, correct?

WITNESS NEUDECK: That's correct.

MS. DES JARDINS: I wanted to ask you, let's go to the proposed mitigation for settlement while boring. I'd like to go to Exhibit SWRCB-111. And it's pdf Page 166, at 1 to 8.

So please read the paragraph at the top, about the Settlement Monitoring and Response Program. Let me

know when you're done.

WITNESS NEUDECK: Yeah, I've read the Lines 1 through 8. Do you want me to continue?

MS. DES JARDINS: You can read further, if you want.

WITNESS NEUDECK: Okay. I'm through 13.

MS. DES JARDINS: Okay. So this describes risks of ground settlement during tunneling, and I wanted to know if these are the kind of risks your testimony referred to.

WITNESS NEUDECK: No, it is not. The risks I was relating to was associated with loaded truck traffic on levee roads.

MS. DES JARDINS: But you do discuss boring, risks of tunnel boring as well in your testimony?

WITNESS NEUDECK: That is correct. And I agree with much of what's said in these two paragraphs I've just read. I'm familiar with the pressure balance borings and done a number -- I've been involved, not designed, but rather involved as a reclamation district representative with a number of earth pressure balance tunneling projects. So I'm familiar with what's being said in these two paragraphs.

MS. DES JARDINS: So one of the things it says is the magnitude of risk for ground settlement depends

on the excavated diameter of the tunnel; is that correct?

WITNESS NEUDECK: That's what it says.

CO-HEARING OFFICER DODUC: Hold on.

Ms. Ansley.

MS. ANSLEY: I'm going to object. He's already testified that he's not familiar or has no experience with this type of tunnel project that the California WaterFix will encompass. And now he's being asked again to provide input on potential impacts on those tunnel borings at the level of the California WaterFix and risks of subsidence.

He clarified that the subsidence he was talking about was truck traffic on levees.

CO-HEARING OFFICER DODUC: Mr. Keeling.

MR. KEELING: Given the range of this witness's experience and the nature of the question, which goes a little bit beyond what he testified to in his direct, I think that any expansion of evidence -- of his testimony beyond that would be a matter of weight for the Hearing Officers.

MS. ANSLEY: My objection wasn't to the scope of cross. It was to that this witness has already answered that he does not have experience with tunnels of this magnitude and this depth, such as the Cal

WaterFix. And he said that in response to whether he could provide testimony regarding such impacts.

So here, he's being asked to testify about subsidence with the type of tunnel construction and depth that we are talking about with the Cal WaterFix.

So it's not that the scope of cross is improper; it's that he has already testified that he is not an expert on this. I will also point out that he has said -- already testified that he is completely unfamiliar with the Mitigation Monitoring and Reporting plan or program, which is this document, and he's unfamiliar with the mitigation measures.

MR. KEELING: Mr. Neudeck has indicated that he is not a tunnel expert per se, but he has indicated what his expertise is and his experience is with reclamation districts and tunneling. And I think that these questions are within the range of his expertise and experience.

CO-HEARING OFFICER DODUC: All right. Objection overruled.

You may continue, but we will take that into consideration when we weigh the evidence.

MS. DES JARDINS: So Mr. Neudeck, I was trying to ask you, one of the factors in a risk for ground settlement depends on excavated diameter of the tunnel.

And you described a 72-inch-diameter boring machine in your testimony?

WITNESS NEUDECK: That's correct.

MS. DES JARDINS: And that's 6 feet in diameter?

WITNESS NEUDECK: Yes, it is.

MS. DES JARDINS: Whereas the WaterFix tunnels are 40 feet in diameter?

WITNESS NEUDECK: The tunnels themselves are 40 feet. The boring will be much larger than that. There's what's called an annular space. The actual boring is larger than the tunnel in order to construct the tunnel within it. So it's probably something on the order of 46 to 48 feet in diameter. I don't know the exact number to -- kind of depends upon the lining of the tunnel and how they want to handle that annular space.

MS. DES JARDINS: So there's something called face loss with tunneling, which has to do with the area of the tunnel boring machine. Are you familiar with that?

WITNESS NEUDECK: Generally I think face loss is what -- the difference between where the earth pressure balance face of the machine is relative to the material it's cutting. That's my limited knowledge of

what I construe to be face loss. So if you're in a liquid material or a material that's voided, that space could be greater, and you won't have that direct point of contact up against the boring machine; whereas, if you're cutting through very rigid, rock-like material, that space will be much more limited and much more narrow.

MS. DES JARDINS: Are the sediments the Delta more rock-like or softer?

WITNESS NEUDECK: No, they're not rock-like at all; they're very soft material.

CO-HEARING OFFICER DODUC: Ms. Ansley?

MS. ANSLEY: Vague and ambiguous as to depth and -- of the sediments, and likewise, then, the response would be vague and ambiguous, if we're talking about the depth of the tunnel.

CO-HEARING OFFICER DODUC: Ms. Des Jardins, clarify.

MS. DES JARDINS: I could go to the CER. I was not trying to get that level of -- level of specificity with deltaic soils.

MS. ANSLEY: I think I was just asking for a more clear question as to what you meant by "sediment."

MS. DES JARDINS: Mr. Neudeck, are there -- how -- do you know how deep is to bedrock in the Delta,

like, solid hard rock?

WITNESS NEUDECK: No, actually I do not know. The formation of the Delta is over millions of years, and it's an interlayment of vegetation, sediment. Vegetation rots, the sediment comes back on top of that and ends up being peat-like, very soft formable soils. We do a fair amount of borings for our levee construction.

Granted, they are not 200, 300, 400-foot deep. But they are down relatively deep, 100-plus feet, 120 feet deep, and you're not running into anything of a rigid nature.

If you run into some clays, which would be construed in our realm rigid, something that would be competent -- we're typically trying to find material that limits the passage of water. That's a good boring for us. But we never find rock.

The only -- you might find rock as you move outside the Delta, outside the basin, move into the upstream conditions. Then you get into the cobble, the hydraulic mining elements, maybe a little more sand -- but not in the Delta itself. It's in the bottom of the system, and that's how that region was formed.

MS. DES JARDINS: Would it be correct to characterize the settlements at the bottom of the

borings that you've seen as clay, sand, or silt?

WITNESS NEUDECK: Exactly.

MS. DES JARDINS: Thank you.

So I'd like to go back to this. Let's scroll down to 37 of 41, which discusses monitoring -- well let's start at 31, regarding geotechnical studies. And then at 37 of 41 it discusses ground stabilization methods and settlement monitoring programs.

WITNESS NEUDECK: Okay. I've read that.

MS. DES JARDINS: Mr. Neudeck, would it be of concern that the settlement monitoring hasn't been specified yet? Or does this indicate that the settlement monitoring has been specified?

MS. ANSLEY: Vague and ambiguous as to "specified." Can we get some clarity on that?

MS. DES JARDINS: Mr. Neudeck, this states, "Settlement monitoring programs will be evaluated," correct?

WITNESS NEUDECK: That is what the document states.

MS. DES JARDINS: "Will include prescriptive specification requirements for settlement monitoring of sensitive features such as levees," correct?

WITNESS NEUDECK: That's correct.

MS. DES JARDINS: So that -- that indicates

that settlement monitoring programs have not yet been evaluated or will be evaluated in the future?

WITNESS NEUDECK: That's correct. And I believe, in this particular instance, it covers a concern I would have. Any time we do what we wall a normal or perpendicular cross into levees, such as one that would result from tunneling below them, we are very concerned as to settlement of the levee.

I did not directly testify to this, but we would seek and expect extraordinary monitoring during the course of construction and immediately thereafter. The course of construction, of course, is the most dangerous time frame, when you're tunneling and creating that initial void.

Once the tunneling structure is built in and the annular space is filled, the settlement risk is reduced. But every tunneling project we've had beneath a levee we monitor substantially during the course of construction as well as before and as well as after. But during the course of construction there's substantial monitoring.

MS. DES JARDINS: Mr. Neudeck, with the reclamation districts that you're involved with, has DWR had any discussion about working with them on monitoring during tunneling?

WITNESS NEUDECK: No, the only time that we've spoken with DWR related to this project relates to the geotechnical boring permission to get onto the property and near the levees for boring the alignment -- excuse me -- for drilling and investigating the underground soil profiles along the alignment.

MS. DES JARDINS: Mr. Neudeck, has there been any discussion with the reclamation districts you represent of what might be maximum safe settlement when tunneling under levees?

WITNESS NEUDECK: Having set forth standards of this nature for any other perpendicular-type crossing -- pipelines, nominal pipelines, I mean, pipelines that would be less than two foot in diameter, bridge construction, things of that nature, any movement whatsoever causes us concern because it typically indicates there's a problem. We'll evaluate that concern and monitor it.

If the movement is, say, less than, you know, a couple tenths, you know, less than an inch, then maybe we're okay. But once that movement starts, we're immediately attentive to it, and then we monitor it very closely. If the occasion does not stop, then we ever some substantial concern.

Setting forth the trigger criteria would

probably bring be on a district-by-district basis if we represented it. Any movement whatsoever requires contact and evaluation immediately with the local reclamation district engineer.

MS. DES JARDINS: Mr. Neudeck, would the risks be greater if there was tunneling under levees during times of high water?

WITNESS NEUDECK: Certainly. That would not be a good time for us to be doing this because, as I've indicated on my settlement consolidation testimony, we's not dealing with a tremendous amount of freeboard so settlement becomes more sensitive what when the water's high. We're dealing with less levee height.

So if you look at the 2017 flood event, many cases we had less than 14 inches of freeboard, that being the portion of levee above the high water, for several hours a day for a period of about two weeks out there. If we were tunneling during that period, I'm not sure that we'd be comfortable, given that any settlement could potentially lead to a breach.

MS. DES JARDINS: I'd like to pull up DDJ-156. That's not -- it's on my -- yeah, yeah. Thank you.

I wanted to ask you about this. This is a design and construction enterprise agreement. And I wanted to ask you about it for specific provision.

Page 4.

CO-HEARING OFFICER DODUC: One, are you familiar with this document?

WITNESS NEUDECK: No, I'm not.

MS. DES JARDINS: There's just one provision regarding actions that could add 60 or more days to the conveyance project schedule that I wanted to ask him about.

CO-HEARING OFFICER DODUC: Let's go there and see what it is.

MS. DES JARDINS: Page 4. Let's scroll out and scroll down please. Zoom out a little.

So this says that the authority -- that the Department of Water Resources director will have to get advice and concurrence of the authority that is constructing the tunnels. And it includes, No. 2, "Any actions that, in the reasonable judgment of the Authority Board, could cumulatively add 60 or more days to the conveyance project schedule previously approved by the parties."

CO-HEARING OFFICER DODUC: Let's see what the question is.

MS. DES JARDINS: So the question is if there was a conveyance project schedule and there needed to be significant delays, seasonal delays to avoid times

of high water, would you be concerned if -- if there was this provision that would require complete concurrence of all of the water agencies to delay?

MR. KEELING: Objection, vague, ambiguous --

CO-HEARING OFFICER DODUC: Sustained.

MR. KEELING: -- internally compound.

MS. DES JARDINS: Okay, never mind.

MS. ANSLEY: And I have the objection onto that one. I think it's improper to read into testimony the provisions of the agreement. If she has a question about delay, then that can be done without referencing an agreement he's hot familiar with.

MS. DES JARDINS: Okay. Well, if -- is it possible, Mr. Neudeck -- let me frame this -- I apologize. I'm not an attorney, and I'm learning to do cross.

So, Mr. Neudeck, if tunneling under levees was not done during times of high water, could that potentially add delays to the tunnel schedule?

CO-HEARING OFFICER DODUC: Do you know what the current schedule is and how the tunnel -- I'm speechless.

Ms. Morris, help.

MS. MORRIS: I think just to summarize what you're trying to state for the record, I would object

that the question is speculative. And it's a question based on a draft document as well.

MR. KEELING: As I understand the question, what she meant to ask was if you have an opinion as to whether avoiding high water periods for tunneling would delay the project.

CO-HEARING OFFICER DODUC: But that implies this current schedule doesn't account for --

MR. KEELING: I don't think there's a foundation for it.

CO-HEARING OFFICER DODUC: Sustained.

MS. DES JARDINS. I would like just to have a chance to respond to that because there is nothing about this project is well defined. The engineering is at 10 percent. There isn't a construction schedule, the AMM's refer to future. And for that reason, it's very difficult to ask questions about -- like, for example, construction conditions without some speculation.

If the trial-like standards barring speculative evidence were followed completely, none of this would be before the Board. So there wouldn't be direct testimony from the petitioners. There wouldn't this and there wouldn't be cross -- I wouldn't be attempting to do cross. So I was attempting to ask a

question about possible -- possible condition and possible concern about delays. So I just wanted to raise that.

And to the extent that it's been admitted under Government Code 11513.C, a project that's very speculative, I'd like to be able to ask questions under those same standards.

CO-HEARING OFFICER DODUC: Ms. Des Jardins, you've established -- at least the witness has responded to your question that the issue of high water level is of concern to him.

Where you went, I think, beyond what is reasonable for speculation was to ask him about a schedule which he does not have familiarity with and, to his knowledge, may or may not have consideration of high water levels already integrated.

So, again, the objections are sustained. Please move on.

MS. DES JARDINS: Okay.

CO-HEARING OFFICER DODUC: Ms. Womack.

MS. WOMACK: I believe what Ms. -- my objection to the sustaining is what is in place for when there are storms like last year that go on for months and to keep people from --

CO-HEARING OFFICER DODUC: Ms. Womack, I'm

acknowledging that high water level is a concern, and so did the witness. The problem here is she's asking a question upon which he has no foundation to respond.

Enough. Enough. Let her continue.

MS. WOMACK: But, so there's --

CO-HEARING OFFICER DODUC: You will get your chance. Let her continue.

MS. WOMACK: Okay.

MS. DES JARDINS: Next I want I wanted to ask some about seismic design. You described the tunnels as a rigid structure, Mr. Neudeck?

WITNESS NEUDECK: Yes, generally speaking, the structure that I believe -- and, again, I don't have design plans like the rest of this -- that it will be made up of concrete liner. And that's -- concrete, as we all know, is relatively rigid.

Some -- there will be some form of lining. Whether it's reinforced concrete, whether it's steel, whether it's a combination of steel and concrete, somehow there has to be a formable structure in place to convey water through the almost nearly 40 miles of distance in a safe and, you know, regular manner.

MS. DES JARDINS: Mr. Neudeck, as a civil engineer are you familiar with the concept of seismic design criteria for structures in California?

WITNESS NEUDECK: Generally. I -- we -- I am not licensed as a structural engineer. My firm works with licensed structural engineers. And I understand, you know, particle velocities and general characteristics associated with it.

And we're not -- my firm does not work routinely with structural design. We're more on the ground, earth work, site plan.

MS. DES JARDINS: I just want to ask you some general questions. Are you familiar with the concept of a maximum considered earthquake --

WITNESS NEUDECK: Yes, I am.

MS. DES JARDINS: -- in California?

And what is that?

WITNESS NEUDECK: It's what -- it's a design standard -- maximum credible earthquake, it's a design standard by which designers must consider when looking at the seismic risk of a particular facility that they're designing.

MS. DES JARDINS: So would you be concerned that the tunnels could survive a maximum credible earthquake without severe leakage?

CO-HEARING OFFICER DODUC: Ms. Morris.

MS. MORRIS: I will object to be this question on the basis that it's speculative and vague and

ambiguous. In addition, I think that this witness has testified he's not a structural engineer. And under Evidence Code 801, he should not be providing expert opinions regarding matters where he is not qualified to provide them.

CO-HEARING OFFICER DODUC: I think, however, if I understand, Ms. Des -- Ms. Des Jardins, are you asking him as an earthquake expert, or are you asking him --

MS. DES JARDINS: I'm asking him --

CO-HEARING OFFICER DODUC: I mean, generally, we're all concerned that the tunnel will survive.

MS. DES JARDINS: As a civil engineer responsible for these -- maintenance of these levees, and at SJC-291, Page 11 at Line 19 -- I can go back and read it, but he discusses the risk if a seismic event were to occur and its impact to the proposed segmented concrete tunnel.

I was just trying to define what -- what kind of seismic event, which I believe would be -- potentially engineers look at a maximum considered earthquake; that would be the kind of seismic event that you will like your tunnels -- in your testimony, that you would like the tunnels to survive without developing a severe leak, correct?

CO-HEARING OFFICER DODUC: I am sustaining the objection. He has said he is only vaguely familiar with that term, but he is not registered as a structural engineer.

MS. DES JARDINS: Okay. Well, would you -- let's go to SJC-291, Page 11 at Line 19.

And you state there, "If the concrete tunnel were to rupture due to a seismic event" -- let's look at Line 18.

CO-HEARING OFFICER DODUC: Let's let him look at it, and then ask your question.

MS. DES JARDINS. And you discuss --

CO-HEARING OFFICER DODUC: Without paraphrasing his testimony.

MS. DES JARDINS: So I can't use any of the words here?

CO-HEARING OFFICER DODUC: You can use it, just try not to paraphrase what he said.

MS. DES JARDINS: I can't refer to the testimony in any way?

CO-HEARING OFFICER DODUC: What is the question?

MS. DES JARDINS: I don't know how to phrase it without at least using some of the phrases in the testimony.

CO-HEARING OFFICER DODUC: Ask the question.

MS. DES JARDINS: This is his actual testimony, and I'd like to be able to just refer to some of the phrases in doing the question.

CO-HEARING OFFICER DODUC: Ask the question.

MS. DES JARDINS: Okay. So you're asking -- you're talking about considering -- you testified about considering the risk of a seismic event here, correct?

WITNESS NEUDECK: That's correct.

MS. DES JARDINS: And if the tunnels were to rupture due to a seismic event, you're concerned if that happened under a levee, for example?

WITNESS NEUDECK: Yeah, my concern goes to anywhere downstream of the intakes, particularly down closer to the southern end, that the head, the height of the water could reach -- if there was ground fracture above the tunnel as well -- could reach the ground surface and flood the ground surface.

MS. DES JARDINS: Let's scroll down a little bit. Scroll down further to where you discuss head. Go ahead. Scroll back up.

And so you're concerned the water could reach the surface of the ground and flood the islands, correct?

WITNESS NEUDECK: That's correct.

MS. DES JARDINS: And where would -- if there were flooding, would there and could there be a sinkhole?

WITNESS NEUDECK: Yeah, the -- well, strike -- yeah. I apologize.

What forms after a seismic event is not -- I'm not testifying to. I'm testifying for the potential -- if the structure of the tunnel were to rupture, and because there's a pressure head associated with the gravity of the water flowing down it, it could reach the ground surface.

Whether that is a large sinkhole -- it will certainly form a sinkhole because, if the water continues to flow, the ground above it will also wash away as the water is pushing up towards the ground surface. It will create a sinkhole, in effect, like you would see if you broke a sprinkler line in your lawn. You will create, ultimately, a sinkhole because the water is pressurized and is pushing the soil above it out.

MS. DES JARDINS: And what would happen if that happened under a levee crossing?

WITNESS NEUDECK: You could potentially rupture and fail the levee system.

MS. DES JARDINS: What would happen if that

happened under a Delta channel?

WITNESS NEUDECK: You would simply be adding Sacramento River water to that channel.

MS. DES JARDINS: Okay.

WITNESS NEUDECK: It's what they call -- in the terms that are not specific, but it's what they call hydrofracking. When you're tunneling with a directional bore, they actually do that under pressure. And they can actually fracture the ground above it. And the drilling fluids will actually escape up into the above-ground soil.

So it's a very large concern with directional boring. And that can either be on the surface, underneath the levee, or in the middle of a channel. And a similar thing could possibly occur, but this would be with fresh water, so the impacts to a channel would be substantially less.

MS. DES JARDINS: So it might be more of an issue for tunnel operation if it was under a channel than for --

WITNESS NEUDECK: That is correct.

MS. DES JARDINS: Okay. So you would like to see, as I've just asked, a civil engineer responsible for levee maintenance in this district which is also a public health concern, you would like to see the risk

of a seismic event adequately considered in the design?

WITNESS NEUDECK: Yes, with the potential State investment, I would expect a robust -- and I stand strongly behind that -- a robust seismic design.

