BEFORE THE

CALIFORNIA STATE WATER RESOURCES CONTROL BOARD

CALIFORNIA WATERFIX WATER RIGHT CHANGE PETITION HEARING	)))

JOE SERNA, JR. BUILDING

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

BYRON SHER AUDITORIUM

1001 I STREET

SECOND FLOOR

SACRAMENTO, CALIFORNIA

PART 1A

Wednesday, August 24, 2016

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Reported By: Candace Yount, CSR No. 2737, RMR, CCRR
Certified Realtime Reporter

Computerized Transcription By Eclipse

APPEARANCES

CALIFORNIA WATER RESOURCES BOARD

Division of Water Rights

Board Members Present:

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

Staff Present:

Diane Riddle, Environmental Program Manager
Dana Heinrich, Senior Staff Attorney
Kyle Ochenduszko, Senior Water Resources Control Engineer

PART I

For Petitioners:

California Department of Water Resources:

James (Tripp) Mizell
Thomas M. Berliner

The U.S. Department of the Interior:

Amy L. Aufdemberge, Esq.

INTERESTED PARTIES:

For Glenn-Colusa Irrigation District (GCID):

Andrew M. Hitchings

For North Delta Water Agency:

Meredith Nikkel

For The Sacramento Valley Group:

David Aladjem

For Sacramento Regional County Sanitation District:

Kelley Taber

APPEARANCES (Continued)

INTERESTED PARTIES (Continued):

For East Bay Municipal Utility District (EBMUD):

Jonathan Salmon

For Sacramento County Water Agency:

Aaron Ferguson

For Friant Water Authority & Friant Water Authority Members:

Gregory Adams

For South Valley Water Association, et al.:

Nicolas Cardella

For San Joaquin Tributaries Authority, The (SJTA), Merced Irrigation District, Modesto Irrigation District, Oakdale Irrigation District, South San Joaquin Irrigation District, Turlock Irrigation District, and City and County of San Francisco:

Tim O'Laughlin

For The City of Stockton:

Kelley Taber

For County of Solano:

Peter Miljanich

For State Water Contractors:

Stefanie Morris

APPEARANCES (Continued)

INTERESTED PARTIES (Continued):

For The Environmental Justice Coalition for Water, Islands, Inc., Local Agencies of the North Delta, Bogle Vineyards/Delta Watershed Landowner Coalition, Diablo Vineyards and Brad Lange/Delta Watershed Landowner Coalition, Stillwater Orchards/Delta Watershed Landowner Coalition, Brett G. Baker and Daniel Wilson:

Osha Meserve

For Central Delta Water Agency, South Delta Water Agency (Delta Agencies), Lafayette Ranch, Heritage Lands Inc., Mark Bachetti Farms and Rudy Mussi Investments L.P.:

John Herrick, Esq.

I N D E X

E X H I B I T S

GLENN-COLUSA IRRIGATION DISTRICT:

EAST BAY MUNICIPAL UTILITIES DISTRICT EXHIBITS:

I N D E X (Continued)

E X H I B I T S (Continued)

EAST BAY MUNICIPAL UTILITIES DISTRICT EXHIBITS:

CENTRAL DELTA WATER AGENCY

Wednesday, August 24, 2016 9:00 a.m.

PROCEEDINGS

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CO-HEARING OFFICER DODUC: (Banging gavel.)

Good morning, everyone. It is 9 o'clock.

Welcome back to the California WaterFix Petition hearing.

I am Tam Doduc. To my right is Board Chair Felicia Marcus. To the Chair's right will be Board member Dee Dee D'Adamo, and to the far right is Diane Riddle. To my left are Dana Heinrich and Kyle Ochenduszko. We are also being assisted by other staff here today.

Our usual quick announcements: Please take a moment and identify the exits closest to you. If an alarm goes off, we are evacuating down the stairs or into a protected vestibule. For those exiting the building, we will gather in the park.

Second announcement: The meeting is being Webcasted and recorded, so please provide your comments into the microphone and please begin by stating your name and affiliation.

A court reporter is here -- thank you again for joining us -- and a transcript will be made available after Part IA. If you need to have it sooner, please

work with the court reporter.

Finally, please take a moment. You know how annoyed I get when these things go off. Please put your noise-making devices on silent, vibrate, sleep mode, whatever that does not make a noise.

Please check.

THE REPORTER: Mine is off.

CO-HEARING OFFICER DODUC: Thank you.

(Laughter)

CO-HEARING OFFICER DODUC: With that, unless there's any other procedural matters . . .

I'm looking around. No, I'm not seeing any.

We will resume with cross-examination by Group 7, Mr. Hitchings.

MR. HITCHINGS: Good morning, Board Members, Board staff and witness panel. Thank you for being here for answering questions this morning.

(Glenn-Colusa Irrigation District's Exhibit 1 marked for identification)

MR. HITCHINGS: I do want to start with some questions regarding -- that are going to pertain to GCID Exhibit 1, and I believe I provided paper copies to the prior panel as well as the Board, and I have copies for at least two of the main witnesses.

CO-HEARING OFFICER DODUC: Okay. Mr. Hitchings, just for my purposes, how much time do you think you'll need?

MR. HITCHINGS: Yes, Hearing Chair. I think probably 20 minutes, 20 to 30 minutes, and I'll try to make it shorter than that if I can.

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

MR. HITCHINGS: Thank you.

(Documents distributed.)

ERIK REYES, TARA SMITH, JAMIE ANDERSON.

GWEN BUCHHOLZ, MICHAEL BRYAN, and KRISTIN WHITE, called as witnesses for the Petitioners, having been previously duly sworn, were examined and testified further as follows:

CROSS-EXAMINATION BY

MR. HITCHINGS: So I'd like to direct most of my questions to Mr. Munévar.

I just handed to you Exhibit 1 and that's the Coordinated Operations Agreement. There was some discussion about that yesterday.

Mr. Munévar, I -- I agree -- I -- I -- I recall that yesterday you indicated that you're generally familiar with the Coordination -- Coordinated Operations Agreement; otherwise, referred to as the COA; is that

correct?

WITNESS MUNÉVAR: That is correct.

MR. HITCHINGS: And generally with its implementation; is that correct?

WITNESS MUNÉVAR: With its implementation with respect to modeling, yes.

MR. HITCHINGS: Okay. If I could refer you to Article 6 of the COA agreement, and let's pull it up on the screen. It starts on Page 8 of that agreement, and it's entitled Coordination of Operations.

(Document displayed on screen.)

MR. HITCHINGS: And in particular -- Do you have that in front of you there?

WITNESS MUNÉVAR: I do.

MR. HITCHINGS: In particular, Article 6(c) on Pages 9 through 10 addresses the CVP and State Water Projects sharing responsibility to meet Sacramento Valley in-basin use with storage withdrawals during balanced water conditions; is that correct?

WITNESS MUNÉVAR: Correct.

MR. HITCHINGS: And -- And under this provision, the responsibility for storage withdrawals is assigned 75 percent to the CVP and 25 percent to the SWP; is that correct?

WITNESS MUNÉVAR: That's correct.

MR. HITCHINGS: And I recall you had provided some testimony along the lines of your familiarity with that -- that sharing approach; is that right?

WITNESS MUNÉVAR: Yes.

MR. HITCHINGS: And then under Article 6(d), on Pages 10 and 11, that addresses the CVP and State Water Project's sharing of responsibility during balanced water conditions when unstored water is available for export; is that correct?

WITNESS MUNÉVAR: Correct.

MR. HITCHINGS: And under that provision, the sharing of available supply is assigned 55 percent to the CVP and 45 percent to the SWP; is that correct?

WITNESS MUNÉVAR: That's correct.

MR. HITCHINGS: Okay. So, in -- in performing the modeling for the Project, did DWR or Reclamation provide any input to the Modelers regarding the COA in order to assure that the modeling for the Project accurately reflected both Reclamation's and DWR's sharing obligations under the COA?

WITNESS MUNÉVAR: Both DWR and Reclamation Modelers were part of the model development and reviewed the model. I won't speak for them in terms of their specific reviews.

MR. HITCHINGS: Yeah. The question was: Did

they put -- Did they provide input as to how the Modelers were to treat COA and the sharing of responsibilities under COA in the modeling assumptions?

WITNESS WHITE: Are you specifically asking whether the Operations staff provided input or whether Reclamation Modelers provided input?

MR. HITCHINGS: Let's say anyone from DWR or Reclamation. Did they provide that type of input with regard to assumptions that should be made as to the sharing of responsibility under COA with the Project in place?

WITNESS MUNÉVAR: I don't recall specific assumptions that would be different than we assumed in the No-Action.

MR. HITCHINGS: Did you make any assumptions with regard to the sharing of responsibilities under COA in the No-Action Alternative?

WITNESS MUNÉVAR: Per -- Per the COA, for long-standing description of the modeling for the past decade or so.

MR. HITCHINGS: And how did you provide -- What -- What were those assumptions regarding the sharing of responsibility for the modeling inputs?

WITNESS MUNÉVAR: They're per the -- per the COA, percentages that were just described in this

exhibit, in COA, the 75-25 under -- under balanced conditions, under basin uses, releases under basin uses, and the 45 -- 55-45 of unstored water for export.

MR. HITCHINGS: Okay. Well, in Alternative 4(a) modeling, limits are placed on total exports in April and May to meet increased spring outflow; is that correct?

WITNESS MUNÉVAR: 4(a) H4, there are export restrictions to achieve the outflows, correct.

MR. HITCHINGS: And is the available export capacity, the assumptions in that alternative, is it -- is the available exports capacity shared 50-50 between the CVP and the SWP and the modeling assumptions?

WITNESS MUNÉVAR: I believe so. I do not recall. Maybe Kristin can chime in on that one.

WITNESS WHITE: Yes, I think that's correct, and that was based on input provided from both DWR and Reclamation Operations staff, not specifically for this Project. That's a longer-standing assumption that's been in CalSim.

MR. HITCHINGS: Okay. So, then, that 50-50 sharing in the assumptions under that alternative, that doesn't then track the 75-25 or the 55-45 that we just talked that in Article 6(c) and 6(d); is that correct?

WITNESS MUNÉVAR: I think in -- in the COA, the

COA did not envision some of the export restrictions that have occurred even recently and so there's been an understanding between the Projects that export capacity under these revised -- or additional export restrictions would be shared 50-50.

WITNESS WHITE: Right. The 75-25 and the 55-45 aren't referring to export restrictions. They're referring to obligations for meeting requirements.

MR. HITCHINGS: So what COA provision was relied upon for the assumption of the 50-50 sharing in the Alternative 4(a) modeling that was just described?