MS. DES JARDINS: Are you aware that seismic design criteria for the tunnels have not yet been set?

WITNESS NEUDECK: No, I'm not.

MS. DES JARDINS: Let's go to Exhibit DDJ-255.

CO-HEARING OFFICER DODUC: And we are breaking for lunch in three minutes.

MS. DES JARDINS: Okay.

That's on the stick, up at the top. There we go. And I'd like to go to pdf Page 31, please.

CO-HEARING OFFICER DODUC: Are you familiar with this document, Mr. Neudeck?

WITNESS NEUDECK: No, I'm not.

MS. DES JARDINS: I just wanted to ask about --

WITNESS NEUDECK: Let me correct that. I've seen these solicitations. They've been e-mailed to my attention, but I have not thoroughly read them. So I'm familiar with the State Department of Water Resources requests, and I likely have scanned this, but I've not reviewed it or spent any time --

MS. DES JARDINS: Just there's one part I'd

like that's relevant.

I'd like to go to pdf Page 21 document Page 28. And let's zoom out please and scroll down. And it's No. 9.

And it says, "The EDM will provide the following design services," and it says, "Construct seismic design of project facilities."

Can you read that?

WITNESS NEUDECK: Yes, I can read that.

MS. DES JARDINS: What does that indicate to you as an engineer? This is an RFQ.

MS. ANSLEY: Objection, vague and ambiguous. What does it indicate to him? Is there a specific question about design criteria?

CO-HEARING OFFICER DODUC: Yes, what is your question?

MS. DES JARDINS: Does this indicate that the seismic criteria for the tunnels have not -- for the project facilities, WaterFix project facilities, have not yet been set?

MS. ANSLEY: Calls for speculation. He's already testified that he is not aware whether the design criteria has been set.

CO-HEARING OFFICER DODUC: I think she's asking him to extrapolate, speculate based on this

December 2017 announcement, which may or may not have already expired.

MS. ANSLEY: I would renew the speculative objection then.

CO-HEARING OFFICER DODUC: Just -- overrule.

Answer so we can go to lunch, please, Mr. Neudeck.

WITNESS NEUDECK: Okay. In my professional capacity, I'd to have say in a vacuum it's very difficult to answer this question. One would truly be speculating that the Department had not already undertaken an analysis, and this was simply a peer review, peer consideration, or maybe they have not. If you take it for it's face --

CO-HEARING OFFICER DODUC: But you do not know?

WITNESS NEUDECK: I do not know. And taken for its face value, one can imply. But I --

CO-HEARING OFFICER DODUC: But you do not know?

WITNESS NEUDECK: I do not know.

CO-HEARING OFFICER DODUC: Thank you. We're breaking for lunch. We will return at 1:00 o'clock.

(Whereupon, the luncheon recess was taken at 12:01 p.m.)

AFTERNOON SESSION

(Whereupon, all parties having been duly noted for the record, the proceedings resumed at 1:02 p.m.)

CO-HEARING OFFICER DODUC: All right, everyone, please take a seat.

Now that we're all refreshed from lunch, we will turn to Ms. Des Jardins to resume her cross-examination, unless there are any housekeeping matters.

MR. RUIZ: Could we just do one?

CO-HEARING OFFICER DODUC: Mr. Ruiz.

MR. RUIZ: Yes. Based on the pace of this looks pretty obvious that we're not going to get to Dr. Michael or Mr. Nomellini today.

I just wanted to --

CO-HEARING OFFICER DODUC: Why not? Ms. Des Jardins has 23 minutes left, and Ms. --

MR. HERRICK: There's another panel.

MR. KEELING: Well, we have another panel.

CO-HEARING OFFICER DODUC: Oh, another panel. Okay. That is correct. We -- I thought you meant your third panel.

MR. RUIZ: No.

CO-HEARING OFFICER DODUC: That is correct.

We will not get to your final panel today.

MR. RUIZ: Thank you.

CO-HEARING OFFICER DODUC: And Mr. Stroshane, did you have a housekeeping matter?

MR. STROSHANE: Related to that, I have a personal scheduling conflict. I take care of my mother on Monday, this coming Monday, and cannot be here. And I very much would like to do cross with Dr. Michael, hopefully Friday.

And I have arranged with -- agreed gotten agreement with DWR and the State Water Contractor's counsels to jump in front again.

CO-HEARING OFFICER DODUC: Collaboration and coordination between the parties.

All right, Mr. Stroshane. I will have a note to have you go first in cross-examination of that fourth panel. 4?

MR. STROSHANE: Yes, thank you.

CO-HEARING OFFICER DODUC: All right.

Ms. Des Jardins.

CROSS-EXAMINATION BY MS. DES JARDINS (resumed)

MS. DES JARDINS: Mr. Neudeck, I wanted to ask you about the safety measures and the conceptual engineering report. That's one paragraph. It's Exhibit DWR-212, Page 147.

CO-HEARING OFFICER DODUC: And you will begin, Ms. Des Jardins, by asking Mr. Neudeck if he's familiar with this document.

WITNESS NEUDECK: Would you like me to respond to you, Chair? No, I am not.

MS. DES JARDINS: This is the draft conceptual engineering report. I wanted to ask you to read just one paragraph, if we can scroll down. The one on -- this is Section 11.4 on safety, and Section 11.4.1 levee failure and shaft/tunnel flooding.

Could you read that section, please.

WITNESS NEUDECK: Okay. I've read that.

MS. DES JARDINS: Okay. The safety measures include secondary levees, and then the tunnel shafts, do they not?

WITNESS NEUDECK: That's what this states.

MS. DES JARDINS: So secondary levees would protect the tunnel shafts and the tunnel bore in the event of a levee failure?

WITNESS NEUDECK: That's what's implied by this DWR-212 exhibit, yes.

MS. DES JARDINS: Do the safety measures protect people on the islands in the event of a levee breach during construction?

CO-HEARING OFFICER DODUC: Ms. Morris.

MS. MORRIS: Objection, calls for speculation, incomplete hypothetical. This document is talking about construction and protecting workers in construction in the event of a flooding event, not talking about other types of protections that would not be in this document.

CO-HEARING OFFICER DODUC: Mr. Neudeck, to what extent can you offer an opinion based on just reading these two paragraphs?

WITNESS NEUDECK: Having extensive experience with floods in the Sacramento-San Joaquin Delta, I think I can offer an opinion as to answering the question posed. So if you'd like I can --

CO-HEARING OFFICER DODUC: Yes, do your best please.

WITNESS NEUDECK: What you're talking about here is an isolated facility with a ring levee around it. So provided you were on the inside of that ring levee, one would consider them possibly protected.

Now, grant that they would be isolated. Better have a boat nearby because they're not going to get off that isolated island out in the middle of a fairly deep flood if the island itself were to flood and breach. Most of these islands are subsea level to a condition of, you know, depths of waters in the range

of 15 to 20 feet deep.

So all the remaining land outside that ring levee would be subject to inundation and potential -- there would be no protection for life equipment et cetera -- unless evacuated up onto the top of levees or off island.

MS. DES JARDINS: Mr. Neudeck, has there been any discussion with the reclamation districts you are involved with of safety preparedness for the risk of a levee breach during construction?

MR. KEELING: Objection vague, ambiguous. Discussion with reclamation districts -- discussions between whom?

CO-HEARING OFFICER DODUC: Ms. Des Jardins.

MS. DES JARDINS: I wanted to ask if he was aware of any discussions with DWR about safety preparedness for the risk of levee breach during construction.

CO-HEARING OFFICER DODUC: Are you able to answer?

WITNESS NEUDECK: Yes, I am. I was waiting for other discussion.

But no, Department of Water Resources has not addressed the California WaterFix in any degree, starting back with even seeking permission to do soil

borings with the reclamation districts. We've been left out of this package of information in its entirety. We have not been consulted with.

MS. DES JARDINS: Do you feel that it's important for public safety issues to cooperate closely on -- in levee risks from construction?

WITNESS NEUDECK: Absolutely, yes.

MS. DES JARDINS: Are you aware of proposals to have multiple tunneling machines in the Delta?

WITNESS NEUDECK: It's my understanding that the project envisions multiple launch points and tunneling boring machines in order to meet some form of a schedule. I don't know of the number. I know that the term "multiple" has been used.

MS. DES JARDINS: If that -- if the there were multiple machines, as has been discussed, and it was not closely coordinated with the reclamation districts would that be risky?

CO-HEARING OFFICER DODUC: Ms. Morris.

MS. MORRIS: Objection, incorporate hypothetical, vague and ambiguous.

CO-HEARING OFFICER DODUC: Sustained.

MS. DES JARDINS: If there were multiple -- multiple tunneling machines in the Delta, would that increase the risks that you discuss in your testimony?

CO-HEARING OFFICER DODUC: And what risk might that be?

MS. DES JARDINS: Risks while tunneling under the levees.

CO-HEARING OFFICER DODUC: Ms. Morris.

MS. MORRIS: I'm going to object that this is eliciting, again -- that this witness has said that he has not done tunneling in this deep of -- 150 feet down. It's been more shallow.

CO-HEARING OFFICER DODUC: Understood.

MS. MORRIS: The foundation hasn't been laid that he has the expertise to answer this question.

CO-HEARING OFFICER DODUC: Mr. Neudeck.

WITNESS NEUDECK: Okay. I'm going to do my best at this. But I believe the question is related to multiple boring machines; therefore, I would construe that to be multiple sites of the tunnel boring machine, not just one machine progressing down the alignment. Therefore, the risk associated with the tunneling construction would be expanded if there were multiple machines, yes. It's just a simple matter of more machines, likely more risk because the construction is the greatest risk during the tunneling process.

MS. DES JARDINS: Okay. Thank you. So I'd like to go, move on and ask you about SJC-298, which

was your erosion slide.

CO-HEARING OFFICER DODUC: Ms. Des Jardins, are all your questions for Mr. Neudeck?

MS. DES JARDINS: Yes.

CO-HEARING OFFICER DODUC: Okay. Lucky Mr. Burke.

MS. DES JARDINS: So you showed this slide, and it showed erosion along -- is this a stream bank?

WITNESS NEUDECK: This is the leveed bank. Nothing in -- it was a representative photograph of erosion along a leveed bank.

MS. DES JARDINS: And why do you -- why are you concerned about erosion as a result of this project?

WITNESS NEUDECK: This was related to the placement of the barge offloading, unloading facilities in that they would create obstruction for high flow conditions within the Delta and potentially form eddies at the upstream-downstream faces and potentially create erosion of the adjoining levee banks.

MS. DES JARDINS: I wanted to also ask you, there's average bypass flows, daily average bypass flows, but there could be sub-daily variations. And I wanted to ask if you had any opinion about if there were wide sub-daily variations and diversions at the

North Delta intakes, if that would raise concerns for you about impacts on levees.

CO-HEARING OFFICER DODUC: Hold on. I'm not sure I understand the question. You're talking now about impacts of diversion and not construction?

MR. BARBER: Sub-daily variations would be if you had an average bypass flow of 13,000 cfs but it went down to 9,000 or up to 15,000, that would be a wide sub-daily variation.

CO-HEARING OFFICER DODUC: Ms. Morris.

MS. MORRIS: I believe the question is regarding fluctuation in the intakes and what they're intaking.

Again, so, incomplete hypothetical, assumes facts not in evidence, vague and ambiguous, as to timing and the amount of variation.

CO-HEARING OFFICER DODUC: Are you able to answer, Mr. Neudeck?

WITNESS NEUDECK: Actually, I'm not able to answer, namely because I did not evaluate the flux situation in diversion and the effects of the diversion structures.

My testimony was related to the barge offloading, unloading facilities placed throughout the Delta for the construction of the tunnel alignment.

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

CO-HEARING OFFICER DODUC: Thank you.

Thank you, Mr. Neudeck, for being helpful.

WITNESS NEUDECK: You're welcome.

CO-HEARING OFFICER DODUC: Ms. Womack, will your questions be for both witnesses or just one?

MS. WOMACK: For both. Would you --

CO-HEARING OFFICER DODUC: If you would begin by just sort of giving everyone a rough outline of the topics you'll be covering for each witness.

MS. WOMACK: Certainly. So Suzanne Womack, Clifton Court LP.

I'm going to be talking about the -- to Mr. Neudeck, the reclamation districts part in levees, and the strength and stability of the levees based on his knowledge, a little bit about seepage regarding levees, and the future of the reclamation districts.

And then Mr. Burke is simply a water question. Okay?

CO-HEARING OFFICER DODUC: Just one?

MS. WOMACK: I believe so.

CO-HEARING OFFICER DODUC: Okay. Mr. Burke?

MS. WOMACK: I know. But I'd like to start with Mr. Neudeck.

CROSS-EXAMINATION BY MS. WOMACK

MS. WOMACK: So, Mr. Neudeck, from your viewpoint is there a public interest in maintaining the levee system?

WITNESS NEUDECK: Yes, there is.

MS. WOMACK: Would you describe the public interest for your reclamation districts you work for?

WITNESS NEUDECK: Well, first of all, the reclamation districts in themselves are public entities. So in order to maintain the public infrastructure, which includes the levees and drainage, outright, that's a public interest. These are political subdivisions in the State of California, and each and every reclamation district in itself is a public entity.

Beyond that, the Delta system as a whole provides channelization of waters in a manner that provides for freshwater to the diversion, both federal and state diversions, at the southern end of the Delta. Absent those narrow dendretic-type channels, you would have a much larger infusion of salt water from the bay. So there's another very measurable and substantial public interest in providing freshwater to both ag and urban interests south of the Delta.

In addition, there's a whole number of other

elements -- recreation, ecological, things of that nature -- that the Delta provides beyond that, which I believe are also public interests, the Delta's place.

MS. WOMACK: Thank you. Do the reclamation districts you represent play a part in maintaining the current Delta levee system?

WITNESS NEUDECK: They are the sole parties that maintain the Delta levee system. It's a responsibility -- within the Sacramento-San Joaquin Delta, there's currently no State-maintained maintenance areas. It's all done by local reclamation districts. So the reclamation districts are the sole parties responsible for the operation and maintenance of both --

MS. WOMACK: Thank goodness.

WITNESS NEUDECK: -- non-project as well as project federal systems.

MS. WOMACK: So how do they do this?

WITNESS NEUDECK: They formed the reclamation district. Most of these formed around the turn of the century. And then they formulate an assessment roll. That assessment roll is made up of the landowners within the jurisdictional boundary, typically the perimeter of the levee system, within that. And that assessment roll is made up of landowners paying a

per-acre charge, dependent upon their use, into the reclamation district's account. The reclamation district's account is held by the local county treasurer and then disbursed through a governing board of trustees, typically a board of trustees of either three or five members made up of local landowners.

MS. WOMACK: Okay. So they -- okay. Thank you.

Do you prepare and file the reclamation districts' levee subvention application for all of your reclamation districts?

WITNESS NEUDECK: Yes, we do.

MS. WOMACK: Can individual landowners apply for these subventions?

WITNESS NEUDECK: No. The levee subventions program is formulated by the State legislature and governed by the State Water Code. And only public agencies are eligible for that program.

Now, the benefit goes to the landowners because it helps the landowners in their overall assessment. But it's the reclamation districts themselves, acting as the public agencies, that submit applications and claims for expenses.

MS. WOMACK: Okay. So I think that answered -- do you know why the State pays the levee

subvention, why they pay that way.

WITNESS NEUDECK: That's a different question.

MS. WOMACK: Okay. Do you know why they pay that way?

WITNESS NEUDECK: Well, there's some history to why the levee subvention program is in place. It's been in place for well over almost 40-something years. And it's an effort by which the State collectively is supporting the measure of maintaining and operating those levee to improve the conditions, not only for the local reclamation districts but also for the state and federal water projects.

MS. WOMACK: So could would you say for the whole state of California?

WITNESS NEUDECK: The whole state of California is benefiting from this. And the current plan is there's beneficiaries outside of the jurisdictional boundaries, and the way by which they pull that in is through this government reimbursement program.

MS. WOMACK: I see.

CO-HEARING OFFICER DODUC: Ms. Womack, just for my education, what is the connection to the issues before us?

MS. WOMACK: Oh, the public interest of the

safety of the levees and who maintains and what -- how this happens. And he's an expert. I would like to know how this --

CO-HEARING OFFICER DODUC: So --

MS. WOMACK: Yes.

CO-HEARING OFFICER DODUC: -- what is the linkage between the proposed WaterFix project --

MS. WOMACK: Oh, well, okay. Well, the State paid for levee subvention for -- as part of the WaterFix, the CWF, California WaterFix.

CO-HEARING OFFICER DODUC: Is that correct?

MS. WOMACK: Yes.

CO-HEARING OFFICER DODUC: This is to educate me, so.

MS. WOMACK: I don't know.

Do you know? Will they pay?

WITNESS NEUDECK: Well, I'm not certain your exact question there. Maybe you can re-ask it. I'm not clear on the question because I don't think I'm going to be able to answer based on what I understand.

MS. WOMACK: I'm not -- yeah. I -- as part of what you've read, do you see something where the -- State will pay for any subvention -- so any levee maintenance, that would be done by the reclamation district, is it -- is that going to be part of the

WaterFix? Will that come under the subheading of subvention, I guess, if there's problems?

WITNESS NEUDECK: Actually, I think it's relatively independent. State Water Code and the levee subventions program is independent of the California WaterFix. The beneficiaries are collectively the same, but it's -- we're talking about the general geography and the general benefit of providing clean water and providing a safe system.

But the WaterFix is not going to govern nor oversee or manage or fund -- maybe that's the better term. The funding currently is coming through bond measures. It previously was through general fund, which we rarely see any general fund programs nowadays. And prior to that, it was tideland and gas-oil reserves.

So there's been a number of ways to fund the program. Of most recent, it's been bond funds. And that's the way it looks for about the next eight years, that the general flood control water resource bond measures that come before the voters in the State are funding that program presently.

MS. WOMACK: Okay. Thank you.

WITNESS NEUDECK: You're welcome.

MS. WOMACK: Does the State pay a hundred

percent of the bill?

CO-HEARING OFFICER DODUC: I'm sorry. The bill for what?

MS. WOMACK: I'm sorry. The subven- -- the subventions bill.

Does the State --

CO-HEARING OFFICER DODUC: Okay. Now, let me see if I understand.

Mr. Neudeck, you have testified in answer to Ms. Womack's question that the funding of this subvention fund is separate from the WaterFix proposal.

WITNESS NEUDECK: That's correct.

CO-HEARING OFFICER DODUC: And would not be affected by the WaterFix proposal.

WITNESS NEUDECK: That's correct.

CO-HEARING OFFICER DODUC: Then --

WITNESS NEUDECK: Well, politically --

MR. KEELING: He testified to his knowledge, he -- that it wouldn't be affected.

CO-HEARING OFFICER DODUC: Understood.

So, Ms. Womack, I think you might want to move on to your next line of questions.

MS. WOMACK: Okay.

CO-HEARING OFFICER DODUC: That was educational for me.

MS. WOMACK: Thank you. I'm learning a lot, too.

So is the purpose of the California WaterFix to protect water supply for South of Delta interests?

CO-HEARING OFFICER DODUC: You're asking Mr. Neudeck what --

MS. WOMACK: As far --

CO-HEARING OFFICER DODUC: -- what he --

MS. WOMACK: Yeah. His opinions. Yes.

CO-HEARING OFFICER DODUC: Okay.

WITNESS NEUDECK: Yes.

MS. WOMACK: I have one last question about the subvention.

So does the State pay interest on -- to the reclamation district on what they've spent to -- they fix the levees, as I understand it, and then you submit. And then you get a percent -- you don't get a hundred percent, but you get a percentage of the money back that you spent. Do they give you interest for that money spent or admin costs?

MR. KEELING: Relevance.

CO-HEARING OFFICER DODUC: Ms. Keeling -- Mr. Keeling, sorry.

MR. KEELING: Relevance.

CO-HEARING OFFICER DODUC: I was trying to say

"Ms. Morris" and "Mr. Keeling" at the same time. That came out Ms. Keeling.

MS. WOMACK: Okay.

CO-HEARING OFFICER DODUC: Sorry.

MS. WOMACK: Okay. I'll move along.

CO-HEARING OFFICER DODUC: Mr. Keeling.

MR. KEELING: Relevance.

CO-HEARING OFFICER DODUC: Let's move on.

MS. WOMACK: Well, I just --

CO-HEARING OFFICER DODUC: Ms. Womack, Ms. Womack --

MS. WOMACK: Yes?

CO-HEARING OFFICER DODUC: If I might take advantage of Mr. Neudeck.

You have been extremely helpful. Perhaps you might spare a few minutes afterwards to talk to Ms. Womack and answer questions she might have that is outside the scope of these proceedings?

WITNESS NEUDECK: Most certainly. Would be my pleasure.

CO-HEARING OFFICER DODUC: Thank you, appreciate that.

WITNESS NEUDECK: Certainly.

MS. WOMACK: So moving back to flood control, are you responsible for the reclamation districts'

levee patrol?

WITNESS NEUDECK: We are responsible in a variety of capacities. In some cases, reclamation districts put us in full responsibility. In other cases, they have staff, limited staff. And in other cases, they have general manager all the way through levee workers.

So there's a variety of cases. Some districts have no staff, no assistants; it's just us and the general counsel. And then we'll provide all the staff to do the levee patrols. Other cases, it varies. It namely varies from the larger urban districts down to the smaller rural districts.

MS. WOMACK: Right. I'm thinking of farmers. So can these be -- are these volunteer positions? Can they be?

WITNESS NEUDECK: Most definitely.

MS. WOMACK: Does the State depend on the reclamation districts' levee patrols to monitor the levees and prevent flooding in the Delta?

WITNESS NEUDECK: The answer I guess would be yes. The State is relying upon the local reclamation districts to maintain and operate their levees in an adequate condition. And therefore, yes, they're looking to us to remain responsible and keep them in an

unflooded condition.

During a flood event, the Department of Water Resources is there to assist us --

MS. WOMACK: Oh.

WITNESS NEUDECK: -- in the event of a flood in a variety of capacities. It's not that the Department is solely on the sidelines. They will assist us through their flood management group as well.

MS. WOMACK: That's good to know.

So, okay. So moving along to levee strength and stability, do you know whether or not the 2017 closing of the Clifton Court Forebay caused higher river flows that caused erosion or overtopping for your reclamation districts?

CO-HEARING OFFICER DODUC: Hold on.

Ms. Morris.

MS. MORRIS: Objection, relevance.

CO-HEARING OFFICER DODUC: Help me understand.

MS. WOMACK: Public interest, public safety. I want to --

CO-HEARING OFFICER DODUC: How does it -- I'm sorry. How does that particular incident tie into the proposed WaterFix project before us?

MS. WOMACK: Well, Clifton Court is part of the WaterFix. And I just want to know, when an

emergency happens, what happens to the water districts.

CO-HEARING OFFICER DODUC: Okay. Overruled.

WITNESS NEUDECK: Okay. May I ask you to repeat your question? I'm not exactly certain what you're referring to as far as the Clifton Court event.

MS. WOMACK: Well, the Clifton Court Forebay was closed for, oh, six weeks, eight weeks. I don't know exactly; they never told me. But it was closed for a while because it was broken.

And I was wondering if your reclamation district experienced higher flows because of an emergency closing for six weeks.

CO-HEARING OFFICER DODUC: First of all --

MS. WOMACK: Yes?

CO-HEARING OFFICER DODUC: -- were you familiar with that event, Mr. Neudeck?

WITNESS NEUDECK: I'm not familiar with it, but I'm familiar with the interrelationships, and I think I can answer the question.

CO-HEARING OFFICER DODUC: But not specific to that.

MS. WOMACK: I could give a date. Would that help?

WITNESS NEUDECK: No.

MS. WOMACK: Okay.

MS. MORRIS: I think there's lack of foundation for when this occurred and what hydraulic conditions.

CO-HEARING OFFICER DODUC: I understand.

MS. MORRIS: It's an incomplete hypothetical.

CO-HEARING OFFICER DODUC: I understand.

This is not an answer specific to any particular incident but just based on your general experience and awareness.

WITNESS NEUDECK: Okay. So based on my general experience, during a flood event, we ask and seek that the water projects turn their pumps on full capacity and remove as much from the Delta as possible. That's a general request in every flood, high water event.

MS. WOMACK: Yes.

WITNESS NEUDECK: Namely because there's excess water in the Delta, and any water that can be evacuated from the system would be helpful --

MS. WOMACK: Absolutely.

WITNESS NEUDECK: -- to maintain lower flood waters. The actual differential has never really been measured. And the impact I do not know, by closing the gates and not having that diversion. The State has tried in many high-water events to help and assist the

Delta in that event, but they have to look downstream and make sure there's someplace for them to put that water. You just can't push it down the canals and not have San Luis or East Side Reservoir or things like that that can store the water available or groundwater, you know, recharge basin -- somewhere the water has to go. You just can't put it in the canal.

So it's a dynamic realm. They've been very responsive to us in the past. I was not familiar with the gates being closed during the 2017 event. The 2017 event was not a severe event. It was a high-water event. It wasn't a 1997 event. But it was a good -- what we call a good wake-up call, a good 20-year, you know, wake-up and remember that this area gets high water.

MS. WOMACK: Yeah, so you weren't aware they put in cofferdams?

WITNESS NEUDECK: I was not.

MS. WOMACK: Okay. Thank you.

WITNESS NEUDECK: You're welcome.

MS. WOMACK: And did the Oroville Dam closure cause erosion or overtopping for any of your levees? Did you notice a difference with the Oroville closing?

CO-HEARING OFFICER DODUC: Ms. Morris.

MS. MORRIS: Objection, incomplete

hypothetical, calls for speculation. There's no foundation that this witness -- nor has there been any connection laid by the questioner that any event at Oroville had any impact on reclamation districts he represents in the Delta.

CO-HEARING OFFICER DODUC: Mr. Jackson?

MS. WOMACK: I'm asking.

MR. JACKSON: It seems to me that that was the purpose of the question. If the question could be repeated I think it would say, to Mr. Neudeck's knowledge, did the high water event caused by the releases from Oroville make any changes in the Delta for his reclamation districts.

CO-HEARING OFFICER DODUC: Are you familiar enough to answer that question?

MS. MORRIS: May I? Sorry. I have an objection -- if we're now restating that question -- are as to relevance because there has been testimony by the witnesses that the upstream operations are not going to change. And so what relevance does Oroville operation from past years have on WaterFix or impacts from WaterFix?

CO-HEARING OFFICER DODUC: Anyone else want to weigh in? Mr. Ruiz?

MR. RUIZ: Well, it's not an operational

issue. We're talking about an emergency situation and a response.

CO-HEARING OFFICER DODUC: Bonds. I understand.

MS. WOMACK: But it is a maintenance issue.

CO-HEARING OFFICER DODUC: Ms. Womack, I'm going to overrule her.

MS. WOMACK: Sorry.

CO-HEARING OFFICER DODUC: Give me a chance.

MS. WOMACK: I'm trying.

CO-HEARING OFFICER DODUC: Overruled.

You might want to reask -- repeat your question or rather repeat Mr. Jackson's question to Mr. Neudeck.

MS. WOMACK: Do you need me to repeat his question?

WITNESS NEUDECK: Yes, please, there's been a fair amount of objection. I just want too clarify what you're asking. That's all.

MS. WOMACK: I don't know if I can do that. Let's see.

Did -- for the levees that are in your reclamation district, did the closure of the Oroville dam cause erosion or overtopping for any of your levees? Did you notice a difference in the levees?

WITNESS NEUDECK: Okay. I may be mistaken but you're referring to a closure versus the -- I'm not sure what you mean by "closure."

MS. WOMACK: I -- well, it wasn't a closure. I'm sorry. The emergency. I don't know how to call it.

WITNESS NEUDECK: That's fine. Sorry. The event that occurred at -- in the pulse flows that came down the Feather River and the Upper Sacramento did not have an appreciable impact to the Delta stage or conditions within our leveed system. We had high inflow from both the Sacramento and San Joaquin River systems that created the Delta pool, which is a tidal pool, to elevate itself, and to what degree would be probably non-measurable.

MS. WOMACK: Okay.

WITNESS NEUDECK: The impacts associated with levees were all upstream in the Sutter-Butte area. And we do have clients up there, but it's not a part of my testimony or part of what I believe to be a California WaterFix issue. But there was much more substantial levee damage in the upstream reaches of those river systems, not so much -- not at all in the Delta.

MS. WOMACK: Well, thank you. That's so nice to hear.

WITNESS NEUDECK: You're welcome.

MS. WOMACK: Now, do you believe the temporary barge unloading facilities could cause increase in water surface elevation?

WITNESS NEUDECK: With the limited amount of information I see, no.

MS. WOMACK: So -- okay. Would there be any -- anything that would disturb the tidal exchange and flow velocity patterns for the fish and wildlife?

WITNESS NEUDECK: There could be at a higher flow condition. Those are dock-type facilities, and higher flows could have a slight change in the patterns and the flows -- that's what I testified to earlier -- that create eddies at the upstream and downstream phase. These are not appreciable extensive impacts though.

MS. WOMACK: Okay. So would that also cause levee erosion in your reclamation district area?

WITNESS NEUDECK: It could potentially, yes.

MS. WOMACK: Are you -- and would that cause channel erosion as well?

WITNESS NEUDECK: Most likely not. It really depends because it's unclear as to where these facilities go. If they go into a very narrow channel and they block a large enough percentage of the channel

capacity, then the answer to my question is it could.

The channel velocities in the Delta are not extraordinary, and they tend not to be scour velocities in general. But if you put it in a narrow enough channel and block enough of it, you could potentially increase the velocities to a scour velocity.

MS. WOMACK: Thank you.

WITNESS NEUDECK: You're welcome.

MS. WOMACK: So who would fix the erosion if there was erosion caused by barge facilities?

WITNESS NEUDECK: You're asking a local representative. I would seek to have the State do that work because it would be a an impact associated with their facility.

We also could look to making counter-measures prior to the installation or during the course of the installation to protect against that as another measure. But we would see that as a third party impact on the local reclamation district, and we would seek other to mitigate that damage -- potential damage, excuse me.

MS. WOMACK: Yes, absolutely. Okay.

But if there were damage, you have the capacity to fix -- you would have the capacity to fix that type of erosion?

WITNESS NEUDECK: Well, certainly the reclamation district would. The reclamation district would not stand by looking for a party to repair in the event of a damaged site that may impair the levees' ability to perform. But hopefully we would attempt to mitigate before it got to that stage of impairing the integrity of the levee.

MS. WOMACK: Right. That's so important.

On Pages 5 and 6 of your testimony, you speak of that -- California WaterFix overlooked the levee subgrade and foundation settling caused by heavy trucks. Is this in sunny weather that you're referring to?

WITNESS NEUDECK: It's in any weather.

MS. WOMACK: Any weather.

WITNESS NEUDECK: So any hauling on the levees. The levees themselves -- the history of the Delta is it was constructed on softer foundations -- tend to consolidate and compress when heavy loads are on that. And unfortunately that was not addressed as part of their traffic study. Most of it was related to the surfacing and impacts to traffic flow.

MS. WOMACK: Would the trucks be heavier than I mean -- you have a lot of farming trucks. Would these be a lot heavier?

WITNESS NEUDECK: Well --

MS. WOMACK: Could they be?

WITNESS NEUDECK: Most likely not. This is a State project. The State would be responsible for adhering to legal loads. And namely, if they were planning on taking those out -- now, if they were local loads one could seek a variance and carry more than the highway load.

I did not envision that. If that were the case, that would impact my consideration for consolidation. But generally speaking, the legal loads -- even the legal loads compress these levees.

MS. WOMACK: Because there's so much -- so many more --

WITNESS NEUDECK: Right. These are what we call 80,000-pound loads. That's a typical truck and trailer, with material of a rock within it.

MS. WOMACK: All right. Thank you. Would the conditions be different during heavy rains and flooding like the winter of 2017? Would that -- would that create even different conditions?

WITNESS NEUDECK: Well, that's now would go to -- not -- not increasing or impacting the subsidance and settlement, but it would impact the road surfacing. Most of the roads in the rural settings are graveled

roads, and heavy traffic will eventual degrade those conditions to the point where they're impassable.

And we would be very concerned, given the nature of our reaction time, not having an all-weather road surface on our levees. So we'd be very, very much attentive to the fact that if this hauling was going to degrade an all-weather road, that that would be unacceptable.

MS. WOMACK: Okay. Should building be able to continue -- in your opinion, should building be able to continue year round, regardless of the weather because the California WaterFix needs to be built?

CO-HEARING OFFICER DODUC: You mean the construction.

MS. WOMACK: Construction, I -- yes, building construction of the California WaterFix.

WITNESS NEUDECK: Wow, I feel like the weight of the world just got loaded on my shoulders.

To answer that question would -- there's a lot of qualifications. I think with the appropriate measures taken, one could construct this year round. I know there's been immeasurable impacts testified to in the last three days I've been here at this hearing -- last two days, excuse me.

CO-HEARING OFFICER DODUC: Just seems like

three, huh?

WITNESS NEUDECK: It does. No, it's been a pleasure. But the point being is --

CO-HEARING OFFICER DODUC: You did take the oath.

WITNESS NEUDECK: That's correct.

The impact of doing work within this region, in an agricultural rural setting, during the winter months can become very difficult if nothing other than the tule fog.

MS. WOMACK: Yes.

WITNESS NEUDECK: We, unfortunately, in this line work, get involved in trying to do work during the tule fog and have had a number of very serious, fatal accidents that I've spent a lot of time in front of juries and trials, you know, dealing with that. So that alone can shut a project down for months on end, just traveling on these traffic roads because you're trying to get in and off with large trains of trucks, and traffic doesn't always see those, so.

MS. WOMACK: Do you know if there's a provision in California WaterFix for stopping hauling trucks on levees in periods of this sort of bad, bad whether?

WITNESS NEUDECK: No, I'm not familiar with

that mitigation measure.

MS. WOMACK: Yeah, okay. And who would -- do you know who would make the decision for the California WaterFix project in real-time to stop -- you know, to say, "Hey, we have to stop"?

WITNESS NEUDECK: I'm not familiar with the governing structure of the WaterFix at this point.

MS. WOMACK: Okay. Thank you so much. Next part is about seepage. I'd like to see Figure SJC-304.

And this shows -- the bottom part, I'm sorry, the sand -- is this showing sand as a conduit for water? Is that what the blue --

WITNESS NEUDECK: Yes. And I'm glad you raised this because it doesn't really show the sand interconnecting with the surface, but quite often what you have is that sand lens also makes it all the way up to the surface of the ground --

MS. WOMACK: Yes.

WITNESS NEUDECK: -- as well as extends through the levee.

What -- this was a simple depiction of water escaping from the slough or river system through these interconnected sand lenses out into the ground behind the levees.

MS. WOMACK: Okay. And I think there's

another slide that shows what the -- a -- an island flooded --

WITNESS NEUDECK: That's correct.

MS. WOMACK: -- I believe.

Do you know what slide that it is? I --

WITNESS NEUDECK: I'll tell you real quick.

MS. WOMACK: I thought I had that, but I -- this is good. But -- yeah.

How far does that seepage go to?

WITNESS NEUDECK: It's 308 is the other one.

MS. WOMACK: 308?

WITNESS NEUDECK: This seepage can extend as much as -- well, it extends extensively. But we have conditions where boils will occur as far away as 300 feet from the channel.

MS. WOMACK: From the levee, from --

WITNESS NEUDECK: Levee channel.

MS. WOMACK: From the actual levee, 300 -- yeah. Okay.

WITNESS NEUDECK: That's where it escapes up. But, I mean, these islands are all sub-sea level. So if you turn the pumps off, they eventually --

MS. WOMACK: Water.

WITNESS NEUDECK: Water reaches the same elevation on the inside as well as outside. It reaches

equilibrium at some point.

MS. WOMACK: Do you require sand -- I mean, do you require an island to have this kind of sand -- I don't know -- where the sand conduits, the water, is that required to be an island to have that happen? Or does that happen any time there's a sand layer like that?

WITNESS NEUDECK: Well, I'd rather not have any of that. I'd like to have a nice clay lens all the way down to --

MS. WOMACK: Yeah.

WITNESS NEUDECK: -- to where it says "clay."

No, this is just part of the natural formation of the Delta, where you have these inter-dispersed sand lenses. And they are highly conductive for water. It's just something we deal with in our ongoing operation and maintenance of these levee systems.

MS. WOMACK: Okay. So would a toe drain take care of this type of seepage? Is this what you'd put in at the levee?

WITNESS NEUDECK: Yes. So a toe drain, which is not shown on this photograph, would be a ditch right at the point where the levee meets the ground, very close there to somewhere in the range of 20 to 30 feet offset towards the middle of the island. And the idea

is to intercept the water that's seeping through the levee, not necessarily beneath the levee. And the idea there is to try and limit and reduce the seepage water going through the levee.

Dirt feels stronger when it's dry than it does when it's wet. And that's just a very simplistic approach towards the engineering of a fill.

So if you can drain that levee to some degree, which we do by placing those ditches and then dewatering those ditches through the dewatering system, we strengthen the levee fill itself.

MS. WOMACK: I see. But that does not prevent seepage from going through the sand and popping out.

WITNESS NEUDECK: No. The only means of preventing that is to put in what is known as a cut-off wall, which would be a clay-type wall, down through the sand, tying that into clay. So it would be like a vertical -- almost like a sheet of very unpermeable-type soil. Very expensive process. It's what goes on in urban levees, like up here in Sacramento and so forth, to minimize seepage through. But that's an expensive effort.

Most cases, we do not stop the seepage. We just build to offset is the seepage.

MS. WOMACK: Okay. Okay. So -- yeah. So

you're -- you -- yeah.

Okay. And the -- okay. I guess I'll move on. Okay.

Do you know how the California WaterFix plans to take care of seepage caused by their projects?

CO-HEARING OFFICER DODUC: Ms. Morris.

MS. MORRIS: Objection, lack of foundation, assumes facts not in evidence.

CO-HEARING OFFICER DODUC: If there were a seepage.

MS. WOMACK: If there were a seepage, sorry.

CO-HEARING OFFICER DODUC: Uh-oh. I bet that wasn't even good enough for Ms. Ansley.

MS. ANSLEY: The question is directed to Mr. Neudeck. He has already testified that he is unfamiliar with the mitigation measures of the Cal WaterFix.

CO-HEARING OFFICER DODUC: Then we'll let him say it again, unless he's changed his mind between then and now.

WITNESS NEUDECK: No, I've certainly not changed my mind. I'm not familiar with the mitigation measures of the California WaterFix as it relates to seepage.

MS. WOMACK: Thank you. So SJC-308, so that's

showing a -- a flooded island would be like a preserve or something?

WITNESS NEUDECK: That's correct. And the purpose of this was to demonstrate just in another localized impact of what would potentially occur if there was a flooded island next to a dry island, dry island possibly being the island that's, you know, hosting the tunneling project.

But it's a condition of risk, one that we -- is a known fact for the region. And it just was a demonstration of an additional risk item of Delta levees.

MS. WOMACK: Thank you. And, again, showing that that's going to go under the slough or cut and end up --

WITNESS NEUDECK: Yeah, it actually goes under and back up. And as demonstrated by my photographs, you can see where it surfaced.

MS. WOMACK: Was that 309?

WITNESS NEUDECK: 309 and 310, those are --

MS. WOMACK: 309 and 310 because I think that's fascinating.

CO-HEARING OFFICER DODUC: We've actually seen it several times.

MS. WOMACK: Oh, okay. Well, we don't need to

then. I'm just fascinated by it.

CO-HEARING OFFICER DODUC: It is fascinating.

MS. WOMACK: Well, just how far it travels, seepage is such a tricky issue.

CO-HEARING OFFICER DODUC: All right. Question?

MS. WOMACK: Sorry. I'm sorry. I have just a little bit more.

The future of the reclamation districts , I was really touched by your Page 12 and 13 of testimony regarding the economic sustainability from the loss of farmland due to the California WaterFix construction, the loss of the crops due to salinity, and the loss of farmland due to the wetlands.

And I know that's a compound, so I can break that out.

What will happen to the reclamation district if it -- if a district, say, loses part of its farmland or most of its farmland to construction?

WITNESS NEUDECK: Recognizing how these reclamation districts work, it's not too dissimilar to how cities work. They rely upon, in this case, assessments versus taxes for, like, cities and counties.