WITNESS MUNÉVAR: Go ahead.

WITNESS WHITE: As I think Mr. Munévar said, that was a -- When COA was developed, export restrictions were not envisioned so it wasn't specifically addressed. So that was added to CalSim based on input from the Reclamation-DWR Operators but not specifically for this Project. That was added some time ago.

MR. HITCHINGS: So there's no COA provision that -- an expressed COA provision that supports that 50-50 assumption.

WITNESS WHITE: I do not believe so, although I'm not . . . an expert in the legal use of COA.

CO-HEARING OFFICER DODUC: Mr. Munévar, do you have a different response?

WITNESS MUNÉVAR: No.

MR. HITCHINGS: Were the modelers that performed the modeling for the different Project alternatives have been -- Were they informed as to how the CVP and the State Water Project are proposing to share the new diversion facilities under the Project?

WITNESS MUNÉVAR: No, we were not. As far as I understand, that is still uncertainty.

MR. HITCHINGS: Okay. I'd like to refer you to DWR Exhibit 515. There was some discussion about that yesterday and, in particular, Page 3, and specifically the box for the H4 scenario Delta outflow requirements.

(Document displayed on screen.)

MR. HITCHINGS: And it's at the bottom of Page -- Well, it's the bottom of the box on Page 3.

And there was a discussion yesterday. The last sentence in that box referred to potential Oroville releases to meet the outflow target.

Do you recall that discussion yesterday?

WITNESS MUNÉVAR: I do.

MR. HITCHINGS: And during your testimony yesterday, I believe you testified that those described releases from Oroville are inconsistent with your current understanding of the COA's requirements; is that correct?

WITNESS MUNÉVAR: The releases from Oroville

alone to meet an outflow, if it was termed an in-basin use, would be inconsistent with current COA applications.

MR. HITCHINGS: And I also believe you testified that the modeling of the export curtailments to meet the outflow target under this scenario complied with the COA's requirements as the export restrictions; is that correct?

WITNESS MUNÉVAR: They were in terms of the total export capacity.

MR. HITCHINGS: And -- And what were those requirements that you had in mind when you provided that answer?

WITNESS MUNÉVAR: Well, in particular, we were speaking of H4, I believe, and the amount of export curtailments that would be required to -- to achieve the outflow targets that are in H4.

MR. HITCHINGS: And -- And what would the -- What were the modeling assumptions as far as the sharing percentages for that alternative analysis?

WITNESS MUNÉVAR: Again, I -- I may have to seek some assistance here from my Panel Members, but . . .

Kristin, you want to . . .

WITNESS WHITE: You're asking how the export restrictions were shared between the State and Federal

Projects at the pumps?

MR. HITCHINGS: Yeah. There was a statement that -- I believe, Mr. Munévar, your testimony was that the modeling of the export curtailments to meet the outflow target complied with COA's requirements as the export restrictions, and -- and that's what I'm trying to get clarification on.

What COA provisions did you have in mind when you made that statement?

WITNESS MUNÉVAR: Yeah. So I -- I do not recall whether the -- the total export capacity was limited such that the outflow could be met without dropping below the 1500 cfs. I cannot recall whether the 50-50 split on the export curtailment was implemented or it was left to COA to apply the split between SWP and CVP.

MR. HITCHINGS: So, you were referring to that 50-50 sharing that we just spoke about a few moments ago?

WITNESS MUNÉVAR: No. I was referring to -- to the COA split.

What I don't recall is whether the split was 50-50 for that particular requirement or left to the COA -- COA logic to provide.

WITNESS WHITE: I think we're mixing up terms a little bit here.

The COA split of 75-25 or 55-45 refers to the obligation to meet in-basin demands. So the Delta outflow responsibility would be shared according to whatever those rules were depending on the balanced or whatever the conditions were in the basin.

The export restriction talks about, when we're restricted on pumping, how do we share that restriction?

So I think when we say it applies for COA, we're talking about how much is being released from each Project in order to meet an overall obligation. When we talk about export restrictions, it's a -- it's not that it's inconsistent with how much we release.

I don't know if that makes sense.

MR. HITCHINGS: Well, what -- what percentage was applied with regard to the sharing of export restrictions?

WITNESS WHITE: I think that's the 50-50 sharing, although I think we heard from Mr. Leahigh and Mr. Milligan that exact operations south of Delta has not been determined as far as the sharing between Projects.

CO-HEARING OFFICER DODUC: Mr. Munévar, can you point to any specific COA requirements that pertain to sharing of export restrictions?

WITNESS MUNÉVAR: I think the -- the export restrictions that were included in COA -- And I don't

have them -- I don't have them, per se. They were included in terms of amount of export available for each of the Projects under certain conditions. That's the 55-45.

Then additional restrictions have been applied to the Projects post-COA, and that's the assumption that Kristin's talking about. The operations assumptions have been 50-50 for many of those requirements.

MR. HITCHINGS: Okay. Thank you.

I just have a couple more questions. And if we could switch gears here and go to DWR-514. And this is on Page 15 of that document, and it's the Figure 12 simulated end-of-September Shasta storage exceedance spot.

(Document displayed on screen.)

MR. HITCHINGS: Page 15, Figure 12.

(Document displayed on screen.)

MR. HITCHINGS: And do you recall there was some -- some questions and discussion regarding this spot, I think from Mr. Lilly but also from Mr. Aladjem at the end of the day yesterday?

Do you recall them?

WITNESS MUNÉVAR: Yes.

MR. HITCHINGS: And one of the lines of questioning was the fact that several of the

alternatives, other than the No-Action Alternative, provided for higher levels of upstream storage in -- in a certain amount of the years, both in the H3, H4 and even in the boundary analysis; is that correct?

WITNESS MUNÉVAR: Correct.

MR. HITCHINGS: And so my question is: Were the modelers from the Project directed in the assumptions that they provided in the modeling to achieve higher end-of-September storage in Shasta under those other Project alternatives?

WITNESS MUNÉVAR: No. The -- The desire in the modeling, in terms of the way we set allocations and the way we set the Rule Curve, is to achieve No-Action levels or higher. Those were the -- the modeling protocol that we developed.

The higher storage assumptions were an outcome of that -- of that approach on a specific target we were seeking to achieve.

MR. HITCHINGS: So it was more almost a performance target?

WITNESS MUNÉVAR: No, not a performance target. It's an outcome of -- of the modeling assumptions that were -- and the alternative assumptions that are included.

MR. HITCHINGS: Well, were assumptions made in

the withholding input so that that result would be achieved, higher end-of-September storage?

WITNESS MUNÉVAR: No.

MR. HITCHINGS: Okay. I think that's all I have.

Thank you very much.

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

And according to my calculation, that concludes the cross-examination for Group 7, except for the Sacramento County Water Agency, who will be conducting their cross-examination with Group Number 15; is that correct?

All right. We will move on to Group Number 8.

Is there anyone here from Group Number 8? Not seeing anyone.

Group Number . . .

MS. NIKKEL: Nine.

CO-HEARING OFFICER DODUC: She's Group 9.

MS. NIKKEL: I'm here for nine.

CO-HEARING OFFICER DODUC: Don't confuse me. Group Number 9.

MS. NIKKEL: Good morning. Meredith Nikkel on behalf of North Delta Water Agency, not Tehama-Colusa Canal Authority for which I'm also representing, but my

questions this morning are for the North Delta.

CO-HEARING OFFICER DODUC: Miss Nikkel, how much time do you anticipate needing?

MS. NIKKEL: About 45 minutes.

CO-HEARING OFFICER DODUC: Okay. And to help me out, can you just briefly go over the topics you'll be covering.

MS. NIKKEL: Sure.

I've got a few just general questions that -- just a couple that are not repetitive, and then a couple also on the boundary analysis framework that -- I think from a different angle focusing more on the DSM-2 aspect of the modeling work that's been done.

And then the 1981 contract between the Department of Water Resources and North Delta Water Agency.

And then specifically the modeling results regarding water quality and water levels.

CO-HEARING OFFICER DODUC: Finally, water quality. I'm happy.

MS. NIKKEL: There we go.

CO-HEARING OFFICER DODUC: Please proceed.

MS. NIKKEL: Thank you.

CROSS-EXAMINATION BY

MS. NIKKEL: So, most of my questions will be

directed to Mr. Nader-Tehrani, although I welcome the input from other panelists as well, as appropriate.

So, Mr. Nader-Tehrani, I just want to make sure I understand your role in developing the modeling results that were presented.

And your written testimony explains that your job duties include directing and reviewing the modeling that was done by DWR and its consultants for the California WaterFix Project; correct?

WITNESS NADER-TEHRANI: That's correct.

MS. NIKKEL: So are you the Department's most knowledgeable witness on the water quality and water level-related impacts associated with the operation of the Proposed Project?

WITNESS NADER-TEHRANI: I would not necessarily consider myself the most expert, but I have about 20 years of experience dealing with models in the Delta, DSM-2 water quality, hydrodynamics, and so forth.

MS. NIKKEL: Okay. Is there somebody else with the Department who would have more knowledge than you on the impacts associated with the Project on water quality and water levels in the Delta?

MR. BERLINER: Objection: Relevance.

CO-HEARING OFFICER DODUC: Miss Nikkel.

MS. NIKKEL: I think we're entitled to know, of

all the witnesses that the Petitioners are putting forward, who the most knowledgeable person is on the key question of impacts on water quality and water levels.

CO-HEARING OFFICER DODUC: You know, Miss Nikkel, as long as the witness can answer your question, we'll --

MS. NIKKEL: Of course.

CO-HEARING OFFICER DODUC: -- leave it at that.

MS. NIKKEL: If you --

CO-HEARING OFFICER DODUC: So go ahead with your questions, your specific questions on water quality.

MS. NIKKEL: Water quality and water levels.

CO-HEARING OFFICER DODUC: And water levels.

MS. NIKKEL: Yes.

WITNESS NADER-TEHRANI: I think I -- I can answer those questions.

MS. NIKKEL: Is there anybody else at DWR, to your knowledge, that has more knowledge than you do?

CO-HEARING OFFICER DODUC: Miss Nikkel, I don't think I made myself clear. I sustained the objection.

MS. NIKKEL: Oh, I'm sorry. I misunderstood you.

CO-HEARING OFFICER DODUC: Please just ask him the water quality questions you have.

MS. NIKKEL: Okay. I misunderstood. Thank

you.

So, also, I understand that your testimony and your modeling work focused on water quality and water levels.

Was DWR's analysis on any other -- Or was there any analysis by DWR in any other aspects resulting from the Project, such as flow or -- or velocity of flow in the Delta?

WITNESS NADER-TEHRANI: We -- We've looked at velocities and flows, but they're not specifically included in the testimony that I provided.