We rely solely upon the landowner's ability to

afford to cover the assessments on the acreage that they farm in order to use those -- that money to operate and maintain both the levee system as well as the drainage system.

Reclamation districts' charge, back in the turn of the century, was to drain and reclaim. You can't drain unless you reclaim. So you've got to build the levees first and drain.

If that ability of the landowner to afford that assessment is reduced and they're putting less money in their pocket because they have less land to farm or their crops are impacted by higher salinity and the yields on their fields are reduced, so goes their ability to afford the assessment, and there goes the ability to continue to operate and maintain the system as it currently is being operated and maintained.

These levee districts are moving towards assessment currently that is almost to the point of not being affordable for the farmers. They're getting very expensive on a per-acre basis. So any impacts to that ability to afford a landowner assessment could have a crucial impact on their ability to continue to operate.

MS. WOMACK: Okay. So then what would happen -- if, say, only one farm out of ten was left, what would happen to that reclamation district? Do you

know?

WITNESS NEUDECK: You would be left with about 10 percent of your income. So you would be doing about 10 percent of your work. It would be like if you were making a hundred dollars an hour, went down to ten dollars an hour. Where do you start cutting? There are some very basic costs. One of them is PG&E. PG&E does not like being -- they'll turn the power off if you don't pay them. So things of that nature.

So there's some fixed costs that these reclamation districts have. Typically the levee budget is what's left over in their budget. You pay all the fixed costs, and what's left over goes to the levees.

Now, that can be somewhere between 100- to $500,000 per district, but it's not an extensive amount of money.

MS. WOMACK: That's an awful lot for one farmer to come up with.

WITNESS NEUDECK: That would be too much for one farmer.

MS. WOMACK: So does the California WaterFix provide for the decimation of reclamation districts?

CO-HEARING OFFICER DODUC: Ms. Morris.

MS. MORRIS: Objection, speculative. It mischaracterizes the witness's testimony. I didn't

object to last question, which was complete speculative hypothetical. And there's no facts to suggest that that would happen.

CO-HEARING OFFICER DODUC: We'll strike-out the "decimated" part.

And Mr. Neudeck, are you aware of any proposed mitigation for the scenario you just speculated in the WaterFix project?

WITNESS NEUDECK: No, I'm not.

MS. WOMACK: Thank you. Whoops.

Oh, doggone it. I'm so bad at this. Oh, gosh. I'm almost at the end, but I just went the wrong way.

Is there a potential in the Delta for landowners to be priced out of the Delta because of their obligations?

CO-HEARING OFFICER DODUC: Are you an economist able to answer that question, Mr. Neudeck?

WITNESS NEUDECK: To answer your first question, no, I'm not an economist. I do engineering economy, and I do landowner assessments and prepare assessment rolls. So there is a potential, if we increase the burden to the reclamation district landowners, that they would not be able to afford the continued operation and maintenance, as I testified in

my direct.

CO-HEARING OFFICER DODUC: That's logical enough. All right.

WITNESS NEUDECK: Thank you.

MS. WOMACK: Thank you so much. That's it.

Mr. Burke, I just have one question. Would someone in the South Delta who pumps river water for their household use be more likely to have an increase in salts in their water with the California -- well, just in general with the way things are going?

CO-HEARING OFFICER DODUC: Ms. Ansley.

MS. ANSLEY: Objection, calls for speculation. And I don't believe that Mr. Burke has a foundation for drinking water quality with his testimony.

CO-HEARING OFFICER DODUC: Based on your analysis, Mr. Burke, that you presented the past few days, are you able to answer Ms. Womack's question in general terms?

WITNESS BURKE: Yes, I could.

Based on the water budget that we put together or the salt budget that we put together for the South Delta, we showed that the difference in salt accumulation in the South Delta between the No Action Alternative and the preferred alternative would show an increase of salt in South Delta. And that salt that

will be left into the Delta would transform into some type of increase in salinity.

We can go to calculate the actual increase in salinity, but we showed that there will be an increase in salinity in South Delta due to the preferred alternative.

CO-HEARING OFFICER DODUC: Based on your analysis?

WITNESS BURKE: Based on the budget analysis that we evaluated.

MS. WOMACK: So it could affect what I drink. Thank you so much.

CO-HEARING OFFICER DODUC: Thank you, Ms. Womack.

Any redirect, first of all, for Mr. Burke, who's been taking it easy this afternoon?

MR. HERRICK: Yes, we have a little redirect for him.

REDIRECT EXAMINATION BY MR. HERRICK

MR. BURKE: John Herrick for South Delta parties.

Mr. Burke, do you recall questions on cross-examination from DWR regarding the interpretation of your results?

WITNESS BURKE: Yes, I do.

MR. HERRICK: And do you recall, in your explanations thereof, referencing the salt budget analysis that you did?

WITNESS BURKE: Yes, I did.

MR. HERRICK: Would you please better ex- -- not "better."

Would you please explain what you mean by the salt budget analysis that you did?

WITNESS BURKE: Well, salt budget looks at the South Delta as a confined entity. You might be able to visualize that better if you looked at the South Delta as being a box. We evaluated the amount of salt that's moving into that box and the amount of salt that's moving out of that box for two different scenarios, the No Action Alternative scenario and the preferred alternative scenario.

And what we did is we looked at -- for each scenario, we calculated the amount of salt going into the box, the amount of salt coming out of the box. And the residual, what's left over, we then compared between two alternatives to see if one alternative left more salt in the South Delta -- or in the box -- than the other.

As a result of that analysis, we determined that more salt would be left within the South Delta --

in the box -- for the preferred alternative as compared to the No Action Alternative.

MR. HERRICK: Now, Mr. Burke, you said analyzed salt in and salt out. Is the model actually analyzing all salt that enters that region of the South Delta and all salt exiting or something else?

WITNESS BURKE: The model is not capturing all of the salt that's entering and exiting because it's not accounting for groundwater inflow into the South Delta. But it is accounting for all the salt that enters or leaves the area within the channels that are draining into and out of the South Delta.

MR. HERRICK: So would you -- in your testimony when you talk about the model being used in a comparative manner, by that do you mean that the results allow you to see the difference between the two scenarios rather than any absolute or predictive numbers?

WITNESS BURKE: That's correct. If you look at the results for any particular scenario, be it the No Action Alternative or the preferred alternative, you can't really look at those numbers for that alternative in isolation in itself because that's using the model in a predictive mode. And the model doesn't really do well in a predictive mode.

But where the model really shines and is most appropriate is when you compare one scenario to another. So the best way to look at this analysis is to compare the results of the budget -- what's the box -- between the No Action Alternative and the preferred action alternative.

MR. HERRICK: Mr. Burke, for your No Action Alternative I'll say result, you come up with a number of 48,692 metric tons. Do you recall that?

WITNESS BURKE: Yes, I do.

MR. HERRICK: Should anyone interpret that to mean that 48,000 tons -- there are less than -- excuse me.

Should anybody interpret that number as meaning that that's an absolute or even an average annual amount of salt that actually leaves the area?

WITNESS BURKE: No, that would be an inappropriate use of the model. Again, that would be looking at the model in a predictive mode to try to predict what the salt change would be for that particular scenario.

MR. HERRICK: And so similarly, when you calculated for the preferred alternative, which is the Biological Assessment preferred alternative, you came up with 18,369 metric tons. Should anyone use that as

an indication of how much salt is actually leaving the area on an average annual basis?

WITNESS BURKE: No, that would be incorrect as well. Again, you would be using that particular scenario in a predictive mode. And DSM-2 is best used in a comparative mode, when you're comparing one scenario to another.

MR. HERRICK: Mr. Burke, when people look at your numbers, your -- I'll say your final numbers, would it be appropriate for them to conclude from any of those numbers whether or not the South Delta area is getting less salty over time?

WITNESS BURKE: If you looked at any particular scenario as presented in our analysis, you would get the impression that there is -- perhaps the South Delta area is actually losing salt because in both scenarios we have a negative result of salt into and out of the South Delta.

But as anybody familiar with the South Delta can testify to is that there is -- there's been a salt problem in the South Delta; the water has not been getting less salty over the years. And that's an indication and verification that these models should not be used in a predictive mode but are better used in a comparative mode.

MR. HERRICK: And so -- never mind.

Turning to your testimony, which is South Delta or SDWA-291, and on Page 3 of that, please, if we could bring that up real fast.

And then, if you scroll down a little bit, in the middle of Opinion No. 1 on Line -- starting on Line 17, do you see --

MR. RUIZ: This --

CO-HEARING OFFICER DODUC: So this would not be on pdf Page 3?

MR. RUIZ: This is San Joaquin County's SDWA-291, sorry. This is San Joaquin County's not South Delta.

MR. HERRICK: Yeah, we need SDWA-291. Sorry.

Up to this point, Mr. Hunt has been perfect.

MR. HERRICK: And on Page 3 of that. And right there, on Lines 17 through 19, Mr. Burke, you see where you referenced that 30,000 -- roughly 30,000 metric tons of salt brought into the South Delta each year under the preferred alternative, do you see where you say that?

WITNESS BURKE: Yes, I see that.

MR. HERRICK: Is the phrasing of "salt brought into the South Delta" the correct description of your analysis?

WITNESS BURKE: Actually, that's not the clearest way to express the results of the analysis. It's more of the salt that remains in the South Delta between the two scenarios.

MR. HERRICK: And if you change that "brought in" phrasing to what you just said now, does that --

CO-HEARING OFFICER DODUC: Hold on.

MR. HERRICK: I'm sorry.

CO-HEARING OFFICER DODUC: Hold on. Ms. Morris is making a dash at the microphone.

MS. MORRIS: I object to that testimony. I ask that it be stricken. That is a change in this witness's testimony. He is now changing his opinions on redirect, his written opinion, and saying it in a different way. And this is not testimony that he has provided, and he should not be allowed to change opinions at this late point in this hearing and after cross-examination.

CO-HEARING OFFICER DODUC: Mr. Herrick.

MR. HERRICK: Well, I mean, that's the purpose of a witness being here. And he went through his testimony, and questions arose about what it meant. And I think he's perfectly able to clarify what he means. If that's a change, then redirect -- excuse me, recross can attempt to do that. But there's no

substantive change in his modeling results or his conclusions.

MS. MORRIS: It is a substantive change. And if they want to change his opinion, they can do it in rebuttal. But at this point, we have already crossed this witness. And based on that cross-exam, he is now changing his written opinion or attempting to do it on the record.

CO-HEARING OFFICER DODUC: Ms. Morris, objection is overruled. I was here for his cross-examination by Ms. Ansley. And I, too, questioned this statement on Line 18, the term "salt brought into the South Delta" because, during that cross-examination, he clarified that what he meant was the residual that remained

So he actually -- it is -- what is the word I'm looking for -- is clarifying the testimony he provided first in writing and then through cross-examination. So the objection is overruled.

MR. HERRICK: So the final question I'll ask is, Mr. Burke, does this change in phraseology that we just discussed, does that affect your analysis or conclusions in your testimony -- otherwise affect?

WITNESS BURKE: No, it does not.

MR. HERRICK: I have nothing further.

CO-HEARING OFFICER DODUC: Thank you.

Mr. Keeling, any re- --

MR. KEELING: Just a couple of minutes' worth --

CO-HEARING OFFICER DODUC: Okay.

MR. KEELING: -- for Mr. Neudeck.

REDIRECT EXAMINATION BY MR. KEELING

MR. KEELING: And solely for the purpose, Mr. Neudeck, you recall a few questions from Ms. Des Jardins and I think one or two from Ms. Womack about communications between DWR and the reclamation districts. So I want to clarify that.

To your knowledge, has DWR contacted any of your reclamation district clients to discuss a plan for levee monitoring during construction of the WaterFix?

WITNESS NEUDECK: No.

MR. KEELING: To your knowledge, has anyone from DWR contacted any of your reclamation district clients regarding a plan for coordinating with the reclamation districts on the construction of secondary levees?

WITNESS NEUDECK: No.

MR. KEELING: To your knowledge, has anyone from DWR contacted any of your reclamation district clients concerning a formation of a plan for use of

levee roads during construction?

WITNESS NEUDECK: No.

MR. KEELING: To your knowledge, has anyone from DWR contacted any of your reclamation district clients with respect to a plan for addressing any WaterFix project construction interference with drainage facilities?

WITNESS NEUDECK: Yes.

MR. KEELING: Can you please describe that communication?

WITNESS NEUDECK: In one occasion, the -- I'm blanking on the gentleman's name, but I was invited to a meeting held at Reclamation District No. 800, which is also known as Byron Tract, which is north of Clifton Court Forebay, which is a planned substantial muck deposit site.

I was invited to a meeting with the landowner, the Mormon Church, and the reclamation district general manager. And the amount of muck for that region was going to completely decimate the drainage system in the lower half of Byron Tract.

And that was all that was noted during the course of the meeting from a reclamation district's perspective because it was filling about 3500 acres 15 feet deep of which we had an integrated drain system

through it. And I said, "Well, we've got a problem. You know, when you fill it up, we're no longer going to be able to drain the ground."

And they understood, recognized it would have to be a complete redesign of our drainage system. That was the only occasion where I've come upon any integration with anyone on the California WaterFix.

MR. KEELING: Was there any further follow-up to that one incident where there was communication?

WITNESS NEUDECK: No. The only follow-up was with regards to the issue with regards to the soil borings.

MR. KEELING: I'm going to try to streamline this, Mr. Neudeck. If I asked you that same sequence of questions with respect to the Bureau of Reclamation, would your answers be the same other than that one incident?

WITNESS NEUDECK: No -- no. My answers would be all the same with the exception to the one yes. They're all no for the Bureau. We've had no contact with the Bureau.

MR. KEELING: I ask asked you these questions with respect to the California WaterFix project.

If I asked you the same questions with respect to the project known as the Bay Delta Conservation

Plan, would your answers be the same?

WITNESS NEUDECK: Correct.

MR. KEELING: I have no further redirect.

CO-HEARING OFFICER DODUC: All right. Let me hear from those who wish to conduct recross.

Is it just going to be the Department? The Department and State Water Contractors? All right.

Mr. Jackson.

MR. JACKSON: I'd like to reserve about ten minutes. I may not use it, but then I haven't heard the recross yet.

CO-HEARING OFFICER DODUC: You are supposed to recross based on redirect, not recross based on recross. You should have just left out that second part of your request, Mr. Jackson.

MR. JACKSON: I should have. And I will rephrase.

CO-HEARING OFFICER DODUC: Thank you.

We will take a break after the recross -- recrosses maybe. And then when we return, we will welcome the next panel.

RECROSS-EXAMINATION BY MS. ANSLEY

MS. ANSLEY: Good afternoon. My name is Jolie-Anne Ansley for the Department of Water Resources. We just have a couple questions for Dr.

Burke, obviously regarding his questions on the 30,000 metric ton the residual.

CO-HEARING OFFICER DODUC: Is it "doctor"? I apologize.

MS. ANSLEY: Mister. It's Mr. Burke. I apologize.

Can we bring up DWR-1152 again, Page 2.

Oh, did we lose that? It was on our -- oh, here it is.

CO-HEARING OFFICER DODUC: Page 2, I think you said.

MS. ANSLEY: Page 2.

And thank you for being so good as to retain that after we took back our drive.

Okay. Mr. Burke, looking again at the table at the top, looking in at -- looking at the Middle River and Old River water -- components of your water analysis -- of your analysis, just to confirm my understanding, less salt is being added by the proposed action than the NAA in your analysis; that's correct?

WITNESS BURKE: Are you referring just to the components of Middle River and Old River?

MS. ANSLEY: If you'd like to add in San Joaquin at Vernalis, those are the three inputs in my understanding.

WITNESS BURKE: Well, the -- for those three components, there is a reduction in the amount of salt between those two scenarios

MS. ANSLEY: Being brought into the South Delta?

WITNESS BURKE: That is correct.

MS. ANSLEY: Okay. Then looking at the final column, the total column again, looking at just the NAA, the negative 48,692 in your analysis denotes that more salt is leaving the South Delta than entering the South Delta; is that correct?

WITNESS BURKE: It shows that the residual of the water budget -- of the salt budget for the components coming into and out of the South Delta have a negative value. Now, I wouldn't necessarily put anything specific on that exact number, but it just implies that, for the model, the way it's configured for handling salinity, it gives us a negative 48,600.

MS. ANSLEY: And the negative value means, in your analysis, that, with the flux there is more salt leaving the South Delta than entering the South Delta because this number is negative?

WITNESS BURKE: That would be interpreting this as -- in the predictive mode, that that number would actually be predicting salt leaving the system.

The DSM-2 model, which has been stated repeatedly in this hearing, shouldn't be used in that fashion. It's more appropriate to use this in a comparative mode because, for any one particular scenario, it's not that great at predicting what the actual values would be.

CO-HEARING OFFICER DODUC: Oh, the irony of that answer.

MS. ANSLEY: But generally, what I'm saying is, I'm not imparting a mean to the 48,692; I'm asking you what does the negative value correspond to in your testimony because you do compare the two scenarios --

WITNESS BURKE: I do compare.

MS. ANSLEY: You reach a conclusion based on the value.

WITNESS BURKE: What's important is not the value or the sign of the result that comes out of the salt budget analysis but the difference between that residual in the two scenarios.

MS. ANSLEY: What if the number was positive?

CO-HEARING OFFICER DODUC: Doesn't matter, Ms. Ansley.

MS. ANSLEY: It does matter. I believe the sign actually does matter. And if the number was positive, I'd like to know if that changes his

conclusion. If one of these two numbers was positive, I'd like to know if it changes his conclusion.

CO-HEARING OFFICER DODUC: It would depend on the difference between those numbers, I believe, Mr. Burke.

WITNESS BURKE: That's correct.

CO-HEARING OFFICER DODUC: If I understand your modeling correctly.

WITNESS BURKE: Any one number should not be attributed to any value. It's the difference that makes the comparative scenario have value.

MS. ANSLEY: So let me make myself clear.

If it's my understanding that both of these numbers are negative under, independently, each scenario, there is no residual salt in the South Delta under the analysis that you performed. Just generally, not ascribing a particular metric ton, just generally on the hydrodynamics of your model.

WITNESS BURKE: I would still --

CO-HEARING OFFICER DODUC: Hold on.

MR. RUIZ: I'm going to object as vague and ambiguous and compound. There's a couple questions there, and she mentioned these numbers. I'm not sure what she's talking about.

CO-HEARING OFFICER DODUC: And it's actually

not consistent with the question that Mr. Herrick asked on redirect.

MS. ANSLEY: I believe that he asked, you know, that this can only be used in comparative sense; and they've change their testimony about the 30,000 metric tons not being an actual value of residual, but just to compare between the two models.

MR. RUIZ: That misstates his testimony and is beyond the scope of the redirect.

CO-HEARING OFFICER DODUC: Let's -- to get through this, even though it is a repetitive or repeat of Mr. Herrick's question in a different way, go ahead and ask it Ms. Ansley. And Mr. Burke will respond yet again.

MS. ANSLEY: If both scenarios are showing a flux, which is the type of analysis you did, where more salt is shown by your components individually to be leaving the Delta than entering the Delta, how can there be a residual?

WITNESS BURKE: Each of those different components is not showing whether salt is leaving or entering the system as a residual. It's just showing the residual of the numbers for that particular scenario.

You can't assign any particular value to that

number because it can't be used in predictive mode like that to say whether it's negative and salt's leaving or positive and salt's gaining. It's only when you compare one scenario to the next that you can see the true difference in the salt budget that results from the change in the hydrodynamics of the system.

MS. ANSLEY: But your conclusion, as clarified by Mr. Herrick, is concluding that there is a residual left behind in the South Delta.

WITNESS BURKE: Only when you compare one scenario to the next.

MS. ANSLEY: And we confirmed that less is being added under the proposed action than the No Action Alternative; is that correct?

WITNESS BURKE: Again, if you use those numbers as an actual value, you're using that in a predictive mode.

MS. ANSLEY: Right.

WITNESS BURKE: You should be looking at the difference between the two scenarios rather than the actual values for any one particular scenario.

MS. ANSLEY: But you used the values for any one particular scenario in reaching a number that has a meaning to you.