MS. NIKKEL: And where would that information be available?

WITNESS NADER-TEHRANI: All that information is available in the model output that was provided back in the end of May, or middle of May.

MS. NIKKEL: And that's the information you're referring to that's on the State Board's website and the FTP website?

WITNESS NADER-TEHRANI: That's correct.

MS. NIKKEL: Okay. Thank you.

I want to shift focus and ask a couple of questions about the boundary analysis that we've talked a lot about here.

Were you involved personally in the development

of the boundary analysis approach?

WITNESS NADER-TEHRANI: The boundary analysis focus started with CalSim and assumptions in CalSim, so in that aspect, I was not involved in the development of the assumptions for the Boundary 1/Boundary 2.

What I was involving was, once the analysis was done, then we ran DSM-2 to see the effects on water quality and so forth. So that's -- From that portion on, I was involved in making assessments about that.

MS. NIKKEL: Okay. Thank you for that clarification.

So, did you hear yesterday, Mr. Munévar testified that -- that these boundaries represent, you know, a spectrum of options, but they're -- but one could come up with or concoct, I think was the word he used, additional scenarios that are not contained within the boundary analysis?

Do you recall that testimony?

WITNESS NADER-TEHRANI: I recall that, yes, um-hmm.

MS. NIKKEL: And do you agree with Mr. Munévar that one could concoct additional scenarios that don't fall within the boundary analysis?

WITNESS NADER-TEHRANI: I don't have any comments on that. I would leave that to Mr. Munévar.

MS. NIKKEL: Okay. And in your professional opinion, having reviewed and executed, I would say, the boundary analysis approach, would you agree that the boundary analysis is an appropriate tool for analyzing the wide range of effects on hydrodynamics in the Delta?

WITNESS NADER-TEHRANI: I -- I would consider that a proper approach.

MS. NIKKEL: All right. Switching gears again.

Let's have a look at the 1981 contract that I mentioned.

So if staff could please pull up DWR-306.

(Document displayed on screen.)

MS. NIKKEL: Mr. Nader-Tehrani, are you familiar with this document?

WITNESS NADER-TEHRANI: I have seen this document, but not lately.

I have not reviewed all the detail. I do recall looking at it and looking at some of the requirements in the -- that was included in the contract.

MS. NIKKEL: Okay. Can you give us just a generally understanding -- general description of what your understanding of this document is?

WITNESS NADER-TEHRANI: It is -- It -- I believe -- And I could be wrong, but I believe it's an agreement that was signed between DWR and North Delta

Water Agency to provide a certain water quality with -- you know, that would be different depending on the flows or the, you know, precipitation patterns of the River Flow Index at different locations in the North Delta area.

MS. NIKKEL: Okay. And so it's your general understanding that it's DWR who's obligated to meet the requirements of this contract; correct?

WITNESS NADER-TEHRANI: Based on what I recall, yes, um-hmm.

MS. NIKKEL: And is it also -- Based on what you recall, is it also your general understanding that during certain times of the year, the water quality requirements in this contract govern the State Water Project operations rather than D-1641 requirements at Emmaton?

MR. BERLINER: Objection: Calls for a legal conclusion.

CO-HEARING OFFICER DODUC: I believe he can answer to the best of his ability.

WITNESS NADER-TEHRANI: I don't know the answer to that question.

MS. NIKKEL: Let's try it this way:

Do you know if -- in the modeling assumptions, if there were periods when this governed -- this document

1 governs water quality? And by "govern," I mean, you
2 know, the model is designed to meet certain water quality
3 requirements of this document and this contract as
4 opposed to 1960 -- I'm sorry -- D-1641?
5 WITNESS NADER-TEHRANI: The water quality
6 provisions are implemented in CalSim.
7 So, for example, the D-1641 water quality
8 objectives, all of that is included in the assumptions in
9 CalSim. So CalSim determines the flows required to meet
10 specific water quality provisions.
11 DSM-2 is a tool that's used to -- to check
12 whether the -- the -- the desired response is achieved.
13 MS. NIKKEL: Okay. So maybe --
14 WITNESS NADER-TEHRANI: So DSM-2 is not the
15 tool to enforce certain water qualities. It's a tool to
16 just check the desired outcome based on the assumptions
17 that were made in CalSim.
18 MS. NIKKEL: Okay. So maybe the question is
19 better directed to Mr. Munévar.
20 But my -- my question goes to, either in DSM-2
21 or in CalSim, is there a modeling assumption that at some
22 times of the year this contract must be -- the water
23 quality requirements of this contract must be met and not
24 D-1641?
25 WITNESS NADER-TEHRANI: I'm not aware that

this -- This contract is part of the modeling, if that's what you're referring, but -- but Mr. Munévar could -- could prove me wrong.

MS. NIKKEL: Mr. Munévar, do you have a different answer?

WITNESS MUNÉVAR: No. In the CalSim modeling, D-1641 water quality requirements are what drive the operations.

MS. NIKKEL: Okay. Thank you.

WITNESS NADER-TEHRANI: I have something further --

MS. NIKKEL: Yes.

WITNESS NADER-TEHRANI: -- I want to add.

I think Mr. Leahigh mentioned that, you know, he uses in his day-to-day operations -- you know, he considered only a handful of locations. And I think he -- And I could be paraphrasing. He called them the constraining, you know, locations, by -- and by meeting the water quality objectives at those locations, that the -- the other locations are met by -- by themselves.

And my understanding, based on what I recall reading from the North Delta Water Agency contract, is a similar idea that, when you meet the water quality at the locations, specifically Emmaton, Jersey Point, and Contra Costa, that you meet the requirements, at least most of

what's included -- what I recall -- the locations that are included in the North Delta Water Agency contract.

MS. NIKKEL: Okay. And I have a similar recollection of Mr. Leahigh's testimony.

I want to explore two different concepts, though. There's two different things going on here. There's one, a difference in the monitoring location, and then the other is the time of year when requirements apply.

So, is it your understanding that this contract has water quality requirements at Emmaton?

WITNESS NADER-TEHRANI: My understanding is, there -- there is a location included at Emmaton, and I think the requirements are the same as the D-1641 during April 1st to August 15.

But based on what I recall, outside that period, the requirement moves to a different location, and you know better, but that's what I recall.

MS. NIKKEL: That's what I'm asking for is your understanding, so thank you.

WITNESS NADER-TEHRANI: I believe it moved to Rio Vista based on what I -- not Rio Vista -- Sac -- 3 miles from Sacramento River and Three Mile.

MS. NIKKEL: Thank you.

And can you tell me in geographic terms where

Three Mile Slough is located relative to Emmaton?

WITNESS NADER-TEHRANI: I believe it's a couple miles upstream. I can't be specific.

MS. NIKKEL: Approximately a couple miles upstream of Emmaton?

WITNESS NADER-TEHRANI: Upstream, yes.

MS. NIKKEL: Can we zoom down to Attachment A of this contract? I'm sorry, I don't have the exact page number. It's probably Page 5.

(Document displayed on screen.)

MS. NIKKEL: Go up one.

(Document displayed on screen.)

MS. NIKKEL: Thank you.

So Attachment A shows the -- the water quality requirements.

Here in this version of the contract, it says Sacramento at Emmaton. I will represent to you that that was subject to a later amendment of the contract and it moved to Three Mile Slough.

WITNESS NADER-TEHRANI: That's -- Yeah, I recall something along those lines.

MS. NIKKEL: Okay. So looking at this -- this water quality requirement, do you see where it says August 23rd in the top left chart, August 23rd to 31st, September, October, November?

WITNESS NADER-TEHRANI: I do see that.

MS. NIKKEL: And can you describe for us what that -- if that -- what that means to you, if anything?

WITNESS NADER-TEHRANI: I believe that is describing the starting goal for salinity during that time period.

MS. NIKKEL: Okay. And the -- I think I also heard from you that your understanding is that the D-1641 requirements are -- those end in August --

WITNESS NADER-TEHRANI: 15th.

MS. NIKKEL: -- on August 15th; correct?

WITNESS NADER-TEHRANI: Correct, at Emmaton, yes.

MS. NIKKEL: So, is it fair to say that the requirements of this contract extend beyond, in terms of time, the water quality requirements of D-1641?

WITNESS NADER-TEHRANI: At Emmaton, yes, but there are other water quality objectives at other locations in the Delta that go year-round.

MS. NIKKEL: Thank you.

But at Emmaton.

WITNESS NADER-TEHRANI: Emmaton, yes.

MS. NIKKEL: So, can you explain to me how, if at all, this water quality objective at Three Mile Slough under the 1981 contract with the North Delta Water Agency

is accomplished in the modeling after August 15th?

WITNESS NADER-TEHRANI: I think, as it was pointed out, not all the D-1641 -- So let's go back to the D-1641.

Only four or five of the locations that are specified in D-1641 are actually modeled. And we -- I refer to them as constraining occasions, and they are -- they are such that, when you meet the water quality at those locations, you meet at -- at remaining locations.

So, based on what I recall, looking at the -- When the provisions of North Delta Water Agency contract is met, that because of the fact that it's moved to Rio -- to Three Mile Slough, the salinity is lower at Three Mile Slough.

And by meeting the D-16 -- other D-1641 water quality objectives at other periods, and other provisions, including minimum Rio Vista flows and so forth, that you meet those same requirements most of the time.

I don't have anything specific to this particular testimony that -- that I can point to right now that would say that.

MS. NIKKEL: Okay. And I think I understand that explanation, but I just want to make sure I'm understanding that there is nothing in the model that

requires a certain water quality level at Three Mile Slough from August 30 -- sorry -- August 15th through November.

WITNESS NADER-TEHRANI: Yeah. For the same reason, I think I said that not all the 1641 water quality objectives are modeled, I would categorize this as the same way.

MS. NIKKEL: I'm not asking for the reason. I'm just asking if that's correct, that there --

WITNESS NADER-TEHRANI: That is correct.

MS. NIKKEL: Okay. Thank you.

WITNESS NADER-TEHRANI: My understanding, it's not part of the model. And as I explained that, that kind of water quality objectives are -- they're all modeled in CalSim, and DSM-2 is just the tool.

CO-HEARING OFFICER DODUC: So let me cut to the chase.

It's not in the model, and sitting here today, you cannot say whether these particular objectives are met.

WITNESS NADER-TEHRANI: That is correct.

CO-HEARING OFFICER DODUC: All right. Was there anything else on this, Ms. Nikkel?

MS. NIKKEL: No, thank you.

All right. I'm going to switch gears a little

bit and move to water quality modeling results more generally.

So if staff could please pull up DWR-5.