WITNESS BURKE: I used the values --

MR. RUIZ: Hold on. Hold on.

I'm going to object. That's not a question; it's a statement; it's testimony.

CO-HEARING OFFICER DODUC: It's a question which I'm sure Mr. Burke is about to deny.

WITNESS BURKE: I'm sorry, I've forgotten what the question was, statement was.

MS. ANSLEY: You know, I think we're good. We'll address on rebuttal. Thank you.

CO-HEARING OFFICER DODUC: Ms. Morris.

MS. MORRIS: Thank you. I just have a few questions for Mr. Neudeck. Do I need to explain the nature of my questions?

CO-HEARING OFFICER DODUC: No.

MS. MORRIS: Thank you.

RECROSS-EXAMINATION BY MS. MORRIS

MS. MORRIS: On redirect, you were asked some questions about coordination with DWR and the reclamation districts that you represent in the Delta, correct?

WITNESS NEUDECK: That's correct.

MS. MORRIS: And you don't represent every single reclamation district in the Delta, do you?

WITNESS NEUDECK: No, my firm represents 30 in the Delta proper.

MS. MORRIS: Thank you.

WITNESS NEUDECK: So about half.

MS. MORRIS: And have your reclamation districts reached out to DWR to try to coordinate with them on any of the areas that Mr. Keeling asked you about? I can restate them one at a time if that would be helpful.

WITNESS NEUDECK: No, I recall what he said.

No, we have not -- we have reached out to DWR but not on those specific areas related to the WaterFix.

MS. MORRIS: Okay. Thank you. And has DWR said that it will not reach out to you at some point in the future?

WITNESS NEUDECK: No, there's been no affirmative statements made by the Department.

MS. MORRIS: And you are an engineer, and you plan projects, correct?

WITNESS NEUDECK: That's correct.

MS. MORRIS: All right. And do you generally reach out to talk to people who you're coordinating with before you have final plans of where maybe perhaps alignment might be or what roads may be used?

WITNESS NEUDECK: My response to that is, where we are familiar with and are knowledgeable of it,

that the third party coming in to impact our facilities typically contacts us for our input so it becomes a design element.

To wait for the project to be completely designed and then determine what our measures of impact typically creates some pretty horrendous problems. And I have tremendous experience with this, tremendous experience with tunneling, the Los Vaqueros project did that to us. They were doing a set-back levee. It created one of the most adverse elements I've ever been involved with.

Now, it worked itself out over about a year-and-a-half-long period, but they ignored us up to the point where they almost got to final plans, and we ended up having to redo the plans in its entirety because of the impacts associated with the Delta.

So I strongly recommend the Department reach out sooner than later.

MS. MORRIS: Yes, I agree. I think that that coordination is always better.

Let me just ask you a few follow-up questions on that. In terms of a levee monitoring plan, is that something that would have to be -- that would affect construction plans, or is that something that could be designed totally outside of the construction plans?

WITNESS NEUDECK: It would be a component of the construction specifications. So when you say "totally outside," not likely because it would be part of the construction documentation element. A contractor could not bid this project without the element of monitoring included. It could become a somewhat expensive effort, so I'm not sure if I fully appreciate what you mean by "totally outside."

MS. MORRIS: Let me try it this way. You're aware of the percent of design that's complete on this project, correct? I believe you testified earlier.

WITNESS NEUDECK: Generally, yes.

MS. MORRIS: And what was that again?

WITNESS NEUDECK: It was less than 30 percent.

MS. MORRIS: Right. And so it seems like there's multiple iterations, potentially, before the plans get to final. And I guess my question is, to you, isn't there adequate time for the Department to reach out when they have more final details and to coordinate with your reclamation districts on these important issues?

MR. KEELING: For the record, lacks foundation, but I'm not going to ask that he not be allowed to answer -- not answer it. But it does lack foundation.

CO-HEARING OFFICER DODUC: Mr. Neudeck.

WITNESS NEUDECK: I apologize. I had formulated my answer, and I now somewhat forgot the direction of the question. If you would mind repeating it? I apologize. I was going down a thought that I was going to be directed not to answer, and I let my answer go.

CO-HEARING OFFICER DODUC: See what you did, Mr. Keeling.

WITNESS NEUDECK: I apologize. It was --

CO-HEARING OFFICER DODUC: No, no. Mr. Keeling needs to apologize.

MS. MORRIS: I'll move on. I'll ask a different question.

In your experience with RDs, isn't it generally required that, if you're going to enter private land, that you would first seek permission?

WITNESS NEUDECK: Absolutely. It's a common courtesy. And it's private property, and that's private property for a reason. I'm not certain that the Department always does it that way, but that's a common --

MS. MORRIS: Thank you for the extra commentary. That was to the in response to my question.

WITNESS NEUDECK: You're welcome. All right.

MS. MORRIS: And then in regards to -- you made a comment in response to Ms. Womack's question that Mr. Keeling redirected you on regarding geotechnical work.

Isn't it true that the Department did try to reach out to the RDs and the landowners to be able to enter the property to do geotechnical borings to gather more information so that they could have better plans and that that -- that those requests were not permitted in most instances?

WITNESS NEUDECK: They reached out to individual land owners, not to reclamation districts. And that was one of the reasons we had substantial complaint in the litigation against the Department.

MS. MORRIS: Okay. Thank you.

CO-HEARING OFFICER DODUC: Thank you.

Mr. Jackson, do you wish to recross?

MR. JACKSON: No. To keep my record clear, you were right; I was wrong. And I'm not going to recross.

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

Everyone take note. Mr. Jackson is the star of the day.

With that, thank you, Mr. Burke and Mr. Neudeck.

WITNESS NEUDECK: Most welcome.

CO-HEARING OFFICER DODUC: Again, I always appreciate your patience, your participation in these daily ordeals, but more importantly I appreciate the accepts of cooperation and assistance you have brought into these proceedings.

WITNESS NEUDECK: You're welcome.

WITNESS BURKE: Thank you.

CO-HEARING OFFICER DODUC: We will take a break, and we will -- oh, let's take a long break. We'll return at 2:45.

(Recess taken)

CO-HEARING OFFICER DODUC: All right. Ready? All right. It is 2:45. We are back in session.

And before we get to this panel, I assume there's a housekeeping matter, Ms. Ansley?

MS. ANSLEY: It's actually a motion to strike, so whatever you're ready.

CO-HEARING OFFICER DODUC: Okay. For this panel?

MS. ANSLEY: Yes, of course.

CO-HEARING OFFICER DODUC: All right. Why don't we go ahead and hear your motion.

MS. ANSLEY: The Department water resources objects and asks to strike the testimony of Mr. Lambie, Mr. Mehl and Ms. Foglia, who is a contributing witness, to Part 2 because impacts to groundwater levels, to groundwater basins in particular, here, the South American groundwater basin, were already the subject of Part 1 testimony, including by Mr. Mehl, here -- I'm sorry; I believe it's Dr. Mehl -- including by Dr. Mehl, who submitted not only direct testimony in Part 1 but surrebuttal in response to Ms. Buccholz' rebuttal testimony.

So the issue of groundwater impacts to the South American groundwater basin have been addressed in Part 1. And that is the subject of the testimony of Mr. Lambie and Dr. Mehl. So we believe that this is a Part 1 issue. We believe this is sort of a second bite at the apple and that we are here again now receiving additional evidentiary testimony on the impacts to groundwater basins to California WaterFix and, in particular, the South American Subbasin.

CO-HEARING OFFICER DODUC: Response?

MR. FERGUSON: Aaron Ferguson on behalf of Sacramento County Water Agency. I have two points in response. The first is Dr. Mehl's testimony is testimony regarding public interest issues as it

relates to groundwater management in the South American Subbasin, particularly with respect to SGMA requirements. His testimony is closely linked to Kerry Schmitz's testimony, which is largely about the SGMA, Groundwater Management Planning, processes that are ongoing in the South American Subbasin. So it's closely linked to public interest issues in that regard.

I would also say that Dr. Mehl's testimony is responsive to mitigation that was added since the time he last testified. And it was added by DWR in the Certified EIR. And this is directly responsive so that addition that's occurred in the interim.

So I would say the testimony is relevant, on both counts to Part 2.

CO-HEARING OFFICER DODUC: Ms. Ansley?

MS. ANSLEY: First, I would respond to the assertion about Dr. Mehl's Part 2 testimony here. Dr. Mehl does concentrate on mitigation and monitoring groundwater, No. 1 -- the mitigation measure groundwater, No. 1. Mitigation groundwater measure No. 1 was around in Part 1. What has changed between Part 1 and Part 2, I suppose, with the issuance of the final EIR, is additional monitoring has been added.

The subject of Mr. Mehl's testimony here is

that the monitoring period is not long enough. Certainly if the parties had a problem with the length of monitoring period in total or at all, that testimony was pertinent in Part 1, under the original Mitigation Measure Groundwater No. 1.

So my argument would be that, if they felt that the provisions were insufficient, then and now, us adding additional monitoring doesn't make this now a relevant topic of conversation. Presumably they had the same problem with the original mitigation measure in Part 1.

And so -- and then secondly, Dr. Lambie's test- -- so I agree, Dr. Mehl's testimony here he, in his testimony, claimed it's a continuation of his Part 1 testimony. He said that expressly. And that's the focus of his testimony is that mitigation measure, which, if it's deficient now under his testimony, it was deficient then, in Part 1.

CO-HEARING OFFICER DODUC: Excuse me.

MS. ANSLEY: Mr. Lambie's testimony, however --

CO-HEARING OFFICER DODUC: Hold on.

MS. MESERVE: With respect to Dr. Mehl --

CO-HEARING OFFICER DODUC: Hold on. Let's let her finish.

MS. MORRIS: Mr. Lambie's testimony, however, is an entirely new analysis of impacts from the California WaterFix flows and diversions on groundwater levels in both the South American Subbasin and the, think, East San Joaquin Subbasin. Recharge impacts were the subject of extensive testimony in Part 1, including by tone of the parties in this subgroup, which would be Sacramento County Water Agency.

So this is the basis for us claiming that this was a Part 1 issue that was indeed already addressed by parties here.

CO-HEARING OFFICER DODUC: Now, Ms. Meserve.

MR. FERGUSON: Can I quickly make a point? Aaron Ferguson again, Sacramento County Water Agency.

There is a new element to the monitoring that didn't exist in the original mitigation measure. And it has to do -- it's exactly what he's responding to is the proposal to monitor two miles of each side of the river for five years. That's a new element of the mitigation that was not around during Part 1. And he's responding directly to that.

CO-HEARING OFFICER DODUC: Ms. Meserve.

MS. MESERVE: Yes. In addition to there being new information in the developments document that is SWRCB-108, to which some of this testimony responds, I

would also just point out that Part 2 is in the public interest, public trust resources, and that really the focus of this panel is about the regional impacts of this project on the subbasins; whereas in Part 1, we were focused on individual wells, if folks recall that testimony, and really on the legal user aspect from the Part 1.

So I believe it's clearly within Part 2. We'd be happy to brief it further, but it really doesn't seem like a close question to me.

CO-HEARING OFFICER DODUC: Mr. Keeling, I apologize. You were hidden behind the monitor, so you might have to, like, wave or something to get my attention.

MR. KEELING: Are we having serious discussion about whether groundwater is a public trust resource or affects the public interest?

MS. ANSLEY: I'm sorry. I actually take a little bit of offense to that. I --

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

MS. ANSLEY: Yesterday Mr. Keeling called me unethical a couple of days ago. So, yes, I am making a serious motion. Thank you.

MR. KEELING: Well, then, I guess I'm

mistaken.

CO-HEARING OFFICER DODUC: Mr. Keeling.

MR. KEELING: I thought it was a public trust and public issue.

And Ms. Meserve is correct. We did have well-specific testimony in Part 1 about injury to legal users. Had we attempted to present this testimony in Part 1, they would have stood up and moved to exclude because it doesn't focus on legal users.

MS. ANSLEY: I haven't moved to exclude the SGMA testimony, by the way. I've only moved to exclude the testimony concerning groundwater recharge impacts on the basin, in particular the South American Basin, for which we've already heard extensive testimony by some of these parties.

CO-HEARING OFFICER DODUC: Mr. Deeringer, you had a question.

MR. DEERINGER: Just a clarifying question for Ms. Ansley.

Is it the Department's position that, if testimony is relevant to Part 1 issues, it cannot also be relevant to Part 2 issues, that the testimony presented during one part is mutually exclusive from another part?

MS. ANSLEY: No, I don't think that's our

general line of theory. I think what I'm saying here is that these parties, because they are water users, had a significant amount of testimony and opportunity in Part 1 to present impacts to groundwater levels this these particular basins, you know, because it is -- recharge and groundwater levels were something they felt the California WaterFix was impacting.

They are here, again, I believe, using the hook of public interest to present extended analysis on groundwater impact recharges -- on impacts to groundwater recharge and well levels in the areas of concern.

For example, Mr. Lambie's testimony contains cross-sections of wells and related groundwater levels. So, yes, I think it is, this testimony specifically. So I'm not making a general assertion that the Hearing Officers need to rule in this way in any other thing. I'm saying that this testimony by these two witnesses is a little bit of another bite at the apple of showing impacts to groundwater recharge levels of concern to these parties who are groundwater users in this area.

MR. DEERINGER: So parties during Part 1 would have liked to ask these witnesses about public trust, fish and wildlife issues, when would have been their

first bite at the apple?

MS. ANSLEY: I don't believe that there is one any connection here to any fish and wildlife impacts in these people's testimony. These people are providing testimony on impacts to recharge and groundwater levels in the basin.

So I guess, yes. I mean, I guess that could be true of a lot of things. That could be true of some of the salinity and flow matters that we presented in Part 1. But in terms of presenting evidence of impact, they have already presented that evidence in Part 1. They are presenting more evidence of the same impact in Part 2.

CO-HEARING OFFICER DODUC: Final words, Ms. Meserve or Mr. Ferguson?

MS. MESERVE: I would just add that I think what's being overlooked here is that the testimony is really more about the basins and the overall water budget and balance that is impacted by the project, and we were looking at individual wells before.

And of course those are related things, but for instance, you're not seeing anything in this testimony about individual wells. I believe the cross-sections that Mr. Lambie will talk about later, hopefully, are really intended to show what's going on

with the subbasin.

And I would say, later on in Part 2, I do have testimony that we're presenting on the part of the Environmental Council of Sacramento regarding the fish and wildlife issues with the impact on groundwater changes to vegetation and riparian habitat.

So there is definitely a connect. Although I think the testimony here today is not focused on the wildlife aspect, there definitely is a connection.

CO-HEARING OFFICER DODUC: All right. Thank you. We will take that under advisement.

I would like to hear the direct testimony from this panel before we consult and rule on Ms. Ansley's motion.

Ms. Meserve, just a matter of time, how long or -- Ms. Meserve, et al., how much time do you anticipate needing for the direct portion of this panel?

MS. MESERVE: I think we'll need to about an hour and 15 minutes.

CO-HEARING OFFICER DODUC: Okay.

MS. MESERVE: And we're going to beginning with Kerry Schmitz.

CO-HEARING OFFICER DODUC: And we're going to begin with me administering the oath.

Please stand and raise your right hands.

(Panel 4 sworn)

KERRY SCHMITZ, LAURA FOGLIA,

STEFFEN MEHL, JOSEF TOOTLE,

and JOHN LAMBIE,

called as Panel 4 witnesses by Groups 7, 19, 20, 21, and 24, having been first duly sworn, were examined and testified as hereinafter set forth:

DIRECT EXAMINATION BY MR. FERGUSON

MR. FERGUSON: Ms. Schmitz, will you please state your name for the record.

WITNESS SCHMITZ: My name is Kerry Schmitz.

MR. FERGUSON: Is Exhibit SCWA-300 a true and correct copy of your testimony?

WITNESS SCHMITZ: It is.

CO-HEARING OFFICER DODUC: And is your microphone on? And please move it closer to you. Thank you.

MR. FERGUSON: And does SCWA-301 contain a map of groundwater basins in Sacramento County that you relied on in preparation of your testimony?

WITNESS SCHMITZ: Yes.

MR. FERGUSON: Ms. Schmitz, will you please go ahead and summarize your testimony.

WITNESS SCHMITZ: Yes. My name is Kerry Schmitz, and I serve as the Water Supply Division Chief for Sacramento County Department of Water Resources. I oversee activities and facilities related to both surface and groundwater for the Sacramento County Water Agency, or SCWA.

SCWA-delivers water to over 50,000 customers in Sacramento County. My role with SCWA-includes helping the county and SCWA to comply with the Sustainable Groundwater Management Act, or SGMA. My testimony builds on the testimony of Dr. Steffen Mehl regarding the petitioners' inadequate effort on modeling to understand impacts to groundwater in Sacramento County and groundwater impact mitigation proposed by the petitioners.

My testimony discusses how the impacts to groundwater discussed by Dr. Mehl could impact county groundwater interests, including SCWA and other purveyors, stakeholders, and landowners and could impact our efforts to comply with SGMA.

SGMA provides for a framework for Sustainable Groundwater Management Act, referred groundwater management, defined as the avoidance of six undesirable results which include lowering of groundwater levels, reduction of groundwater seawater intrusion, degraded

water quality, land subsidence, and depletions of interconnected surface water.

In addition, SGMA requires the identification of groundwater dependent ecosystems. Sacramento County overlies four main groundwater basins as well as a small portion of the Tracy Subbasin. The North American Subbasin is north of the American River. South American Subbasin is south of the American River but north of the Cosumnes River. Cosumnes Subbasin is south of the Cosumnes River but north of San Joaquin County. And the Solano Subbasin covers a portion of Sacramento County.

Sacramento County's been working on SGMA compliance in each of the four main sub bases in the county in each of the four main subbasins in the county and has a groundwater sustainability agency, or GSA, role in two out of the four subbasins currently.

I'll focus on the efforts in the South American Subbasin for the purpose of this testimony.

There are currently nine valid GSAs in the South American Subbasin. The two overlap areas that are in the process of being resolved: Sacramento Central Groundwater Authority, or SCGA, has submitted an alternative covering the entire South American Subbasin that is currently being evaluated by

State DWR.

The alternative, if approved, will serve as the groundwater sustainability plan for the South American Subbasin. The alternative contains information about basin setting, historical groundwater monitoring and modeling data to establish the sustainable yield at the basin but does not account for impacts to groundwater associated with the WaterFix project. Depending on the success of the alternative, the County could have a GSA role in the South American Basin as well.

The success of our efforts to comply with SGMA in the South American Subbasin as well as the other subbasins in the County are dependant on sound science and an understanding of the groundwater-surface water interaction in the basins.

Given the County and the water agencies' investment in conjunctive use in the South American Subbasin as discussed in Michael Peterson's testimony in Part 1 of this proceeding, a strong scientific basis critical for our understanding of our groundwater conditions and supporting our SGMA efforts.

Dr. Mehl's testimony indicates the following. The modeling performed as part of the WaterFix does not mention the impact of stream-aquifer interactions in

the area downstream of the diversions. There is not a detailed analysis of the water budget for the South American Subbasin.

Models prepared in support of the WaterFix are not accurate enough to achieve reliable results in the water balance for the South American Subbasin and, in fact, were created for a completely different purpose; and the mitigation proposed is inadequate.

WaterFix modeling does not help answer questions relative to SGMA compliance for Sacramento County groundwater interests. And the WaterFix could result in lower groundwater levels, a reduction in groundwater storage, depletions in the interconnected surface water, and impacts to groundwater-dependant ecosystems.

In addition to SGMA compliance impacts, lowered groundwater levels could impact property owner's ability to access groundwater that is critical to their livelihood, and lowered groundwater levels could impact SCWA's ability to implement the conjunctive use program, which is a benefit to all groundwater users in the region. Thank you.

DIRECT EXAMINATION BY MS. MESERVE

MS. MESERVE: Thank you. We'll move on to Mr. Lambie.

And first, Mr. Lambie, to cover your exhibits, is SJC-223 a true and correct copy of your testimony?

WITNESS LAMBIE: It is.

MS. MESERVE: And is SJC-255 a true and correct copy of your PowerPoint?

WITNESS LAMBIE: It is.

MS. MESERVE: And is SJC-222 a true and correct copy of your statement of qualifications?

WITNESS LAMBIE: Yes.