And I assume this is the errata version. That's the one I'm working on. So hopefully our page numbers will correspond.

(Document displayed on screen.)

MS. NIKKEL: And if we could move to Page 54, please.

(Document displayed on screen.)

MS. NIKKEL: So, I want to focus on this part of your -- your presentation, Mr. Nader-Tehrani, on the first bullet (reading):

"Monthly average EC at selected Delta locations."

And I think you already answered some of my questions as to how those select locations account for exchanges in other parts of the Delta.

Can you -- Can you describe for me whether any of these locations include locations along the sloughs and channels -- and I'm going to be very specific here -- between the intakes and the -- Actually, I need to refer to one other slide in your exhibit; just one moment -- and the Georgiana Slough.

WITNESS NADER-TEHRANI: And what is the

question? I'm sorry.

MS. NIKKEL: Do any of these select locations for -- and I'm just thinking of EC compliance -- any -- any locations at -- in between the location of the intakes and the Georgiana Slough.

WITNESS NADER-TEHRANI: They are not part of my testimony, but I have looked at those results.

MS. NIKKEL: Okay. So those results, though, would be available in the modeling trials that you referenced.

WITNESS NADER-TEHRANI: That is correct.

MS. NIKKEL: Mr. Nader-Tehrani, can you tell me:

Is DSM-2 a one-dimensional model?

WITNESS NADER-TEHRANI: That is correct.

MS. NIKKEL: And can you explain that for us civilians? I think Mr. Lilly used that word as well yesterday.

WITNESS NADER-TEHRANI: What a one-dimensional model is?

MS. NIKKEL: Yes, as opposed a two-dimensional model.

WITNESS NADER-TEHRANI: A one-dimensional model assumes flow going in one direction -- I mean, in a territory direction. It can go forward, backwards, but

not sideways, basically. So that's the short answer.

Do you need more detail?

MS. NIKKEL: No. I think that's helpful. I think now we see there's one dimension forward and back but not two dimensions up or down.

WITNESS NADER-TEHRANI: Up and down, sideways.

You could have a two-dimensional that -- that goes forward, backwards and sideways. I mean, technically you can have a model.

MS. NIKKEL: And water in the channel moves in all those two-dimensional directions; correct?

WITNESS NADER-TEHRANI: That is correct, yes.

MS. NIKKEL: So, in your opinion, is a one-dimensional model such as was used here sufficient to capture the multifaceted hydrodynamics of how water moves in the Delta and its channels?

WITNESS NADER-TEHRANI: I think the answer depends on what questions you want to answer.

MS. NIKKEL: Fair enough. For --

WITNESS NADER-TEHRANI: If -- In terms of the information I provided, I think the one-dimensional model is more than adequate.

MS. NIKKEL: For water quality and for water level analysis?

WITNESS NADER-TEHRANI: Yes.

MS. NIKKEL: And would that be the same for the impact of the water velocity?

WITNESS NADER-TEHRANI: Yes.

MS. NIKKEL: I'm going to just go back to your answer.

You said that, during your analysis, you did review results of the model for salinity at locations between the intakes and Georgiana Slough.

WITNESS NADER-TEHRANI: I have looked at them, yes.

MS. NIKKEL: Do you recall which locations?

WITNESS NADER-TEHRANI: I haven't looked at that location around -- near Sutter Slough, Sacramento and Sutter and, moving on downstream, Sacramento and Steamboat, upstream of Cross Channel, downstream of Georgiana and -- Yeah, I've looked at all those, um-hmm.

MS. NIKKEL: Was -- Sorry. Was -- Was upstream of Georgiana something different than --

WITNESS NADER-TEHRANI: No. Upstream of Cross Channel.

MS. NIKKEL: Upstream of Cross Channel, something different than Steamboat; correct?

WITNESS NADER-TEHRANI: That is right, um-hmm.

MS. NIKKEL: And do you recall generally what the results of the models showed at those locations?

WITNESS NADER-TEHRANI: Very similar water quality under No-Action, and all the boundaries, and H2/H4.

MS. NIKKEL: And switching gears for a moment while we're on it, do you recall looking at those locations for the water -- water level results?

WITNESS NADER-TEHRANI: I have included actually water level analysis at a location immediately downstream of the three intakes and a location near Georgiana Slough.

MS. NIKKEL: Did you also look for water level results at these locations: Sutter Slough, Steamboat and upstream of the Cross Channel?

WITNESS NADER-TEHRANI: They are not included in my testimony but I have looked at them.

MS. NIKKEL: Okay. And do you recall what the results were of those?

WITNESS NADER-TEHRANI: I think consistent with the information that I shared. So somewhere -- In general, the farther you get from the intakes, the lower the reduction in water level.

MS. NIKKEL: And all of these locations were along the Sacramento River; correct?

WITNESS NADER-TEHRANI: The ones that are included in my testimony, yes, the two locations I just

described.

MS. NIKKEL: Let me back up.

I'm focused on the ones that are not included in the testimony because those are harder for me to -- to know --

WITNESS NADER-TEHRANI: I looked at --

MS. NIKKEL: -- about.

WITNESS NADER-TEHRANI: I looked at Sutter Slough; I looked at Steamboat Slough.

MS. NIKKEL: Those are on the sloughs themselves.

WITNESS NADER-TEHRANI: Yes, yeah.

MS. NIKKEL: Okay. Okay. Let's move to Page 55, please.

(Document displayed on screen.)

MS. NIKKEL: And you presented this during your direct testimony yesterday.

And in your written testimony, you estimated that there is an increase of about 18 to 19 percent EC at Emmaton in July and August; correct?

WITNESS NADER-TEHRANI: Yeah, something along those lines, yes, for --

MS. NIKKEL: Is it your understanding --

WITNESS MUNÉVAR: Let me be clear.

Yeah, that information relates to Boundary 1,

H3 and H4, and there is actually a reduction in EC for Boundary 2 for the month of August.

MS. NIKKEL: Thank you for that clarification.

So, when I talk about the 18 to 19 percent figure, we're just going to focus on Boundary 1, H3 and H4.

WITNESS NADER-TEHRANI: Yes.

MS. NIKKEL: So, is it your understanding that this 18 percent figure, it's an -- it's an average monthly projected increase; correct?

WITNESS NADER-TEHRANI: That is correct.

MS. NIKKEL: So, in any particular month in the model, the EC could be greater than the 18 to 19 percent above the No-Action Alternative; correct?

WITNESS NADER-TEHRANI: And others would be lower. This is the average number, yes.

MS. NIKKEL: And so, on a particular day, the EC increase at Emmaton could be also much greater than 18 to 19 percent.

WITNESS NADER-TEHRANI: I wouldn't say much, but that would not be the words I use.

MS. NIKKEL: Would it be -- Would there be some --

WITNESS NADER-TEHRANI: Some could be higher; some could be lower. That's how it is.

MS. NIKKEL: So some would be higher and some would be lower. Thank you.

In -- In what types of scenarios would you expect the EC to be greater than 18 or 19 percent?

WITNESS NADER-TEHRANI: I think this question needs a little more clarification here.

This is a period where the D-1641 water quality objectives apply.

And I think part of my testimony, I presented information of the models -- what I refer to as modeling artifact, the issues regarding the -- the discrepancy between CalSim and DSM-2, the assumptions that are made, and I believe part of the reason what -- for why you're seeing this increase is related to -- to the fact that the water quality objective that are implemented in CalSim are implemented based on a monthly average scale, whereas the standards actually apply to 14-day average.

And -- And for the examples that -- that I showed, that there are exceedances that are reported by DSM-2 that are directly related to those inconsistencies.

If we had a perfect tool that -- that -- you know, consistent between CalSim and DSM-2, it is my belief that you may not see the increases you're seeing in the model.

MS. NIKKEL: And I want to get to that. I

appreciate that, and I want to get to that -- that issue --

WITNESS NADER-TEHRANI: Yeah.

MS. NIKKEL: -- in a moment.

WITNESS NADER-TEHRANI: Yeah.

MS. NIKKEL: For now, I want to focus on instances in the model where the EC on a particular month or a particular day is higher than the 18 to 19 percent increase and those instances that are not, in your opinion, a result of those modeling anomalies that you described.

Can you explain what such an instance would be and why it would occur?

WITNESS NADER-TEHRANI: There . . . In CalSim, you know, the flows are monthly average, and then there are procedures that are used to -- to change the monthly flows into daily based on historical patterns.

And so there could be a situation where, because of the historical pattern that is applied, certain days in a month, the flows happen to be lower in the past, that you might -- that would reflect itself in increasing in EC corresponding to those years.

This would be something that an Operator would -- you know, seeing if there is an issue with the D-1641, for example, for the water quality objective at

Emmaton would be easy to be able to detect ahead of time and be able to respond accordingly.

MS. NIKKEL: But I think we can focus our -- our discussion now, just so I can understand the modeling, on -- on the modeling.

WITNESS NADER-TEHRANI: Yeah.

MS. NIKKEL: So your testimony is that you could see a -- an increase over the 18 to 19 percent in a circumstance where there's a preceding dry condition.

WITNESS NADER-TEHRANI: Most of the -- the differences we see in the model, you know, are -- One of the issues, that when you run CalSim, there could be month-to-month differences where the -- You know, there are many years you can meet the water quality objectives, and, therefore, you may see results in the model that, you know, are somewhat -- from looking at it from day to day or month to month, that are very different, just because the different models that CalSim runs go about meeting the objectives a different way that could show itself up as an increase in salinity.

So -- But I don't know if --

MS. NIKKEL: But I think you've identified one example is --

WITNESS NADER-TEHRANI: Right.

MS. NIKKEL: -- if there's a preceding period

of dry conditions.

WITNESS NADER-TEHRANI: Yeah.

MS. NIKKEL: Okay. And now I do want to ask about the distinction you drew in July and August on this chart, that the Boundary 2 shows a reduction over the No-Action Alternative.

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

MS. NIKKEL: Can you explain why that is?

WITNESS NADER-TEHRANI: The water quality at this location is predominantly governed by outflow, so higher outflow, lower -- lower salinity, lower EC.

So it is my understanding that H -- that Boundary 2 has a higher outflow that shows itself up as a reduction in this year, this location.

MS. NIKKEL: Okay. Can we turn now to Page 66, please.

(Document displayed on screen.)

MS. NIKKEL: Mr. Nader-Tehrani, this is the dry year example that you walked us all through yesterday in your direct testimony.

And I just wanted to clarify: This is only showing results through August of 1987; correct?

WITNESS NADER-TEHRANI: That's correct, August 15.

MS. NIKKEL: And do you know what the results

show for September of this same dry year example?

WITNESS NADER-TEHRANI: I don't recall.

MS. NIKKEL: But those -- That result will be available in the modeling trials.

WITNESS NADER-TEHRANI: That objective would be available in the models.

MS. NIKKEL: Can you explain why you chose 1987 in the example here?

WITNESS NADER-TEHRANI: I was trying to illustrate the issues regarding the -- the inconsistencies between the modeling in terms of --

MS. NIKKEL: Maybe -- Let me try rephrasing my question before you complete your answer.

WITNESS NADER-TEHRANI: I understand.

MS. NIKKEL: I'm trying to say -- I'm asking why you chose 1987 as opposed to some other dry year.

WITNESS NADER-TEHRANI: I -- There was no particular reason.

MS. NIKKEL: So is this an example of what we can expect in all dry years?

WITNESS NADER-TEHRANI: I would not say that. I would -- The point of this graph is to illustrate the issues regarding a different set of assumptions that go between the two models.

And June was an example in this case to

illustrate that the D-1641 model water quality examples change in the middle of June, and the issue regarding CalSim being a monthly time-step. So that was the whole point of --

MS. NIKKEL: Okay. So --

WITNESS NADER-TEHRANI: There was no other reason beyond that.

MS. NIKKEL: That's helpful.

So you weren't intending this to be an example of how we can expect EC to behave in other years in the modeling.

WITNESS NADER-TEHRANI: No.

MS. NIKKEL: Okay. Thank you.

So -- So we could expect other dry years to behave differently depending on the conditions; correct?

WITNESS NADER-TEHRANI: Yes.

MS. NIKKEL: Thank you.

Okay. Moving to Page 67.

(Document displayed on screen.)

MS. NIKKEL: Okay. So now I do want to talk a little bit about the modeling anomalies that you've done a very good job of explaining in your testimony so far.

So, if those modeling anomalies that you described were eliminated and the No-Action scenario in the model reflected the 97.4 percent compliance that

Mr. Leahigh testified about, would you expect the -- the increase in exceedances to be more or less than what is shown in this figure?

WITNESS NADER-TEHRANI: The consistency -- or the -- of the models were perfect?

MS. NIKKEL: If the models were perfect.

WITNESS NADER-TEHRANI: Perfect, yes. I would expect that they will all achieve a similar . . . you know, achievement in term of -- a similar achievement that's done in operations are shown, yes, being the 97, 98 percent, achieving the water quality objective at Emmaton, or Jersey Point, wherever.

MS. NIKKEL: I think we're focusing on Emmaton --

WITNESS NADER-TEHRANI: Yes. So --

MS. NIKKEL: -- so --

WITNESS NADER-TEHRANI: -- similar, yes.

MS. NIKKEL: Yeah. Let's just focus on Emmaton because this is a hard enough concept as it is, so --

WITNESS NADER-TEHRANI: Right.

So, if the compliance were not the 80 to 85 percent which was modeled but, rather, the compliance in the No-Action Alternative where -- the 97.4 percent.

WITNESS NADER-TEHRANI: Right.

MS. NIKKEL: Would you expect the increase in

the Project scenarios to be more or less than what is shown in this figure? And the --

WITNESS NADER-TEHRANI: I'm sorry.

MS. NIKKEL: And the change --

WITNESS NADER-TEHRANI: I'm sorry. Can you --

MS. NIKKEL: -- the change in the increase.

WITNESS NADER-TEHRANI: Sorry. Can you repeat? I'm sorry. I lost the question.

MS. NIKKEL: Yeah. Sure. It's a tough one, for me especially.

WITNESS NADER-TEHRANI: Okay. Go ahead.

MS. NIKKEL: So, the -- if the modeling were corrected and the No-Action Alternative showed a 97.4 percent compliance with the Emmaton standard --

WITNESS NADER-TEHRANI: Yes.

MS. NIKKEL: -- would you expect the Project scenarios -- so H3, H4, Boundary 1 and Boundary 2 -- to show an increase over that No-Action Alternative which is more or less than what is shown here?

WITNESS NADER-TEHRANI: If the models were perfect, we would have seen 100 percent for all -- or close to 100 percent for all operational scenarios, not less for --

MS. NIKKEL: I'm talking about the change over the No-Action Alternative.

WITNESS NADER-TEHRANI: I would expect the -- the -- the success to be similar for all operational scenarios if the models were perfect.

MS. NIKKEL: So, let's assume -- and I don't -- I don't know exact numbers here, but let's assume that the change between the No-Action Alternative, which is the black line --

WITNESS NADER-TEHRANI: Yes.

MS. NIKKEL: -- and the blue line, which I believe is H4?

WITNESS NADER-TEHRANI: Yes.

MS. NIKKEL: Let's assume that increase in the . . .

Maybe I'm using the wrong word.

The difference between the black line and the blue line --

WITNESS NADER-TEHRANI: Right.

MS. NIKKEL: -- is probably, what, 2 percent?

WITNESS NADER-TEHRANI: Something like that.

MS. NIKKEL: Something like that?

WITNESS NADER-TEHRANI: Yes.

MS. NIKKEL: Would you expect, if the model were corrected, that 2 percent to go up or down?

WITNESS NADER-TEHRANI: I don't believe that that -- In terms of meeting the -- the D-1641 objective,

I believe that that 2 percent would go away if the models were corrected, if the models were perfect.

MS. NIKKEL: You believe it would go away?

WITNESS NADER-TEHRANI: Yes.

MS. NIKKEL: So it would be -- The change would be less.

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

MS. NIKKEL: So I want to think about this from a different angle.

WITNESS NADER-TEHRANI: Sure.

MS. NIKKEL: And thank you for bearing with me. This is a tough concept.

So, in a -- in a year where a modeled violation -- So let's kind of move away from the Exceedance Plot --

WITNESS NADER-TEHRANI: Right.

MS. NIKKEL: -- concept and just think about a year where there's -- a violation occurs.

But in reality, that was not --

WITNESS NADER-TEHRANI: A violation is not one of them.

MS. NIKKEL: That's why I struggle. I've been using the word "violation" because I'm trying to not confuse it with the use of the word "exceedance" here.

Would you prefer that we use the word "exceedance" as the objective?

WITNESS NADER-TEHRANI: I would prefer to use "exceedance."

MS. NIKKEL: Okay. We're going to use the term "exceedance" now to mean the exceedance of a water quality objective.

WITNESS NADER-TEHRANI: That's right.

MS. NIKKEL: So, in a year where a modeled exceedance was, in reality, in the actual operations that year, just maybe a near miss -- you know, it came real close to the objective but it didn't go over it -- wouldn't correcting the model to accurately depict that, it would put the near miss -- the near miss compliance under the Project scenarios; right? So it would be -- it would be under the compliance.

In the Project scenarios here, if you took that 2 percent of H4, you would bump that near miss up over the compliance and you would see an additional exceedance that you don't see under the current modeling results; is that right?

MR. BERLINER: I'm going to object. That's a very ambiguous, unclear question.

WITNESS NADER-TEHRANI: I mean, the -- one thing I want to say is Mr. Leahigh's presentation, the

way he explained why the times that were successful isn't there was due to unusual circumstances, atmospheric conditions and so forth, that -- that are really not modeled.

So, the models know the tides, the -- you know, all that information. So I believe, if the models were perfect, you would have seen 100 percent.

CO-HEARING OFFICER DODUC: So, Miss Nikkel, let me -- let me try --

MS. NIKKEL: Sure.

CO-HEARING OFFICER DODUC: -- because I think I understand what he's -- he's saying.

If the model had the capacity to truly reflect operational flexibility, then that operational flexibility would be reflected in all the scenarios and all the scenarios would be in compliance is a simple way to explain it.

WITNESS NADER-TEHRANI: Absolutely.

CO-HEARING OFFICER DODUC: So, Miss Nikkel, what he's saying is, the adjustment would not be the same for each scenario. If operational flexibility were to be truly captured, it would change with the different scenarios and, therefore, all scenarios would be in compliance.

MS. NIKKEL: So, you're saying that . . .

(Laughter.)

MS. NIKKEL: I think I understand that and that was helpful.

WITNESS NADER-TEHRANI: I think that that was a very good answer.

(Laughter.)

CO-HEARING OFFICER DODUC: Having an engineering background does help sometimes.

WITNESS NADER-TEHRANI: I appreciate.

MS. NIKKEL: Thank you.

So -- So, in my very simplified example of the near miss, you're saying, under the H4 scenario, it would also be modeled in a perfect modeling world as a near miss.

WITNESS NADER-TEHRANI: The near miss that you're referring to in terms of real, is that what you're after?

MS. NIKKEL: Well, now I'm comparing the -- the No-Action Alternative in my -- my -- my perfect modeling world.

WITNESS NADER-TEHRANI: Right.

MS. NIKKEL: I'm changing the -- the -- the model com -- exceedance into a almost near miss.

WITNESS NADER-TEHRANI: Right.

MS. NIKKEL: And I'm asking you about what

would you expect the --

WITNESS NADER-TEHRANI: I'm sorry. The near miss, you mean it actually goes above and --

MS. NIKKEL: No, it does not go above.

WITNESS NADER-TEHRANI: Okay.

MS. NIKKEL: And now I'm asking about your testimony about what you would expect to occur to the H4 alternative.

Would it also stay within compliance or would you expect it to increase by that 1 or 2 percent and constitute an exceedance in the modeling?

WITNESS NADER-TEHRANI: I don't expect a difference. I expect -- In a perfect model -- If the models are perfect, I would -- I would guess a similar pattern in terms of meeting, you know, 100 percent.

MS. NIKKEL: A similar pattern as what? The No-Action Alternative?

WITNESS NADER-TEHRANI: Among all the alternatives, um-hmm.

MS. NIKKEL: Or the similar pattern that you're seeing --

WITNESS NADER-TEHRANI: If you're asking which one comes closer to it? Is that your question? Which ones come closer to the -- to the -- the objective?

MS. NIKKEL: No, that's not my question.

My question is whether the -- you would expect the H4 scenario in a perfect modeling world --

WITNESS NADER-TEHRANI: Okay.

MS. NIKKEL: -- to exceed the compliance.

WITNESS NADER-TEHRANI: No.

CO-HEARING OFFICER DODUC: All right. Miss Nikkel, you need to move on.

MS. NIKKEL: I'll move on.

All right. In your experience, Mr. Nader-Tehrani, in analyzing models, would you agree that once an exceedance of a water quality objective occurs at Emmaton, it can require a lot of water in the model to correct that exceedance?

WITNESS MUNÉVAR: I would not characterize it as "a lot." It means -- If the model is showing an exceedance, it means it's not using the right amount of volume of water. That means you need to increase it. I wouldn't characterize it as a lot.