MS. MESERVE: And are SJC-224 to 254 and LAND-3, 120, and 124 copies of documents you relied on in preparing your testimony?

WITNESS LAMBIE: Yes, they are.

MS. MESERVE: We shall proceed with your testimony then. And just for the Hearing Officers, we'll be doing it in a question format for this witness.

So first, Mr. Lambie, if you could go over your background for us with respect to your schooling.

WITNESS LAMBIE: I hold a bachelor's and a master's degree from MIT. I studied geology in the undergrad, and I studied sediment mechanics the movement of --

(Reporter interruption)

WITNESS LAMBIE: I took geology and then a

master's of science in water resource engineering; sediment mechanics was my specialty.

MS. MESERVE: And then do you hold any professional licenses or registrations?

WITNESS LAMBIE: Yes, I hold quite a number. I'm a professional civil engineer in California. I'm a professional geologist in California. And I'm a certified engineering geologist in California as well as in other states.

MS. MESERVE: And what's your relevant experience for this testimony?

WITNESS LAMBIE: Well, I'm -- I've worked for 34 years in looking at groundwater systems, issues of surface water-groundwater exchange hydrology, so I'm generally both a quantitative analyst of how much water is there and where is it moving in a groundwater system as well as pretty competent in the field, drilling wells and doing field testing.

MS. MESERVE: And starting out with SJC-227, I'd like you to explain the concept of a losing reach to groundwater recharge.

WITNESS LAMBIE: Okay. Can we have 227?

I built SJC-227 to help people visualize what happens when you have a river whose stage is above the groundwater table around it. So here I've depicted the

concept of the Sacramento River and Mokelumne Rivers as two rivers that will be impacted by the project. The arrows in purple are meant to demonstrate that water is leaving the river and into the groundwater basins nearby. So that's the general depiction there.

And you can see the projection of where my analysis goes is in looking at the height of the river and the wetted perimeter of the river, with and without the diversions removing water from the Sacramento.

MS. MESERVE: And then what is your summary opinion with respect to the recharge effects from the addition of these diversions to the Delta?

WITNESS LAMBIE: In summary, operating these diversions will reduce the amount of water that is recharging the two adjoining groundwater basins that I analyzed, the South American Subbasin and the Eastern San Joaquin Subbasin

MS. MESERVE: And how did you go about forming this opinion?

WITNESS LAMBIE: I'll try and keep it brief.

I had to go to the data. So I went back to all of the records to find out how much water would be coming down the Sacramento River, would be coming down the Mokelumne River based on time histories at the different gauges.

And then I looked to the model information from the Department of Water Resources for the rating curves of the rivers. Rating curve describes how the height of the river goes up and down with different flow levels.

So using those, I calculated the geometry of the change in the wetted area below the diversions against these two subbasins. And with that, I was able to quantify the change in discharge to the basins.

MS. MESERVE: And was this done with well-established technical methods?

WITNESS LAMBIE: Yes. I used methods sort of developed and described by the U.S. Geological Survey. What I did was a methodology where I looked at the return frequency, how often a certain type of flow condition was occurring, either historically or projected by the project, in the river. It's sort of a reasonable way to go about predictive uncertainty. Just as you do flood prediction, this is recharge loss prediction.

MS. MESERVE: What were the sources of data you used?

WITNESS LAMBIE: I used Department of Water Resources C2VSim model to provide me both the rating curves and water deliveries. I used the water

deliveries in it from 1951 to 2009, the period it currently addresses. I used the Department of Water Resources Water Data Library for the groundwater elevation measurements over space and time.

I did similarly for the USGS data sources. I took groundwater level measurements from them. I also used their information on historic Sacramento flows at the Freeport gauge over a variety of different time intervals. I looked at the historic Mokelumne flows, again, off the USGS.

And then I needed to use some information from Woodbridge Irrigations data, on their urban and ag water diversions. And last but not least, I used East Bay Municipal Utilities District's presentation on their monthly take from the Mokelumne River in a current period.

MS. MESERVE: Any other sources?

WITNESS LAMBIE: Yes. I have one in particular that was vital to my analysis. I used a presentation from the Bureau of Reclamation on the operations of the Delta Cross Channel that they provided in about 2006. It describes how the DCC, the Delta Cross Channel, is intended to operate by what the Bureau terms its operating periods during calendar year of the seasonal year.

That timing format ended up guiding how I had to execute the analysis because the Delta Cross Channel impacts how the Mokelumne River stage changes with or without operations of the CVP and, in this case, with or without operations of the new diversions.

MS. MESERVE: And I'm reminding you, Mr. Lambie, to go slow enough for the court reporter. If she's having any trouble, she'll let you Know I'm sure.

Any other sources of information?

WITNESS LAMBIE: Yes, I estimated the geometry of the channels of the Sacramento River below the diversions to get the change in stream height. The estimates were made by comparing the bottom elevations from the C2VSim model and the geomorphological studies of the deltaic fan deposits of the Mokelumne. There's an overview, USGS publication on that as well as the one in my specific references on that.

MS. MESERVE: And moving to the PowerPoint which is SJC-255, Page 4, how would you characterize the method of analysis that you have performed in looking at the effect of this project on groundwater?

WITNESS LAMBIE: I would say I analyzed the river-to-groundwater interactions following the methodologies and the precepts of that USGS circular,

1139, that's up on the screen. My method of analysis used the analytical method in which the flux of water leaving the river is governed by the permeability of the material at the edge of the stream bank, the pressure gradient at the stream bank, and the surface area over which the water is in contact to discharge from the river or, conversely, to come back into the river.

The method I followed identified the temporal flow frequency analysis that I touched on and how that changes the surface area of the river on a flow frequency basis. The method identified the change in river stage using the rating curves I mentioned for both the Sacramento and the Mokelumne. And then the reduction of the Sacramento River flows drives a chronic depletion of the two groundwater subbasins.

So the method identifies that, if the diversions are not added for the CVP and SWP operations, that these groundwater depletions do not occur

MS. MESERVE: Let's talk a little bit about the actualities of the project proposed. Where are the groundwater basins in relation to petitioners' new diversions?

WITNESS LAMBIE: If I could have SJC-224.

Thank you.

It's not the best graphic imaginable for it, but on SJC-224, you see outlined in a pale blue the perimeter of the area of the South American Subbasin. And you can see it adjoins the three pinpoints that are the proposed diversion locations.

I draw in yellow the portion of the Sacramento River along the edge of the South American Subbasin that will be depleted in flow. So I think we're -- that's where the South American Subbasin is.

MS. MESERVE: And then what did you look at more specifically about the actual locations of the diversions proposed?

WITNESS LAMBIE: If I could have SJC-225.

Oh, excuse me. No, no, no. I need LAND-3 to describe that. I apologize.

LAND-3 is informational, just as to where the three proposed intakes are located along the river. But its primary purpose is to identify that there would be 3,000 cfs available to take out at each of the three diversions.

MS. MESERVE: And then what more specifically about the overall location of these diversions?

WITNESS LAMBIE: Right. If I could have LAND-120 up. Thank you.

There you can see at the top of LAND-120, in the red, it's the location of the three diversions. And then, as a general matter, the red lines show the alignment of the proposed tunnel alignment through the area of the Delta, specifically for my interest those portions that are in and around the South American Subbasin and Eastern San Joaquin Basin.

MS. MESERVE: And then, in looking in particular about the South American Subbasin, tell me about that subbasin a little.

WITNESS LAMBIE: Okay. If I could have SJC-224 up again.

SJC-224 simply depicts that the South American Subbasin is defined by the Sacramento River on the west, the -- it's actually not the Cosumnes; it's Deer Creek on the south and the American -- the south -- no, the American River, we'll just call it, on the north. So the South American Subbasin is bounded by those three rivers and then moves up onto the bedrock highlands of the lower Sierra Nevada.

MS. MESERVE: What's your assessment of the South American Subbasin as of January 21st, 2015?

WITNESS LAMBIE: If I could have SJC-225 now. If you could drop that back, that'd be good for everybody's sake. Yeah.

SJC-225 is a depiction from the Department of Water Resources Groundwater Information Mapping Center, on the web, of the water level conditions in March of 2015. What they show is that, as of the enactment or effective date of the Sustainable Groundwater Management Act, that the basin was depleted and then suffered a chronic condition of overdraft.

The reason I say that is you can see, on the graphic, the red lines are where the groundwater elevation pressures equals sea level, or zero feet means sea level. The majority of the area within the basin, say, beneath Elk Grove is in an elevation pressure below that of sea level and, of course, below that of the Sacramento River, which is at or above sea level.

So under the Sustainable Groundwater Management Act, this essentially represents the starting point condition that one would reference in looking at SGMA balance for water budget. So that's a -- a decent synopsis.

I think, if I could have Page 2. Thank you. This is simply the same contour information with the color flood, done, again, by the Department of Water Resources website. I think this helps visually to clarify which -- which areas have higher water

elevations and which ones have lower. The more orange colored is the further below sea level water levels are

MS. MESERVE: Is the Sacramento River gaining water or losing water along its boundary with the South American Basin?

WITNESS LAMBIE: If you could back up one slide, back up to Page 1 for me.

What one can see is that the Sacramento River is discharging to the South American Subbasin virtually from where we're sitting, in Sacramento, all the way down to the bottom end of the basin. It doesn't achieve a sea level water level until the south side of Sacramento or, being generous, somewhere just to the south in southern Sacramento.

So to answer your question, the Sacramento River is only a gaining stream up above Sacramento. It is a losing stream all the way below that.

MS. MESERVE: What's the significance of these groundwater elevations?

WITNESS LAMBIE: That the river is the -- that demand for the water, rather, in the basin has increased the overall water budget by pulling water in from the river. That has become a part of the water budget equation under the Sustainable Groundwater Management Act that is a starting point, again, January

2015.

MS. MESERVE: How do you evaluate -- how did you evaluate the proposed addition of the three new diversions on the South American Subbasin?

WITNESS LAMBIE: If I could have 227 up again.

Again, recapping what I said before, I looked at the time period from 1951 to 2009 -- the period in which the CVP actually began operating; the State Water Project began in 1967 to deliver water -- to the -- as the flow values that I looked at at the USGS Freeport gauge and performed a frequency analysis of how often flow was above such and such a criteria, so on and so forth. I took them at essentially 10 percent intervals.

I looked at a 5 percent return frequency, a 10, 20, 30, 40, 50, 60, 70, 80, 90, and the 95 percent return frequency in order to get those temporal periods in which the river would be at such a height in the river stage that it would be losing water over a wetted perimeter.

So I was calculating over the reach below the diversions how large of an area of wetted riverfront, if you will, along the side banks was changed by the diversions. So that change in the wetted perimeter really drives the change the groundwater recharge from

the river.

So I did that throughout that time period and basically was able to then calculate the chronic loss of water from the river to the basin.

MS. MESERVE: And what did you find that to be in your calculations?

WITNESS LAMBIE: Well, as I comment in my testimony, it's a very solid methodology, but no one analysis should be taken as explicitly or numerically correct. But I found that, basically, the chronic condition of deprivation would be on the order of 700 acre-feet per year from the current recharge condition if the project is enacted.

This would be the same as putting a new well in next to the river that's pumping on the order of 450 gallons per minute every day of every year that this project take place. So it essentially amounts to a new groundwater extraction in the South American Subbasin.

MS. MESERVE: And what would you think the effect of the new diversions on the compliance for the South American Subbasin with SGMA would be?

WITNESS LAMBIE: Well, when you look at the letter of the Sustainable Groundwater Management Act as well as the intent, it falls upon the local groundwater users to look at their water budget and come up with a

balance for both the annual need and also the long-term management of water towards sustainability.

So from a technical point of view, it's simply going to make it that much more difficult for the basin to be managed sustainably by these groundwater sustainability agencies that Ms. Schmitz spoke of. They will soon be under an adoptive form of a groundwater sustainability plan, and they're going to have to describe what the water budget is.

And the work I'm doing elsewhere is they're going to basically be allocating how much water is available to be used on a sustainable basis by both the urban-agricultural needs for water that exist already in the basin.

So it's simply going to make it more difficult to not have this water supply available.

CO-HEARING OFFICER DODUC: Ms. Ansley, that was a no?

MS. ANSLEY: It's a "no" depending on the next question.

MS. MESERVE: All right. Now turning to the Eastern San Joaquin Subbasin, can you briefly describe that?

WITNESS LAMBIE: Yes. If I can have 224 back up, please. SJC-224? There we go.

The Eastern San Joaquin Basin, where I live, is defined on the north by the -- by Dry Creek, I believe it's called, at the Stanislaus-Sacramento -- East San Joaquin-Sacramento County line. It's defined on the northwest, I'll call it, by the north fork of the Mokelumne River and then along most of its western boundary by the San Joaquin River and on its southern boundary, by the Stanislaus River and, again, to the east, it laps onto the bedrock uplands of the lower Sierra Nevada. It's a fairly large subbasin.

MS. MESERVE: And then what is your assessment of the Eastern San Joaquin Subbasin as of January 21st, 2017?

WITNESS LAMBIE: If I could have SJC-226.

Here again is imagery and data from the Department of Water Resources groundwater mapping site for the spring water levels in 2015. And as of January 2015, the Eastern San Joaquin Basin was, as can be seen in the data here, in a condition of chronic overdraft.

If you would move to Page 2 of that exhibit, please. Thank you.

And again, just a color flooding to show where the lowest elevations are. And groundwater is shown in sort of the ochre color. You can see that most all of the basin is yellow to ochre. The red line, again, is

zero feet mean sea level.

If you'd scroll back to Page 1 for me.

The nice thing about Page 1 is it shows you the actual place names. So you can see that the entire area below Stockton is -- the water levels are below sea level and out into the Delta.

So the Eastern San Joaquin Basin is also been declared in a state of critical overdraft since the late 1980s. So -- back to your question. Under the SGMA, this would be the starting condition as of January 2015 that the local groundwater sustainability agencies are going to need to manage toward to come up with a balanced water budget for all of the groundwater users in that basin.

MS. MESERVE: And then is the Mokelumne -- the Mokelumne River gaining water or losing water along its boundary with Eastern San Joaquin Subbasin below the Delta Cross Channel?

WITNESS LAMBIE: It is losing water to the groundwater basin all along the western boundary of the basin throughout its reach.

I had a thought there, and it just flitted through.

Basically, it's just recharging all the way along. And below the Delta Cross Channel connector,

the project will have its impacts because the Delta Cross Channel brings the flow of the Sacramento into the Mokelumne River system.

MS. MESERVE: And did you want to look at the elevations in SJC-243?

WITNESS LAMBIE: That would be helpful.

If you can put up 243.

Here's an exact scaled drawing of water levels and distances. You can see there, the center left, the Mokelumne River incised. And then the first water levels we have show elevations of minus 10 feet off to the east and descending steadily downward to an area east of the city of Stockton itself to a low point, and then it gradually rises back up. So you can basically see the sag.

That's essentially what that shows is that, all along there and out into the basin, flow would be from the river out into the center of the basin.

MS. MESERVE: What's the significance of these elevations of groundwater?

WITNESS LAMBIE: Well, the primary one is the same as for the Sacramento. It means that the water demands in the basin have introduced induced recharge from the Mokelumne River and increased the water budget thereby.

If I could have SJC-255, Page 7.

Yes. There we go. On this, I took the Groundwater Mapping Center's figure, and I simply depicted with arrows what the flow direction would look like from the Mokelumne River reaches out to that hydraulic low. So the green arrows show the direction of groundwater movement into the center of the basin. I believe at the top is also another low point where water would be moving from the Mokelumne system out into the center of the basin.

MS. MESERVE: And how did you evaluate the proposed addition of the new diversions on the eastern San Joaquin Subbasin?

WITNESS LAMBIE: If you could give me 227 back.

I am sort of skipping over the first part, but you can see on 227 I drew a dashed blue line to basically say the water in the Delta Cross Channel transfers over here to the Mokelumne River. And when that DCC is operating, it has a hydraulic import and impact to the Mokelumne River. And when you take the stage height out of the Sacramento River and flow, the same -- or a ripple-down effect, if you will, occurs in the Mokelumne River.

So really following the same methodology but

with this seasonal rating of how the Delta Cross Channel operates, I then calculated the probable frequency of changed stage height, in this case, lowered stage height on the discharge of water out of the basin. So it's the same thing made more complicated by the Delta Cross Channel and how it operates.

MS. MESERVE: And what did you find the impact may be on this subbasin?

WITNESS LAMBIE: That it will have a chronic depletion, but that that depletion or deprivation of recharge to the basin will be on the order of 300 acre-feet per year as compared to the current recharge that is happening as the diversions are being operated now.

To put it in simple terms, this would be the same as, say, placing a well next to the river, pumping 24 hours a day, seven days a week, 365 days a year at about 185 gallons per minute.

MS. MESERVE: What do you believe the effect would be on the SGMA compliance for the Eastern San Joaquin Subbasin from this diversion?

WITNESS LAMBIE: Well, adding these new diversions will again make it technically more difficult for the basin to be managed sustainably.

There will be that much less water in the water budget to work with.

MS. MESERVE: And what's the significance, in summary, of your assessment of the effect of the proposed diversions on the public trust and public interests in groundwater resources at the State in these two subbasins?

WITNESS LAMBIE: Well, summarily, conditions in both of these groundwater subbasins would be better without the addition of these new diversions as compared to current operations for the projects.

If you look at SJC-225, if you would.

You would find that the cone of depression beneath Elk Grove, there, would be increased with the addition of these new diversions out to the epicenter and below. If you look at SJC-226 --

CO-HEARING OFFICER DODUC: Hold on, Mr. Lambie.

Ms. Ansley.

MS. ANSLEY: I don't recall any testimony where Mr. -- or Dr. Lambie or Mr. Lambie made any sort of analysis about the impacts to the cone of depression around Elk Grove or whatever specific locale he is going to next.

I acknowledge that I've seen this contour

before. But I don't recall that next step in his analysis from groundwater recharge impacts to effects in specific locales.

CO-HEARING OFFICER DODUC: Mr. Lambie, Ms. Meserve, could you point out --

WITNESS LAMBIE: I'm uncertain, as I sit here, where that would be reflected in my testimony in writing.

MS. MESERVE: I think it may have been in terms, Mr. Lambie, of the subbasin and not necessarily Elk Grove. I tried to stick very closely to the testimony.

CO-HEARING OFFICER DODUC: I just did a quick word search, and I could not find that word in your testimony.

WITNESS LAMBIE: "Cone of depression"?

CO-HEARING OFFICER DODUC: Yes.

WITNESS LAMBIE: Yeah, I don't believe I used that.

MS. ANSLEY: Or specific impacts to the area around Elk Grove. I do acknowledge that Mr. Lambie does give us an opinion on the effect to general recharge of the East San Joaquin Basin.

CO-HEARING OFFICER DODUC: Then we'll keep it to the general recharge.

WITNESS LAMBIE: Fair enough.

CO-HEARING OFFICER DODUC: Mr. Jackson.

MR. JACKSON: I don't see all that well, but I do see the words "Elk Grove" on this map.

CO-HEARING OFFICER DODUC: Yes.

MR. JACKSON: And so doesn't this map describe the cone of depression underneath Elk Grove?

CO-HEARING OFFICER DODUC: Ms. Ansley.

MS. ANSLEY: If I may, this is a contour map. This is not a map of the analysis done by Mr. Lambie. This is actually sourced from DWR. It doesn't show a cone of depression, nor does it show any impacts of the Cal WaterFix, which is what he was beginning to testify on.

CO-HEARING OFFICER DODUC: All right. Sustained. We will strike that portion of Mr. Lambie's oral testimony.

MS. MESERVE: And then, I think, bringing you back to the summary point from the Eastern San Joaquin Subbasin?

WITNESS LAMBIE: Right. Adding these new diversions will adversely impact the water budget for both of these subbasins by decreasing what is an existing groundwater recharge that was occurring in January 2015 and is occurring today.

This decrease in local water budgets, again, will make it more difficult for local sustainability agencies to manage and create a sustainable groundwater management program, and their local stakeholders, as compared to current operations and diversions.

And I opine that, given the State's interest in sustainable groundwater management, in my opinion, it is not in the public trust interest to build and operate these proposed new diversions in the North Delta.

MS. MESERVE: Thank you, Mr. Lambie.