MS. NIKKEL: What would you characterize it as?

WITNESS NADER-TEHRANI: Depends on the circumstances and all that. But, often, it may not require a lot of water to actually meet the water requirements in the model.

MS. NIKKEL: Okay. Are you aware of any analysis that's been done to analyze the impacts of the

modeled increase in exceedances of D-1641 on water users in the North Delta?

WITNESS NADER-TEHRANI: I think it is my testimony that those exceedances are not real to begin with.

MS. NIKKEL: So you don't expect the Project to result in any additional exceedances of the D-1641 --

WITNESS NADER-TEHRANI: Beyond --

MS. NIKKEL: -- objectives.

WITNESS NADER-TEHRANI: -- what they exists, you are correct.

MS. NIKKEL: All right. Let's switch gears to water levels, please.

If we could move to Page 75.

(Document displayed on screen.)

MS. NIKKEL: Oh, and I think we actually covered my questions on this, so we can move right along to Page 82.

(Document displayed on screen.)

MS. NIKKEL: Okay. I want to focus on this slide on the third dash there, a (reading):

"Maximum water level reduction of about .5 feet during low flow events near the North Delta Intakes . . ."

Can you describe how a low-flow event is

defined?

WITNESS NADER-TEHRANI: I'm referring to, you know, the flow in Sacramento River can range from, you know, 5, 6, 7,000 cfs all the way up to 50, 60, 70,000 cfs during high-flow periods.

So I would -- I would say anything below, like, 10,000 cfs coming from Sacramento.

MS. NIKKEL: Okay. And how often and for how long do these low-flow events usually occur?

WITNESS NADER-TEHRANI: They occur during summer of dry and critical periods, but they're not necessarily occurring just during those years.

MS. NIKKEL: Okay. That's helpful.

And -- And -- And is there a particular -- So you said dry and critical and during the summer; correct?

WITNESS NADER-TEHRANI: Yeah, typically, but it's not unique to those time periods.

MS. NIKKEL: Okay. And can you -- Can you identify for us what the lowest water elevation was in the No-Action Alternative?

WITNESS NADER-TEHRANI: You have to go back to the . . .

Are you referring to this same location near North Delta Diversion?

MS. NIKKEL: Yeah. Trying -- I'm trying to do

the math myself to how you got to the .5.

WITNESS NADER-TEHRANI: Yeah.

(Searching through document.)

Page 76.

(Document displayed on screen.)

MS. NIKKEL: Okay. And so it's -- Well, this is just showing us change; right?

WITNESS NADER-TEHRANI: Yeah. Can you put that slide, Page 76 of the same document.

(Document displayed on screen.)

WITNESS NADER-TEHRANI: Page 76.

(Document displayed on screen.)

WITNESS NADER-TEHRANI: Yeah. Okay. So the way I was explaining it, the -- the points closer to the left side of this figure correspond -- you know, the bottom, you know, stage being high. Those correspond to high-flow periods.

And then the points corresponding to the right side of the diagram most likely correspond to the low-flow period.

So the difference -- Half a foot is the difference between the black line and the -- let's say the gray line.

MS. NIKKEL: Yeah. That's covered all of them.

WITNESS NADER-TEHRANI: In fact, all four are

lined up together.

MS. NIKKEL: Um-hmm.

WITNESS NADER-TEHRANI: That distance is about half a foot.

MS. NIKKEL: And what is that lowest point? Is that zero feet above sea -- mean sea level?

WITNESS NADER-TEHRANI: Zero above mean sea level, yeah. This is based on the NGVD~29 datum.

MS. NIKKEL: Can you describe what you just said? Say that again.

WITNESS NADER-TEHRANI: Well, all the -- You know, the stage, when it's reported, has to be in respect to a certain datum.

MS. NIKKEL: Yeah.

WITNESS NADER-TEHRANI: And so, in this case, it happens to be called NGVD 29. I don't know what "NGVD" stands for.

MS. NIKKEL: NGVD.

WITNESS NADER-TEHRANI: Yes.

WITNESS ANDERSON: "NGVD" is National Geodetic Vertical Datum.

WITNESS NADER-TEHRANI: Yes. Thank you, Jamie.

MS. NIKKEL: Thank you.

WITNESS NADER-TEHRANI: She's great.

MS. NIKKEL: I'm glad we got to speak.

(Laughter.)

MS. NIKKEL: Okay.

WITNESS NADER-TEHRANI: Wait. I just want to make sure I make myself clear because I remember showing this information to someone.

Zero-foot stage does not mean zero depth. I just want to be sure we're all --

MS. NIKKEL: Sure.

WITNESS NADER-TEHRANI: -- clear.

MS. NIKKEL: That's compared to this datum point.

WITNESS NADER-TEHRANI: That's correct.

And so the bottom of the river is many feet below --

MS. NIKKEL: Yeah.

WITNESS NADER-TEHRANI: -- sea level.

MS. NIKKEL: I understand. Thank you.

Okay. In your written testimony, and I think also yesterday, you explained that water levels drop below this -- this minimum level in the No-Action Alternative only 73 days out of the entire model period which, on average, is five days per year; is that right?

WITNESS NADER-TEHRANI: That's correct. The way I said it -- I want to make sure I'm clear -- that I was referring to Boundary 1, but they're all similar.

But it happens to -- that I -- you know, that fact that I was looking at Boundary 1 results.

And I was looking at the minimum water level predicted under Boundary 1 and compared that to the lowest water level that predicted under the No-Action.

This -- Each line here represents 5,000 -- about 5,500 points.

MS. NIKKEL: Yes.

WITNESS NADER-TEHRANI: And so of these 5,500 points that are represented here, only 73 days they go below that black, the lowest number in the black.

MS. NIKKEL: And were those 73 days spread out evenly across all 5,000 of those datapoints?

WITNESS NADER-TEHRANI: No.

MS. NIKKEL: And do you recall how many of those 73 days occurred in -- in -- in the 16 years?

WITNESS NADER-TEHRANI: I did not specifically look at that. There was one period I remember. It was May of 1977. It happens to be a very dry -- dry year.

MS. NIKKEL: And you recall that it dropped below that minimum water level . . .

WITNESS NADER-TEHRANI: Below the lowest minimum level.

MS. NIKKEL: Would you say more than five days in that year?

WITNESS NADER-TEHRANI: No, no.

MS. NIKKEL: How many --

WITNESS NADER-TEHRANI: Okay. Sorry. Five days?

MS. NIKKEL: In that year, yeah.

WITNESS NADER-TEHRANI: In that year? I don't know. I don't know the answer to that question. I don't -- I don't recall. I can get that information. I -- I just don't have that information.

MS. NIKKEL: Okay. Do you recall generally if those 73 days occurred during a specific time of year?

WITNESS NADER-TEHRANI: They were spread.

MS. NIKKEL: So it was a variety of different types of conditions throughout the year?

WITNESS NADER-TEHRANI: Um-hmm.

MS. NIKKEL: And do they occur in successive days generally, or not?

WITNESS NADER-TEHRANI: Generally not.

MS. NIKKEL: Okay. In your written testimony, Mr. Nader-Tehrani, you explained that it was your opinion that there will not be negative effects to legal users of water due to the results of these water level changes.

WITNESS NADER-TEHRANI: And I can explain why I reached that conclusion.

MS. NIKKEL: Okay. Let me try asking some

questions and see if we can get to it.

WITNESS NADER-TEHRANI: Sure.

MS. NIKKEL: Is your opinion on that point supported by an analysis of how the reduced water levels -- these reduced water levels that we've just talked about -- will affect individual Points of Diversion in the North Delta Water Agencies?

WITNESS NADER-TEHRANI: I'm sorry. Can you repeat?

MS. NIKKEL: Sure. I'll try to shorten it up, too.

WITNESS NADER-TEHRANI: Sure.

MS. NIKKEL: Is your opinion supported by analysis of how that reduction in water levels would affect individual Points of Diversions at locations in the North Delta Water Agency?

WITNESS NADER-TEHRANI: Yeah. That's not the basis for my conclusion that I reached.

MS. NIKKEL: Okay. Did you or anybody at DWR, to your knowledge, investigate all of the existing Points of Diversion located between the existing Point of Diversion and the proposed new intakes?

WITNESS NADER-TEHRANI: I don't know the answer to that question.

MS. NIKKEL: Does anybody on the panel know if

anybody investigated all the Points of Diversion between the points of the new -- on the existing Point of Diversion?

CO-HEARING OFFICER DODUC: If they did, it would be news, because I think other testimony has said no.

MS. NIKKEL: I think I heard the testimony yesterday on this point to refer to the Modeling Team, which is why I'm asking, but I don't see any affirmative answers, so I will -- I will move on.

So I have just a few remaining miscellaneous types of questions.

Were you involved in the development of the bypass flow criteria?

WITNESS NADER-TEHRANI: I was not.

MS. NIKKEL: Do you understand it?

WITNESS NADER-TEHRANI: I do understand it.

MS. NIKKEL: And so do you know if the bypass flow criteria is designed or -- or will result in having any effect on the water level and water quality impacts we've discussed today?

WITNESS NADER-TEHRANI: The way I see bypass flows, they're actually designed to protect water levels and water quality, and fish, for that matter.

MS. NIKKEL: Okay. And I think this question

is probably for Mr. Munévar.

This is on Page 20 of DWR-5.

(Document displayed on screen.)

MS. NIKKEL: And yesterday I recall you testifying, Mr. Munévar, that the No-Action Alternative included more frequent inundation of the Yolo bypass of the Fremont Weir.

Do you recall that testimony?

WITNESS MUNÉVAR: I do.

MS. NIKKEL: Has there been any analysis of how that legal change affects legal users of water?

WITNESS MUNÉVAR: I don't know.

MS. NIKKEL: Does anybody on the panel know if there's been any analysis of that?

WITNESS WHITE: That's an assumption that were stated in all the alternatives, the No-Action and all the alternatives, so it wouldn't have been something that would have showed up in this process. But the modification to the Fremont Weir notch is going -- undergoing a separate environmental analysis and an impact analysis to determine what those impacts are.

MS. NIKKEL: Thank you.

And that's not part of this Project?

WITNESS WHITE: That's correct.

MS. NIKKEL: Okay. I have nothing further.

CO-HEARING OFFICER DODUC: Thank you, Miss Nikkel.

Group Number 10.

11?

Oh, 10 is coming up? Okay. Mr. Aladjem, you need to at least wave a hand or something.

Just to do a time check, Mr. Aladjem, how much time do you believe you'll need?

MR. ALADJEM: Madam Chair, I think I could probably do it in half hour, but I'm going to try to do it in 20 minutes.

CO-HEARING OFFICER DODUC: Okay. In that case, we will take a break after Mr. Aladjem is done.

And Mr. Aladjem, quick rundown for me of the points that you'll be exploring.

MR. ALADJEM: Madam Chair, first, I'm going to explore hopefully with Mr. Munévar and Dr. Nader-Tehrani some of the modeling assumptions of both the water quality and water levels.

Then I'd like to go in a little bit more detail on those questions as it pertains to flood control in the Delta.

CO-HEARING OFFICER DODUC: Okay. Thank you.

And I expect you will not be re-visiting any of the modeling assumption aspects that have already been

explored.

MR. ALADJEM: That's not my intention.

CO-HEARING OFFICER DODUC: All right, Mr. Aladjem.

CROSS-EXAMINATION BY

MR. ALADJEM: Good morning, Mr. Munévar, Dr. Nader-Tehrani.

Thank you very much for being willing to talk with us this morning.

Let me first address a question or two to Mr. Munévar.

Mr. Munévar, are you familiar with DWR Exhibit Number 305, which is an agreement between the Department and East Contra Costa Irrigation District?

(Document displayed on screen.)

WITNESS MUNÉVAR: I'm not familiar with it.

MR. ALADJEM: Can you tell me whether the com -- compliance with the terms of this contract was included in the modeling effort?

WITNESS MUNÉVAR: I think I said I'm not familiar with it, so I can't answer that.

MR. ALADJEM: Okay. No further questions about that.

Dr. Nader-Tehrani, I'd like to direct your attention to DWR Exhibit 212, Page 67.

(Document displayed on screen.)

MR. ALADJEM: Thank you, Mr. Baker (sic). I appreciate you getting that up on the screen for us.

(Document displayed on screen.)

MR. ALADJEM: Yeah. Let's look at that.

Let me direct your attention, Mr. Nader-Tehrani, to the very bottom of that page.

Do you see, sir, where it says (reading):

"The BDCP is expected to include long-range operating rules for the Delta . . ."

THE WITNESS: I see that, um-hmm.

MR. ALADJEM: And can you read that sentence, and it goes on to the next page.

WITNESS NADER-TEHRANI: How far down do you want me --

MR. ALADJEM: Just the top, the first line.

WITNESS NADER-TEHRANI: Starting with "The BDCP is expected"?

MR. ALADJEM: Yes.

WITNESS NADER-TEHRANI: You want me to read it out loud or just --

MR. ALADJEM: Feel free to read it to yourself. I just want to familiarize you with --

CO-HEARING OFFICER DODUC: Is it on your screen that's right in front of you?

WITNESS NADER-TEHRANI: I see that better. Thank you. These glasses don't work right.

Okay.

MR. ALADJEM: Dr. Nader-Tehrani, are you familiar with DWR Exhibit 212?

WITNESS NADER-TEHRANI: I have not read it recently, no.

MR. ALADJEM: But do you feel that this is part of the information that you used in doing your modeling analysis?

WITNESS NADER-TEHRANI: I -- You know, my analysis was based on DSM-2 modeling results, so all -- and that's kind of a reflection of what was modeled in CalSim.

So any choices that are made -- for example, for parameters such as bypass flow rules -- are already implemented in CalSim and, you know, the DSM-2 simply takes that information and uses it in the modeling results to simulate water levels, water quality and so forth.

MR. ALADJEM: Okay. And perhaps my question is better directed to Mr. Munévar.

Mr. Munévar --

If we could go to -- Mr. Baker (sic), if you could scroll back up on Page 67.

(Scrolling up document.)

MR. ALADJEM: There we go.

Mr. Munévar, do you see where it says here the factor --

Actually, Mr. Baker (sic), could you go a little further up? It would be helpful.

It says (reading):

"Daily Operational Considerations for Withdrawal from Sacramento River."

Do you see that heading?

WITNESS MUNÉVAR: Yes, I do.

MR. ALADJEM: I'd like to ask you a few questions about the way in which these factors were incorporated in the modeling, Mr. Munévar.

Where you -- Do you see that it says "Factor Hydrological"?

WITNESS MUNÉVAR: Yes, I do.

MR. ALADJEM: Okay. And it says (reading):

"Limitations on volume available for export based on flow rate . . ."

And can you tell us, sir, whether that is -- those limit -- what limitations were incorporated in the CalSim modeling to effectuate this factor?

WITNESS MUNÉVAR: Yeah. I think this refers to the Bypass Flow Diversion Table that was presented

yesterday, and multiple times before that, in terms of how much flow would be required to bypass given a certain amount of flow upstream of the intakes.

MR. ALADJEM: Okay. And would it be fair, sir, if you look at the second item there, "Limitations on permissible time . . ."

Again, this is a bypass flow requirement.

WITNESS MUNÉVAR: I think -- I think this is very similar to what I described in different periods, so there are different bypass flow requirements for different periods of time.

MR. ALADJEM: Thank you.

And then in terms of high flood levels in the Sacramento River, can you tell us how that was incorporated in the modeling.

WITNESS MUNÉVAR: In -- I can speak to the CalSim modeling and maybe Parviz can talk about the DSM-2.

But in terms of the high-flow levels in the CalSim modeling, they were -- they're treated the same way through the bypass criteria as -- as described.

So if we had 50,000 cfs on the Sacramento River, which would be a very high flow, it just limits the amount of bypass that could -- or it limits the amount of diversion that could occur.

MR. ALADJEM: So, now I want to see if I understand correctly.

All these hydrologic considerations really go to the question of how much bypass flow will be at the intakes in order -- Well, let me just leave it there. At the intakes.

Is that fair?

WITNESS MUNÉVAR: I believe at least the first two points on hydrological, that is correct.

MR. ALADJEM: Thank you.

Mr. Baker (sic), could you scroll down a little bit further?

(Scrolling down document.)

MR. ALADJEM: And, again, this is a question either for Mr. Munévar or Dr. Nader-Tehrani.

Do the two of you see the factor Water Quality?

WITNESS MUNÉVAR: Yes.

MR. ALADJEM: And it says there on the first line (reading):

"Water quality monitoring (turbidity, chemicals) local to given intake."

And then the second line is (reading):

"Water quality concerns elsewhere in Delta (such as salinity)."

Could you describe for us how those factors

were taken into account first in the CalSim modeling, Mr. Munévar, and then in the DSM-2 modeling, Dr. Nader-Tehrani.

WITNESS MUNÉVAR: I'm not sure. I think at least for the first point there, the pulse protection that's embedded in the bypass flows is, in particular, targeting these protection of high flows early in the -- in the fall or in the winter, which often are the trigger for high turbidity, which are related to fishery presence.

The second bullet there is -- is if water is required to bypass over and above the bypass flow requirements in order to meet an Emmaton standard or a Jersey Point standard, then water would not be diverted from the North Delta Diversion facility.

MR. ALADJEM: And Dr. Nader-Tehrani, anything to add?

WITNESS NADER-TEHRANI: No. I think Armin characterized it well.

MR. ALADJEM: And is it your understanding, both Dr. Nader-Tehrani and Mr. Munévar, that the implementation of these factors here would be consistent with D-1641?

WITNESS MUNÉVAR: Well, D-1641 doesn't control the North Delta Diversion because it didn't envision --

MR. ALADJEM: Let me re-phrase the question.

That through -- The Project would be operated applying these factors to meet the water quality objectives contained in Decision 1641.

WITNESS MUNÉVAR: I think that's -- that's correct.

MR. ALADJEM: Thank you.

Dr. Nader-Tehrani, in your testimony, which -- and your discussions with Miss Nikkel a few moments ago, you talked about a reduction in water surface elevations near the intakes of half a foot.

Do you recall that?

WITNESS NADER-TEHRANI: Yes.

MR. ALADJEM: And you also discussed with her the use of a one-dimensional versus two-dimensional modeling.

Do you recall that?

WITNESS NADER-TEHRANI: Yes.

MR. ALADJEM: Would it be correct to say that the only analysis you did of water levels near the intake was the DSM-2 modeling, which is a one-dimensional model?

WITNESS NADER-TEHRANI: That's correct.

MR. ALADJEM: Is it also correct to say that DSM-2 would not address directional flows across the channel?

WITNESS NADER-TEHRANI: You mean from one side to the other?

MR. ALADJEM: From one side to the other.

WITNESS NADER-TEHRANI: That is correct.

MR. ALADJEM: Okay. In your analysis of water levels near the intake, Dr. Nader-Tehrani, did you incorporate the encroachment of the intake structures into the channel as described by Mr. Bednarski in his testimony?

WITNESS NADER-TEHRANI: That is not included in the model.

MR. ALADJEM: Did you incorporate into your analysis in DSM-2 the augmented shoreline with the coffer dams that Mr. Bednarski included -- or discussed? Excuse me.

WITNESS NADER-TEHRANI: That's not included.

MR. ALADJEM: Did your analysis in DSM-2 incorporate the channel margin habitat which Mr. Bednarski described in his testimony?

WITNESS NADER-TEHRANI: That is not included.

MR. ALADJEM: Dr. Nader-Tehrani, in your discussions of water level effects from the Project, you said that the effects would be most pronounced near the intakes.

That's correct?

WITNESS NADER-TEHRANI: What I said was, you expect the largest reduction in water level to occur near the vicinity of the intakes and the reduction in water level gets smaller as you get further away from the three intakes.

MR. ALADJEM: I'll take that as a yes.

Did you -- Are you familiar with the configuration of the Delta, Dr. Tehrani? Do you know where the community of Discovery Bay is?

WITNESS NADER-TEHRANI: I know where Discovery Bay is, yes.

MR. ALADJEM: If there is a reduction in water level during low -- periods of low flow of a half foot at the intakes, would you then be able to say what the reduction in water level near the Discovery Bay area would be?

WITNESS NADER-TEHRANI: I -- I don't have the answer here, but I would -- My best guess would be very small change.

MR. ALADJEM: But you did not model that reduction in water surface elevations, sir?

WITNESS NADER-TEHRANI: I did model. I looked at model levels throughout the Delta, and it's my opinion that I expect very little change in Discovery Bay water levels.

MR. ALADJEM: But you just said it would be your guess.

Are you guessing, or did you actually do the analysis? And if you did the analysis, can you tell us what the answer would be?

WITNESS NADER-TEHRANI: I can look to make sure, but it is my opinion that that is what I expect to see when I look at the models.

MR. ALADJEM: Okay.

WITNESS NADER-TEHRANI: Very small change.

MR. ALADJEM: And did your analysis of water levels address any of the questions of changes in velocity in Old River near Discovery Bay?

WITNESS NADER-TEHRANI: We have looked at velocity patterns, yes.