CO-HEARING OFFICER DODUC: Ms. Ansley.

MS. ANSLEY: Yes. I have one additional request to strike. I believe that, a couple times in his testimony, Mr. Lambie -- I do acknowledge that he says in his testimony that his calculated potential impact is 700 acre-feet a year. A number of times he translated that into a number of different numbers. For example, used the -- he translated it to a hypothetical diversion well along the Sacramento River, diverting at a particular rate and time. And that is all beyond the scope of his direct. But I do acknowledge that, aside from that, he was pretty close to his direct. But I do move to strike those extra characterizations of the impact beyond the

700 acre-feet per year.

MS. MESERVE: Actually, on Page 16, Line 22, it states in the testimony "a perpetual removal of 450 gallons per minute" with respect to the American. And then if we look at Page 23 --

MS. ANSLEY: I'm sorry. What line was that?

MS. MESERVE: Line 22 on Page 16 refers to the gallons per minute in the American Subbasin.

And then on Page 23, Line 21, we have the 185 gallons per minute for the East San Joaquin. These are also calculations --

CO-HEARING OFFICER DODUC: I don't believe she's objecting to --

MS. ANSLEY: I withdraw my objection.

MS. MESERVE: Okay. That's fine.

CO-HEARING OFFICER DODUC: Thank you. Does that conclude Mr. Lambie's direct?

MS. MESERVE: Yes.

CO-HEARING OFFICER DODUC: Next?

DIRECT EXAMINATION BY MR. FERGUSON

MR. FERGUSON: We're going to move on to Dr. Foglia and Dr. Mehl.

Dr. Foglia, would you state your name for the record?

WITNESS FOGLIA: My name is Laura Foglia.

MR. FERGUSON: And is Exhibit SCWA-43 a true and correct copy of your statement of qualifications?

WITNESS FOGLIA: Yes, it is.

MR. FERGUSON: And is Exhibit SCWA-308 a true and correct copy of your testimony?

WITNESS FOGLIA: Yes, it is.

MR. FERGUSON: And did you contribute to the development of Dr. Mehl's testimony for Part 2 of this proceeding?

WITNESS FOGLIA: Yes, I did.

MR. FERGUSON: Thank you.

Dr. Mehl, will you please state your name for the record?

WITNESS MEHL: Steffen Mehl.

MR. FERGUSON: Dr. Mehl, is SCWA-41 a true and correct copy of your statement of qualifications?

WITNESS MEHL: Yes, it is.

MR. FERGUSON: And is SCWA-302 a true and correct copy of your testimony for Part 2 of this proceeding?

WITNESS MEHL: Yes, but I'd like to make a correction.

MR. FERGUSON: Yes, we can get to that, certainly. Please go ahead and point out the correction.

WITNESS MEHL: On Page 8, on Line 10, I'd like to insert the phrase "one of" after the word "was" so that Lines 9 through 10 would read "2013 was one of the driest years on record while this year was one of the wettest."

MR. FERGUSON: Thank you. Does SCWA-303 contain an excerpt from the document titled "Developments After Publications of the Proposed Final Environmental Impact Report"?

WITNESS MEHL: Yes.

MR. FERGUSON: Great. And did you rely on this document in the preparation of your testimony?

WITNESS MEHL: Yes.

MR. FERGUSON: Do SCWA-304, SCWA-305, SCWA-306, and SCWA-307 contain excerpts of journal articles that you relied on in preparation of your testimony?

WITNESS MEHL: Yes, they do.

MR. FERGUSON: Dr. Mehl, please summarize your testimony.

WITNESS MEHL: I'd like to begin by just sort of recapping how I got to this point. Previous testimony that I gave looked at modeling efforts that were performed in regards to groundwater and stream-aquifer interaction, in particular, how those

models simulated the stream-aquifer interaction in the area of the South American Subbasin and how those models may or may not have addressed some of the concerns of the Sacramento County Water Agency.

In particular, in surrebuttal, I pointed out some of the deficiencies of those models, particularly the CVHM-D model and its fidelity, let's say, numerical fidelity to simulate those stream-aquifer interactions. Rather than address those modeled deficiencies, seems like DWR has moved forward with the EIR to use monitoring for groundwater impacts.

And so that brings me to today, kind of looking at technical and critical evaluation of some of those mitigation measures MMGW-1 proposed to address those groundwater impacts.

Really, there are two issues that are of concern to SCWA. The first is are these -- are these mitigation measures sufficient to address SCWA's concern regarding the impacts to groundwater in the Zone 40 management area and the South American Subbasin and, secondly, do those mitigation measures align with SCWA's obligations under SGMA, the Sustainable Groundwater Management Act.

So the mitigation measures, MMGW-1, is basically a series of monitoring wells that will be

used as part of the conveyance in the operations monitoring program. It will span a four-mile corridor, both east and west -- two miles on the east and west on either side of the Sacramento River, both upstream and downstream of the North Delta Diversions. That's the anticipated area of influence.

And the monitoring will begin once operations commence and last up to five years, so I'm reading that as a maximum of five years.

There's no justification provided for that spacial and temporal coverage. Typically, monitoring networks are designed to answer particular concerns. Groundwater is tricky to deal with because it has a long response time. That mean there could be a long time lag between, you know, stresses on the aquifer and when those -- how those propagate through the aquifer, for example, the stream-aquifer interaction and stream depletion from the withdrawal of a pumping well.

This is well known that the maximum depletion can actually occur after pumping has ceased. All right? So you know, you pump well, the cone of depression begins, and it starts to propagate out through the aquifer. And then let's say you stop pumping, but that signal is still out there. It's still moving and traveling through the aquifer. And

then it can eventually reach a stream and start depleting the stream.

People say, well, it can't be from the pumping well; we stopped pumping a long time ago. But it's just that signal hasn't reached there yet, and that makes things, you know, tricky.

On top of that California hydrology has a lot of variability. And I'll show why that comes in to compound things as well.

So getting back to this issue of groundwater response time, it's really, you know, the aquifer's ability to, you know, adjust water levels in storage to filed a new equilibrium. This can be approximated analytically or, you know, with numerical -- numerical models. It can be highly variable from days to centuries and beyond.

A key relationship that I have in my testimony is response time is characterized by the distance or length over which this propagation occurs; it's distance squared. So say we're talking about 10 miles, then that becomes 100, right? It's squared distance. And then divided by the aquifer -- the ratio of aquifer properties, of the transmissivity to the storativity. The transmissivity is, of course, the aquifer's ability to transmit water. The storativity is the aquifer's

ability to store water, the sponginess of the aquifer.

So, you know, large basins, you know, we have large distances with high storativity, you know, they tend to have long response times.

There's a lot of literature about management and monitoring and groundwater in regards to the groundwater response time that's in the written testimony. Just to kind of summarize some of that briefly, this is acknowledged that this is challenging. You know, water management time frames often occur over, you know, 50 years or so. But groundwater response times can often occur over much longer time periods than 50 years.

There have been studies on large regional aquifer systems throughout the world showing that some of these response times are, you know, ranging from thousands of years to millennia. All right. So huge variability there.

Closer to home, there have been studies in Nevada, alluvial systems in Nevada, looking at monitoring networks and designing for that. of course, the Sacramento River is an alluvial system as well. Alluvial systems tend to have High storativity. That's one of the numbers cited previously. So they tend to have longer response times.

So, you know, we're seeing that groundwater has these long response times that can kind of range in variability from days to centuries to millennia. Systems that have substantial stream-aquifer interaction, they can be difficult to characterize because the stream system responds at a different time scale than the groundwater system can respond.

So keeping that understanding is crucial to understanding how to manage the systems. Developing appropriate monitoring networks should really account for those different time scales in how aquifers respond and how those changes are propagated through the aquifer. Typically, that's characterized through modeling.

On top of this, as mentioned, California has a large amount of variability. So in order to characterize that part of it, you need long-term sampling to sample through that variability.

If I could, could we bring up SCA -- SCWA-302 and scroll down to the last page. I guess it's Page 9.

So this figure shows the water budget analysis, comparing the difference in stream leakage along the Sacramento River and adjacent to the South American Subbasin using the CVHM model, the No Action Alternative, and the -- against Alt-4.

And, you know, in the previous testimony, I acknowledged that these models were not implicitly designed for stream-aquifer interaction, so, you know, we know that. But this is the best we have right now. All right?

So you know, what this shows is, yes, indeed, there is potential for impact in terms of the stream leakage. So we're seeing that out of this model result.

The other thing I want to point out is, you know, let's say you're going to monitor for the first five years, right, and you see a negative value. But then, look down the road a little bit, and all of a sudden, it changes dramatically, and it's a positive value. And it seems fairly constant for a while, and in the late '90s, all of a sudden you get this other large jump.

Five years of monitoring isn't going to account for the large variability in California hydrology that can be driving a lot of this, these extreme shifts between dry conditions and wet conditions, things like that that we know we can see in California.

And, of course, the groundwater response can be over many decades to those shifts. And it can vary

in space as well. And so we've seen that in the other testimony. We've seen these systems are bounded by the Sacramento River on one side and the American River, you know, to the north. So those changes are being pushed around and propagated through the aquifer.

Monitoring programs should be developed in conjunction with modeling. Modeling can help inform where to monitor, and monitoring results can help improve your modeling efforts. Should really be done together.

If I can just summarize, basically, there's no justification provided that the five years and four miles that they're being proposed is long enough to capture the full variability in California hydrology, is long enough to capture the full variability that the California WaterFix operations might operate through and the variability that the aquifer itself might respond over.

So at the end, it will be very difficult to separate cause from effect out of all this, which is really what it's supposed to do.

Furthermore, the five years doesn't align with any of the SGMA requirements, which requires a 20-year planning period. So there seems to be a disconnect there.

MR. FERGUSON: Thank you.

DIRECT EXAMINATION BY MR. KEELING

MR. KEELING: I'm Tom Keeling, representing the San Joaquin county protestants.

Good afternoon, Mr. Tootle.

WITNESS TOOTLE: Good afternoon.

MR. KEELING: Is Exhibit SJC-284 a true and correct copy of your statement of qualifications?

WITNESS TOOTLE: It is.

MR. KEELING: Is Exhibit SJC-285 a true and correct copy of your written testimony?

WITNESS TOOTLE: It is.

MR. KEELING: Would you please summarize your written testimony, beginning with an overview of your own experience and qualifications.

WITNESS TOOTLE: Sure. Again, my name is Joe Tootle. I'm a licensed professional civil engineer and a licensed professional geotechnical engineer in the State of California. I have over 20 years of practical design and construction experience on numerous projects, both large and small, as well as both public works and private development projects.

I spent most of my career practicing in California on projects in the San Francisco Bay Area, in the Los Angeles Basin, and up and down the Central

Valley.

I have to say I've been fortunate as an engineer to see the vast majority of the projects I've work on go from concept to design and into construction. So as an engineer, it's great to see your designs get built and then also get the opportunity to watch the performance of those projects.

I guess, in the context of at least a portion of my testimony that relates to the handling of large earthwork, I thought it might be worth saying a few words on some projects I've been involved with. A couple sizable projects that I've imaged include one in south central Contra Costa County that involved moving approximately 110 cubic yards of soil. And one that just started in northern Los Angeles County that involved over 250 million cubic yards of soil removed.

CO-HEARING OFFICER DODUC: Mr. Tootle, I apologize.

Ms. Ansley.

MS. ANSLEY: Yes, I'd just like a clarification that these details are in his statement of qualifications because they're not in his direct testimony.

MR. KEELING: I asked him to give an overview of his experience and qualifications, and he is doing

so.

MS. ANSLEY: And now he's speaking about unrelated projects.

CO-HEARING OFFICER DODUC: And these particular projects that he's mentioning are referenced in his statement of qualifications?

WITNESS TOOTLE: The Contra Costa County project is. The northern Los Angeles County has just begun, so it was prior to me submitting the qualifications.

CO-HEARING OFFICER DODUC: So Ms. Ansley, do you still object?

MS. ANSLEY: I do if he's going to provide details that are not in either the statement of qualifications or the direct testimony and in some way relate those projects as somehow analogous situations to what he's discussing there.

I would say that that is surprise beyond the scope of his direct testimony. So it sort of depends on the level of detail he's about to go into.

CO-HEARING OFFICER DODUC: All right. Let's just stick to what's in your statement of qualifications, Mr. Tootle.

WITNESS TOOTLE: Fair enough. I guess I'll try and demonstrate how it's pertinent to the testimony

that's been submitted.

So to put it in the context of the California WaterFix project, these two jobs alone involve moving almost eight times the amount of soil that's estimated by DWR to be removed in the WaterFix project. But --

CO-HEARING OFFICER DODUC: And, wait.

Ms. Ansley.

MS. ANSLEY: Again, just -- someone is free to point me, but projects that involve eight times the amount of California WaterFix project sounds to me like he is taking projects that he didn't testify on and now adding detail and analogizing them presumably to make them relevant to his testimony.

But this is extra information that we didn't have beforehand, and I don't believe it's in his testimony. That's all I'm saying. He's free to say what projects he worked on if it's listed in his statement of qualifications, but if he's going to testify as to the details of those projects in relation to the Cal WaterFix, then I have a problem.

CO-HEARING OFFICER DODUC: Understood.

Mr. Tootle.

WITNESS TOOTLE: I have no further details about those projects.

CO-HEARING OFFICER DODUC: And we will strike

those details that you voiced earlier.

WITNESS TOOTLE: Well, that's enough about me then.

MR. KEELING: Well, Mr. Tootle, you didn't intend for your written statement of qualifications to be an exclusive and complete list of all your experiences, did you?

WITNESS TOOTLE: I did not.

MR. KEELING: Thank you.

WITNESS TOOTLE: Okay. So the testimony that I was going to summarize here today was divided into three categories: disposal of spoils that will be generated from the project; the potential for and consequences of failure during the proposed tunneling activities; and the lack of geotechnical field exploration and design performance to date upon which a lot of the important decisions are apparently being made.

So the first part, as summarized in the conceptual engineering report, there is an estimate of earthwork volumes that will be generated by project. They are broken down into a couple of different categories, but the sum total of those, of the earthwork, is 45.4 million cubic yards.

And for even someone that's used to projects

that involve very large earthwork, you know, this is a large quantity of soil; 45 million yards of soil is a lot of soil. If you were to pile it all up in one place, for example, it would equal almost 13 1/2 Great Pyramids of Giza. So that gives you a picture of the amount of soil that would be produced by this project.

Of course, it won't be possible and it's not proposed to pile up all up into one place. Because the soil will mostly be saturated and will require substantial drying before anything can be done with it, if all the soil was spread out in a one foot layer, for example, to dry it out, a one-foot-thick layer, it would cover over 28,000 acres in size, in plan area.

So hopefully these comparisons can give you a mental picture of the storage process that will be required to drain the water out of the soil spoils. If these storage areas are unlined, then the water will be free to infiltrate into the groundwater where, at best, it will cause mounding of the groundwater in the area, and at worst, assuming that the water coming out of these spoils is of lesser quality than groundwater below the area, it could degrade the quality of water within those areas.

If the storage areas are lined in order to prevent the degradation of the groundwater quality,

then these areas will act as barriers to the natural infiltration of groundwater that would have otherwise recharged those areas had the areas not been lined during storage.

So in summary, either of these conditions either lined or unlined, can negatively impact the use of the waters in these areas.

The second part of my testimony deals with potential loss of ground events that could occur during the tunneling activities themselves. So loss of ground can be a serious occurrence during tunnel construction. Although major loss of ground occurrences are very rare, with the tunnel boring machine methodologies being proposed for this project, they do occur.

A case of true history can be found on several projects from the United Kingdom to Germany, Egypt, as well as Japan, Singapore, and the United States.

So as some of these case histories shows the consequences of such events occurring in the wrong location could be catastrophic. So, much of the ground along the proposed tunnel alignment is either below sea level or only a few feet above sea level. Therefore, a failure of a segmental liner under a levee could easily lead to a very rapid breach of the levee system itself.

It goes without saying that any breach of the levee will have a significant effect on the island that gets flooded itself and would disrupt the water use of the people on the island. But the impact would not just restrict it to the single island because even a single flooded island puts pressure on adjacent islands and could also result in upstream water intrusion that impacts all water users in the Delta, including export water users, not to mention the obvious economic loss and even the potential loss of life that could result from a levee failure.

The WaterFix petitioners acknowledge the possibility of settlement of the levee foundation and damage as a result of the proposed tunneling activities. But unlike many other tunneling projects, the consequences of failure in the Delta are many orders of magnitude greater than exists in other locations and because many water users are linked together by a shared use of the same levee system.

So under these circumstances, merely outlining potential mitigation strategies may not adequately address this potential problem. Given these potential consequences, it is not surprising that the petitioners admit to the need for further studies, geotechnical exploration, and engineering analysis.

It's this admission that brings me to the final point in my testimony. And that's the apparent lack of sufficient subsurface exploration data upon which the current conclusions and mitigation measures are based. Although the total number of geotechnical subsurface explorations, geophysical surveys, and geomorphological evaluations for a project of this magnitude can be a bit subjective, in my experience, the current level of geotechnical exploration is a little lacking.

To that point, one does not have to look very far to find a similar project in the same vicinity as the proposed WaterFix tunnels.

East Bay MUD has a similar tunneling project that actually crosses the tunnel [sic] fix alignment. And even a cursory review of the relative geotechnical and geophysical effort undertaken by the respective projects indicates a much more thorough effort on the part of East Bay MUD compared to the California WaterFix.

In my opinion, the standard of practice between these two similar projects with regard to subsurface characterization do not appear to be the same at all.

In closing and with regard to the issues

discussed, there's a question in my mind as to whether or not the proposed project will result in adverse consequences for public trust resources and the public interest. Thank you.

MR. KEELING: Thank you, Mr. Tootle.

And that concludes our panel.

CO-HEARING OFFICER DODUC: Thank you. With that, we will take a short break four the court reporter as well as for us to consider Ms. Ansley's motion.

Is there anything additional?

MS. ANSLEY: Do you want to hear cross first or after the break? Would you like to hear estimates of cross?

CO-HEARING OFFICER DODUC: Won't that depend on our ruling on your motion?

MS. ANSLEY: Oh, yes, that's true.

CO-HEARING OFFICER DODUC: I wouldn't want to presuppose anything. Let's return at 4:10.

(Recess taken)

CO-HEARING OFFICER DODUC: All right. It is 4:10. We're back in the session. If everyone could please take a seat.

Ms. Ansley, with respect to your motion to strike, it is denied. We find the testimony to have --

to be relevant to the key hearing issues before us in Part 2, particularly testimony that would contribute to a better understanding of regional response to SGMA, which was not covered during Part 1.

So with that, I will now ask for estimates of cross-examination for this panel. We'll begin with DWR and State Water Contractors.

MS. ANSLEY: I would estimate an hour, though it may be a little shorter. I'm prone to throwing questions out as I go sometimes.

CO-HEARING OFFICER DODUC: Ms. Morris.

MS. MORRIS: I would estimate 15 minutes.

CO-HEARING OFFICER DODUC: Mr. Herrick.

MR. HERRICK: John Herrick, South Delta parties. An estimate of maybe 20 minutes.

CO-HEARING OFFICER DODUC: Mr. Jackson.

MR. JACKSON: I had an estimate of 45 minutes.

CO-HEARING OFFICER DODUC: Mr. Stroshane.

MR. STROSHANE: Tim Stroshane representing Restore the Delta, Group 31. I'm estimating 45 to 60 minutes, hopefully less since I'm following everybody else.

MS. DES JARDINS: Deirdre Des Jardins, California Water Research. I would estimate 45 minutes.

CO-HEARING OFFICER DODUC: Ms. Womack, who, by the way, did a really good job on your cross with last panel.

MS. WOMACK: Thank you. That means a lot from you. I -- perhaps 20. Thank you.

CO-HEARING OFFICER DODUC: All right. If that is all, Ms. Ansley, do you have --

MS. ANSLEY: I do have one caveat. And I'm happy to agree to almost any order.

I do have questions for Mr. Mehl, Mr. Tootle, and Dr. Lambie. My only request is that I would like to have my questions for Dr. Lambie not split. So if there's any -- if there's any way, I think that my -- if there's any way, I'd like to keep Dr. Lambie's -- you know, the cross all consistent, since it walks through his analysis. So if there's any party that would like to go before us, that's fine. If you'd --

CO-HEARING OFFICER DODUC: Let me try this. Ms. Ansley, how much time do you estimate needing for the cross examination of the other witnesses besides Mr. Lambie?

MS. ANSLEY: I think it's very short, 20 minutes, 25 minutes.

CO-HEARING OFFICER DODUC: Let's do that and break for the day.

You guys can thank Ms. Ansley.

And as I will ask the attorneys to move so that Ms. Ansley could take that spot. Now I get to gaze at Mr. Keeling, whereas before, I couldn't.

And as we are making this shift, I was just handed a note to ask for whether Mr. Tootle affirmed his written testimony as true and correct. Did we cover that?

MR. KEELING: I did ask him if those exhibits numbers were true and correct copies of his testimony and of his statement of qualifications.

CO-HEARING OFFICER DODUC: All right. I just asked. Mr. Herrick.

MR. HERRICK: Since we're just shifting here, since this panel will go through tomorrow morning sometime, we will have the next panel person not here first thing but late morning or something like that.

CO-HEARING OFFICER DODUC: Yes, I'm -- yes, we have several hours. I would say probably after the lunch break.

MR. HERRICK: I will have him here by 11:00, just in case.

CO-HEARING OFFICER DODUC: All right. Thank you, Mr. Herrick.

MS. ANSLEY: And that's Mr. Michael and

Mr. Nomellini, then. Michael first, I understand?

MR. HERRICK: As far as I know, we were going to put on Jeff Michael first and then Nomellini after, sort of as different one-man panels.

CO-HEARING OFFICER DODUC: That's my understanding as well. All right.

MR. HERRICK: And Nomellini is on call, so any time we need him.

CO-HEARING OFFICER DODUC: Actually, let me -- oh, some of the cross-examiners have left, but I was wondering does anyone have cross-examination for Ms. Schmitz?

MS. ANSLEY: Actually, I do not have cross-examination for those two ladies, so you might want to ask, so they can be dismissed.

CO-HEARING OFFICER DODUC: Okay. You do, but that's tomorrow.

You're free to leave if you so wanted to beat traffic out of here. Thank you for joining us today. We'll see you tomorrow.

MS. MESERVE: Might I add just one thing? I have no idea if this can be accommodated, but if it is possible to excuse Mr. Lambie by noon tomorrow, we would like to try because he has another appointment and has been waiting. I have no idea if it's possible,

but I just wanted to throw that out there as a --

CO-HEARING OFFICER DODUC: We will see what we can do.

Ms. Ansley, Mr. Lambie can actually leave today -- yes, because we won't get to you today. Right?

MS. ANSLEY: Yes, I thought that we were going to try and get through Mr. Mehl -- or Dr. Mehl and Mr. Tootle, and then hopefully it's not fast, it's not too much of a gap, but then I'd like to have a longer period to cross Dr. Lambie.

CO-HEARING OFFICER DODUC: So, Mr. Lambie, you may -- it was Mr. Lambie that you wished to cross-examine tomorrow, correct?

MS. ANSLEY: Oh, I'm sorry. I'm sorry. I would like to cross Dr. Lambie tomorrow, yes.

CO-HEARING OFFICER DODUC: So you may also leave right now if you wish.

WITNESS LAMBIE: I was just commenting, I don't wish to leave.

CO-HEARING OFFICER DODUC: You may stay.

WITNESS LAMBIE: I can go sit in the back of the room if you'd like. I would like to hear what Dr. Mehl has to say. His testimony and mine are intertwined, so.

CO-HEARING OFFICER DODUC: All right. Ms. Ansley.

MS. ANSLEY: Yes?

CO-HEARING OFFICER DODUC: Your topics that you will be covering with Mr. Tootle and Dr. Mehl?

MS. ANSLEY: For both of them, of course, I have planned to stay pretty much on the topics of their testimony. I do not plan to go off the scope of pretty much direct.

With Dr. Mehl, I plan on talking to him about Mitigation Measure Groundwater 1, of course, and I plan on asking him some questions regarding his Figure 1 -- I plan on asking questions about Mitigation Measure Groundwater 1, which will include asking him questions regarding his testimony on aquifer response time. And then I have some question about the modeling that went into Figure 1.

For Mr. Tootle, I have questions for him regarding spoils disposal. I have questions regarding impacts to levees, which I believe he testified about directly. And I think that is basically it for him. And I'm going to start with Mr. Tootle because I believe those are shorter, more discrete questions.

CROSS-EXAMINATION BY MS. ANSLEY

MS. ANSLEY: Good afternoon, Mr. Tootle.

WITNESS TOOTLE: Good afternoon.

MS. ANSLEY: My name is Jolie-Anne Ansley for the Department of Water Resources.

You provided testimony on soils disposal on Page 3 through 5 of your testimony; is that correct?

WITNESS TOOTLE: I believe so, yes.

MS. ANSLEY: And this would be SJC-285?

WITNESS TOOTLE: That's correct.

MS. ANSLEY: If we could call that up on the screen for the witness.

And you also have a copy in front of you?

WITNESS TOOTLE: I do.

MS. ANSLEY: And, please, any time that you need a moment to read your testimony, I don't mean to limit your questions ever to a specific sentence.

WITNESS TOOTLE: All right.

MS. ANSLEY: Looking at your testimony, are you aware that DWR will develop and implement an extensive reusable tunnel material handling plan that is detailed in SWRCB-11?

WITNESS TOOTLE: I am aware that a plan will be developed, yes.

MS. ANSLEY: And you're familiar with that mitigation measure, correct?

WITNESS TOOTLE: I'm familiar with the

mitigation measures on handling spoils, yes.

MS. ANSLEY: And are you aware that the Department of Water Resources has identified areas along the tunnel for potential storage of the reusable tunnel material?

WITNESS TOOTLE: I am aware of that, yes.

MS. ANSLEY: And so you are aware of the locations listed in SWRCB-3, Appendix A Map Book?

WITNESS TOOTLE: I do know that I reviewed locations that were shown on the conceptual engineering report drawings. I don't know whether that's the same one you're referring to or not. I can't positively say.

MS. ANSLEY: Okay. I think -- but generally you are aware of the mitigation measures of the Department -- that the Department of Water Resources proposes for reusable tunnel material?

WITNESS TOOTLE: I am, yes.

MS. ANSLEY: And do you discuss those mitigation measures specifically in your testimony?

WITNESS TOOTLE: I think I make reference to mitigation that are being proposed -- in general terms.

MS. ANSLEY: Starting on Page 5 of your testimony, you raised concerns regarding the subsidence; is that correct?

WITNESS TOOTLE: Maybe you can help point me to where on Page 5?

MS. ANSLEY: Or should I say -- is it more correct for me to say "loss of ground"? I'm looking at Page 5, Lines 17 to 19, sort of the topic sentence of your section.

WITNESS TOOTLE: Yes, if there is a loss of ground event during the tunneling activities, it could result in subsidence of the ground surface.

MS. ANSLEY: Now, I did want to ask you some questions in your -- about your testimony regarding the website Tunnel Talk. Do you see that sort of at the bottom of Page 5, from Line 22 over until Page 6, Line 18? Do you see that?

WITNESS TOOTLE: I do.

MS. ANSLEY: And do you cite this testimony as an example of failures of tunnel projects around the world?

WITNESS TOOTLE: Well, I was using these examples of tunneling projects where they experienced loss of ground events during tunneling. The term "failure" can mean different things to different people. So I guess I'd have to have you further define what you mean by that term.

MS. ANSLEY: No, I'm very happy for you to

define exactly the terms that you mean and to correct me when I use an incorrect term.

Does all of your information on these representative -- I believe you said "failures of tunnel projects." Have I used the right word this time?

WITNESS TOOTLE: I guess I was referring to them as events where there was loss of ground during a tunneling project.

MS. ANSLEY: Is your source for those examples exclusively this Tunnel Talk website?

WITNESS TOOTLE: It's not exclusively this website, no.

MS. ANSLEY: Do you list any other sources in here?

WITNESS TOOTLE: I believe this was the only source.

MS. ANSLEY: And do you know any of the people who provided these comments? And let me ask more specifically, do you know who Nick Shirlaw is?

WITNESS TOOTLE: I'm not personally aquatinted with any of these people, no.

MS. ANSLEY: Did you check the veracity of any of these assertions regarding loss of ground incidents for any of these projects after you read of them on the

Tunnel Talk website?

WITNESS TOOTLE: I did not do any independent research into the events that they're referencing, no.

MS. ANSLEY: But you draw a conclusion on Page 6, Lines 16 through 18 that it is unlikely that all catastrophic problems can be eliminated by simply following applicable codes and best practices; is that correct? If you need to look, it's Page 6, Lines 16 through 18.

WITNESS TOOTLE: I think you read that sentence correctly, yes.

MS. ANSLEY: And do you -- are you aware of the applicable codes and best practices for the projects you cite here as examples?

WITNESS TOOTLE: I couldn't cite you the applicable codes on the projects that are used as examples. I think the intent of citing them is that, although rare, catastrophic events have occurred, and the potential for them is not zero on any project including this project.

So the intent was to point that out as a possibility for this project. And given the potential consequences of failure on this project, it is not insignificant.

MS. ANSLEY: But you are not aware of the

applicable codes and best practices in place in Cairo, Egypt in 2009?

WITNESS TOOTLE: I am not.

MS. ANSLEY: At this moment, I'd like to lodge an objection, a timely hearsay objection for the record -- understanding, of course, that hearsay evidence may be admitted -- to the testimony on Page 5, Line 21 through Page 6, Line 18. And what I mean to specifically reference, if there's anything extra in here, is the assertions by unknown parties off of a website called Tunnel Talk.

MR. KEELING: Well, the irony here, of course, is, as you will recall in Part 1, when Mr. Bednarski testified about the wonderful tunnels all over the world, I cross-examined him on his knowledge of those sources. Of course he had no knowledge. So I understand the objection, and I understand that it goes to weight.

MS. ANSLEY: And my objection actually was a hearsay objection.

CO-HEARING OFFICER DODUC: So noted.

MS. ANSLEY: Speaking of Mr. Bednarski, you cite the direct testimony of DWR Witness John Bednarski, DWR-57; is that correct?

WITNESS TOOTLE: That's correct.

MS. ANSLEY: You do not, however, cite Mr. Bednarski's rebuttal testimony, DWR-75; is that correct?

WITNESS TOOTLE: I don't recall citing that, no.

MS. ANSLEY: Have you reviewed the rebuttal testimony of Mr. Bednarski, DWR-75?

WITNESS TOOTLE: I don't have specific recollection today of doing that.

MS. ANSLEY: So you're not aware that Mr. Bednarski did actually testify as to the successful completion of large-diameter tunnel projects throughout the world?

MR. KEELING: Mischaracterizes the witness's testimony.

MS. ANSLEY: I'm sorry. I thought he said he was not aware.

You did review DWR-75 or you did not? I'm sorry.

WITNESS TOOTLE: I did review and cite DWR-57.

MS. ANSLEY: Yes.

WITNESS TOOTLE: I don't have specific recollection of 75.

MS. ANSLEY: Are you aware that, in DWR-75, Mr. Bednarski testified as to a number of

large-diameter tunnel projects throughout the world?

WITNESS TOOTLE: Yes, I am.

MS. ANSLEY: And are you also aware that he provided testimony regarding impacts to levees from loss of ground?

WITNESS TOOTLE: Yes.

MS. ANSLEY: And are you aware of the DWR environmental commitments regarding further detailed geotechnical investigations?

WITNESS TOOTLE: I am aware that the intent is to do further geotechnical explorations, yes.

MS. ANSLEY: I think that concludes my questions for Mr. Tootle. Thank you.

And the rest of my questions, for today at least, are for Dr. Mehl.

Good afternoon, Dr. Mehl. Am I saying your last name correctly?

WITNESS MEHL: Yes.

MS. ANSLEY: Thank you. And your testimony provides an opinion that the Mitigation Measure Groundwater 1, the length of time of monitoring is inadequate; is that your conclusion?

WITNESS MEHL: That and the spacial coverage.

MS. ANSLEY: Is your understanding that Mitigation Measure Groundwater 1 is to monitor

groundwater levels during the construction of the CWF project as well as the first five years of operation of conveyance; is that correct?

WITNESS MEHL: That's correct.

MS. ANSLEY: So under Mitigation Measure Groundwater 1, the project has committed to monitoring groundwater levels for at least 18 years, the sum of construction time plus five additional years; is that correct?

WITNESS MEHL: If it is indeed 18 -- if it is indeed -- you know, the construction time, if it's going to take that amount of time, right, yes.

MS. ANSLEY: Is it your understanding of -- what is your understanding of how long the construction project will take?

WITNESS MEHL: Well, I've heard several estimates so, I mean, I'm not going to hazard a guess what I think it will take.

MS. ANSLEY: Oh, no, right. I'm saying are you aware that -- I mean, I don't want to testify, so I think that's the end of the question. I'll move on.

On Pages 3 to 4 of your testimony -- I'm sorry, we can have that brought up for you. It's SCWA-302. And you may have a copy in front of you.

But starting on Page 3. Here you have a

discussion of the -- of the South American Subbasin of the Sacramento Valley Groundwater Basin; is that correct?

WITNESS MEHL: Can you -- at the bottom of that page?

MS. ANSLEY: Oh, I'm not specifically citing any specific sentence. I'm just saying that I suppose I should say Section A1, you discuss the South American Subbasin; is that correct?

WITNESS MEHL: That's correct.

MS. ANSLEY: I'm just orienting you.

WITNESS MEHL: Yes.

MS. ANSLEY: And the purpose of your testimony here is to talk about response times of aquifers; is that correct?

WITNESS MEHL: For A1?

MS. ANSLEY: In your testimony.

WITNESS MEHL: In my testimony, yeah. I'm talking about aquifer response time. That's one of the things that's been talked about.

MS. ANSLEY: And starting on Page 5 in Section 3, you have a literature review of aquifer response time.

WITNESS MEHL: Yes.

MS. ANSLEY: And you cite four studies; is

that correct?

WITNESS MEHL: Yeah, that's a --

MS. ANSLEY: Are any of these studies specifically involving the South American Subbasin or the Sacramento Valley Groundwater Basin?

WITNESS MEHL: No, they were just, you know, representative of aquifer systems. And I think I state that in the testimony.

MS. ANSLEY: And is there a large deal of variability between aquifer systems?

WITNESS MEHL: Oh, absolutely there can be.

MS. ANSLEY: Is the there a reason why your exhibits to your testimony do not provide complete copies of these studies?

WITNESS MEHL: I was just trying to, you know, keep things simple and to the relevant parts of what I cite out of those.

MS. ANSLEY: I may be incorrect, but your testimony does not provide a reference section or a bibliography providing a full cite of those studies; is that correct?

MR. FERGUSON: I'll just clarify, if I might, on the first page of each of those exhibits, there is a full reference.

MS. ANSLEY: So you did not provide full

copies because you were intending to only save time by providing excerpts of the studies?

WITNESS MEHL: That's correct.

MS. ANSLEY: Okay. On Page 6, Line 21 to 22, you say that response times can have a large variability, and you cite a range of days, centuries, to millennia; is that correct?

WITNESS MEHL: Yes, that's correct.

MS. ANSLEY: But you do not provide a study of the response time of the South American Subbasin?

WITNESS MEHL: No, I do not.

MS. ANSLEY: So finally, looking at your Figure 1 graph and your water budget analysis, which starts on Page 7, Subsection B and runs through Page 8, you mention that you used a comparison of the CVHM NAA, No Action Alternative, modeling run and the CVHM Alt-4 modeling run provided by petitioners; is that correct?

WITNESS MEHL: That's correct.

MS. ANSLEY: For your CVHM Alt-4 model run, do you mean the Draft BDCP Alt-4 or the CWF Alt-4A?

WITNESS MEHL: It's the -- so you're asking about the CVHM Alt-4?

MS. ANSLEY: I do. I want to know which modeling scenario that is, to be clear.

WITNESS MEHL: It's the one that was provided.

So it's the one that's up on the FTP site. It's just labeled as Alt-4.

MS. ANSLEY: There's a CVHM model on the FTP website for the WaterFix, or for the Board's hearing here?

WITNESS MEHL: I believe for the WaterFix.

MS. ANSLEY: Okay.

WITNESS MEHL: That was provided to us by DWR, and it's labeled as Alt-4.

MS. ANSLEY: Just so that I have the source clear, you personally downloaded -- you received from a download from an FTP site on the CWF WaterFix website a CVHM Alt-4 model?

WITNESS MEHL: I can't remember if it was a California WaterFix website or if it was a DWR-hosted site.

MS. ANSLEY: Is it possible you received it in response to a Public Records Act request?

WITNESS MEHL: It's possible.

MS. ANSLEY: But today, sitting here -- what I'm trying to do is understand exactly which modeling run we are talking about. Do you have any more information to provide on what the source of that was and exactly which modeling run you were looking at? I understand it was labeled Alt-4.

WITNESS MEHL: Right. I mean, I can dig that back up again. Unfortunately, I don't have those files, you know, handy. But they are the ones that were provided by DWR.

MS. ANSLEY: And you don't recall in response to what sort of inquiry they were provided to you regarding --

CO-HEARING OFFICER DODUC: Hold on.

WITNESS MEHL: I would have to go back and look. It was a while ago.

CO-HEARING OFFICER DODUC: Mr. Ferguson.

MR. FERGUSON: Yes, I can clarify. They were provided in response to a request, an initial request, where I was communicating directly with DWR. They provided us with all the groundwater modeling they said that they conducted.

And then I believe -- that was in direct response to a communication. Then they additionally directed us to prepare a Public Records Act request, after they said they couldn't provide any more information.

And I believe it all came across in that initial communication with DWR. And they said it's the modeling conducted in 2013, all the initial groundwater modeling. And there's only been one update -- that's

our understanding -- since then as it related to the story wall analysis.

MS. ANSLEY: Okay. So my question is, Dr. Mehl, as you sit here today, you're not aware of whether this is a modeling run for Alt-4 or Alt-4A?

WITNESS MEHL: And I -- I'm -- I would have to go back and look and let you know if it was Alt-4 or Alt-4A. I couldn't tell you right now.

MS. ANSLEY: Okay. And it's your understanding that the project before the Board that we are considering here in these proceedings is Alt-4A, correct?

WITNESS MEHL: Okay.

MS. ANSLEY: Is that yes? I'm sorry.

WITNESS MEHL: Yeah. I mean, there's been a -- yeah.

MS. ANSLEY: Okay. Just make sure we are checking the right thing.

CO-HEARING OFFICER DODUC: And would it be helpful if Dr. Mehl, overnight, reviewed his analysis and return tomorrow and confirm whether it was Alt-4 or Alt-4A that was analyzed?

WITNESS MEHL: Right. And I believe for the CVHM model, there is only one provided. For the CVHM-D model, there are different ones. But for -- I just

couldn't tell you which one it is.

MS. ANSLEY: Which leads to my next few questions, which are almost over.

So the model run that you used is the CVHM model run, not the CVHM-D run?

WITNESS MEHL: That's correct.

MS. ANSLEY: Were you aware that the CVHM model run did not specifically include the North Delta intakes?

WITNESS MEHL: Yes.

MS. ANSLEY: Is that because the CVHM run was only used for San Joaquin Valley analysis?

WITNESS MEHL: I wouldn't say that was -- it was only used for that. There's -- it has been used for that.

MS. ANSLEY: Are you aware that the CVHM model is based on a one-square-mile grid?

WITNESS MEHL: Absolutely.

MS. ANSLEY: So that it might not be detailed enough to analyze the groundwater elevations along the Sacramento River for CWF operations of the intake?

WITNESS MEHL: Absolutely. I testified to that in Part 1.

MS. ANSLEY: I have no further questions.

CO-HEARING OFFICER DODUC: Thank you,

Ms. Ansley.

With that, we will adjourn until 9:30 tomorrow. And I believe we're back in this room?

Yes, I see a nod. All right. Thank you.

MS. ANSLEY: Thank you very much.

(Whereupon, the proceedings recessed at 4:40 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 which typewriting 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 9th day of April, 2018.

DEBORAH FUQUA

CSR NO. 12948