And I don't know, Mike, you want to talk?

WITNESS BRYAN: We looked at -- We looked at peak daily velocity in the channels at a number of different locations in the Delta as a part of our analysis of microcystis and how microcystis may change or not change.

And what we found was, when we did Exceedance Plots and looked at the -- you know, the typical black line from the Project and another line for the Proposed Project, that the lines basically fell on top of each

other.

So, from a peak daily velocity perspective, and looking at it in an Exceedance Plot type format, we just didn't see much change at all in peak velocity in -- in most of the locations that we looked at. Any changes that we did see were very normal.

MR. ALADJEM: Mr. Bryan, thank you very much. And good morning to you as well.

WITNESS BRYAN: Good morning.

MR. ALADJEM: Mr. Baker (sic), could we put up DWR-5 errata, Page 61.

(Document displayed on screen.)

MS. RIDDLE: I'm just going to clarify: This is Kevin Long assisting the Board today.

Kevin Long.

MR. ALADJEM: Pardon me?

MS. RIDDLE: Kevin Long is assisting the Board today, not Jason Baker, just --

MR. ALADJEM: Oh, excuse me. I'm -- I'm sorry.

Okay. Mr. -- Dr. Nader-Tehrani, if you're -- If I direct your attention here to this exhibit.

The estimated chlorides for Boundary 1 during the fall and winter, from October through February, are substantially higher than the No-Action Alternative; is that correct?

WITNESS NADER-TEHRANI: I think my explanation was when I was showing that, is -- also maybe in a previous slide, I mentioned that Boundary 1 does not include the Fall X2 action, which has a -- quite a bit of, you know effect on the water quality.

So it will -- To a large extent, the increases you see -- in this case, October, November -- would be due to -- due to the Fall X2 action not being included, yes.

MR. ALADJEM: But, Dr. Nader-Tehrani, are you saying that the Department would never operate the boundary line?

WITNESS NADER-TEHRANI: That's not what I said.

MR. ALADJEM: Okay. So, Boundary 1 is part of the Project, and this -- it may be that Fall X2 is the reason that there's higher chloride there, but it is within the opportunity of the Project to operate to Boundary 1 and, therefore, there could be that effect.

WITNESS NADER-TEHRANI: Well, what I was describing here is, we are comparing Boundary 1 that does not include Fall X2 to a No-Action Alternative that includes Fall X2, and so at least, to a large extent, some of that difference is due to that.

Now, that's -- that's where I leave it, you know. You know, that's the way I was trying to explain

those increases.

MR. ALADJEM: Thank you.

Let me ask you a question here about the overall magnitude of the effects.

Would it be fair, Dr. Nader-Tehrani, to say that, with the exception of a few months, and particularly the Boundary 1 scenario we were just discussing, that estimated chloride levels at Contra Costa Canal would be less than 150 milligrams per liter?

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

MR. ALADJEM: Sir, what do you think the likelihood of chloride levels at Contra Costa Canal exceeding 250 milligrams per liter would be?

WITNESS NADER-TEHRANI: You mean in real world or in the model?

What is your question? Is it in the -- Are you talking about in the model or in the real-world operation.

MR. ALADJEM: First, in the model and then, secondly, in the real-world.

Thank you for the clarification.

WITNESS NADER-TEHRANI: Yeah. In the model, I think there is a slide that shows about the compliance, the D-1641 compliance, to the 250-milligram per liter chloride.

And the model shows that -- I believe it was about a 5 percent chance that -- not Boundary 2, but the other --

MR. ALADJEM: I believe in 1977; is that correct?

WITNESS NADER-TEHRANI: Well, are you talking about the number of days?

MR. ALADJEM: Yes.

WITNESS NADER-TEHRANI: Okay. That -- That particular -- Yeah, it was 1977 that all except Boundary 2, including the No-Action, did not reach the required number of days for that 150.

But another time to say that in real-world, there was some barriers that were installed to reduce the ocean salinity intrusion, and those barriers were not part of the model.

MR. ALADJEM: But, now, let me come back to my original question.

WITNESS NADER-TEHRANI: Yes.

MR. ALADJEM: Would it be fair to say that, under the modeling, it is unlikely that 5 percent -- unlikely -- that there would be a chloride level of 250 milligrams per liter or more?

WITNESS NADER-TEHRANI: It is in my belief that the increase you see, that 5 percent, falls in line with

the same modeling artifact that I was referring to earlier, which is the difference in the model assumptions between CalSim and DSM.

MR. ALADJEM: So if the model were, as Ms. Nikkel was saying, accurate, we didn't have those inconsistencies, we would show that there would not be an exceedance of the 250-milligram per liter standard -- again, chloride -- here at Contra Costa Canal.

WITNESS NADER-TEHRANI: Yeah. If the models were perfect, I would not expect to see an exceedance of the 250.

MR. ALADJEM: And now Mr. Munévar and yourself have all -- have said a number of times, models are not used for prediction purposes. They're comparative; correct?

WITNESS NADER-TEHRANI: That would be the best use of the model.

MR. ALADJEM: But given the fact that the chloride levels here are generally less than 150 milligrams per liter, would it be fair to say that it is unlikely in the real-world, given the operational flexibility that the two Projects have, that you would not exceed 250?

WITNESS NADER-TEHRANI: Well, the numbers you see here are 16-year averages.

So, we are back to that some years will be higher, some years will be lower.

MR. ALADJEM: That's a -- That's an interesting question, Dr. Tehrani -- Nader-Tehrani.

Where would I find the data from your DSM-2 modeling here on chloride at Contra Costa Canal that shows the maximum and minimum?

WITNESS NADER-TEHRANI: Well, if you look at the slide that has the D-1641 compliance. You are not limited to just the D-1641 -- the period that the D-16 -- Well, that's year-round.

So, there's a slide --

WITNESS MUNÉVAR: Slide 71.

WITNESS NADER-TEHRANI: Slide 71?

That's correct, Slide 71.

If you -- Yeah. If you see that, the red line represent the standard. So, ideally, all lines should go -- be below that.

So, at best, you see on the left side where the values are, you know, with crosses at the line, I would say about 230, 240. That means 230 milligrams per liter below the threshold of 250.

So that means all operational scenarios in the best of times are reporting about 20 milligrams per liter.

The way I arrived at 20 was, I subtracted 250 by the 230 that are shown on the graph at the intersection of those lines and the Y-Axis.

And, then, at the times where it goes above zero, that's toward the right end of the graph, somewhere around 93, 94, you see that those are the ones going above the 250 in the model world.

MR. ALADJEM: And, Dr. Nader-Tehrani, this is very helpful. Let me summarize what I think I heard you say.

Approximately, for the No-Action Alternative, 93, 94 percent of the time, the 250 part per million standard -- chloride standard would be met with the remaining 6 percent of the time, it would not.

WITNESS NADER-TEHRANI: Once again, I would characterize this as a modeling artifact. In a perfect model, that exceedance would not occur.

MR. ALADJEM: So let me -- let me try to understand here.

If we had a perfect model, there would be no exceedance of the 250-milligram per liter standard for chloride at Contra Costa canal.

WITNESS NADER-TEHRANI: That is my opinion, yes.

MR. ALADJEM: Thank you.

Turning back to water levels for just a second. I'm not sure whether this is a question for you, Dr. Nader-Tehrani, or Mr. Munévar.

WITNESS NADER-TEHRANI: I think I'd be able to answer. I prefer the water level.

(Laughter.)

MR. ALADJEM: If there is a half -- a 6-inch or a .05-foot reduction in water levels.

Was there an analysis, by the Department or by Reclamation, of the effects of that reduction in water levels on levee stability?

WITNESS MUNÉVAR: I -- I don't know.

MR. ALADJEM: Mr. Munévar?

WITNESS MUNÉVAR: Yeah, I also don't know.

MR. ALADJEM: Would it be fair to say that there was no modeling analysis of levee stability undertaken by the Project?

WITNESS NADER-TEHRANI: I'm not aware of it.

MR. ALADJEM: Madam Chair, if I could have a moment or two to check my notes.

CO-HEARING OFFICER DODUC: Okay.

MR. ALADJEM: One last question for Mr. Munévar and Dr. Nader-Tehrani.

Yesterday, Mr. Mizell stipulated -- I believe it was with Mr. Lilly -- that the Department and

Reclamation had not proposed any Permit terms or conditions to address some of Mr. Lilly's concerns, his questions about upstream storage.

Do you recall that discussion?

WITNESS NADER-TEHRANI: I do.

WITNESS MUNÉVAR: Yes.

MR. ALADJEM: Would it be fair to say, gentlemen, that the Department of Reclamation have not proposed any Permit terms or conditions to deal with water level effects or water quality effects of the Proposed Project?

WITNESS NADER-TEHRANI: That is my understanding.

MR. ALADJEM: Mr. Munévar?

WITNESS MUNÉVAR: That's, I think, the same point that was made yesterday.

MR. ALADJEM: Madam Chair, no further questions.

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

Mr. Mizell, perhaps we should clarify your stipulation.

My understanding of the stipulation yesterday was that it applied to all -- that the Department does not propose criteria for any aspect, and not just the

north storage that Mr. Lilly was interested in, and also for the question that Aladjem just asked.

So a clarification: Was your stipulation, does it apply to all aspects?

MR. MIZELL: Yes, Hearing Officer Doduc, you understood my stipulation correctly. It applies to all.

The Department has not yet presented any conditions for this Permit at this time.

CO-HEARING OFFICER DODUC: All right.

MR. ALADJEM: Thank you, Madam Chair.

My understanding was, it applied only to the reservoir operations. That's very helpful.

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

Before we take our break, let me do a check-in.

Group Number 11 has not shown, so I don't expect them and they're not here.

Group Number 12?

13? Okay. I see a hand.

So we will take a 15-minute break according to that one (indicating). We'll go -- resume at 10:55 and -- with Sacramento Regional County Sanitation District conducting its cross-examination.

(Recess taken at 10:36 a.m.)

///

(Proceedings resumed at 10:55 a.m.:)

CO-HEARING OFFICER DODUC: Welcome back to the session.

Miss Taber, what topics will you be exploring this morning?

MS. TABER: I anticipate to needing five to 10 minutes.

CO-HEARING OFFICER DODUC: Okay.

MS. TABER: And at most, my topics will be related to the modeling inputs as they concern the discharge from the Sacramento Regional Wastewater Treatment Plant.

CO-HEARING OFFICER DODUC: Thank you.

Please proceed.

CROSS-EXAMINATION BY

MS. TABER: Good morning, panel. My name is Kelley Taber. I represent the Sacramento Regional County Water Irrigation District.

I have just a few questions about the input into your modeling work, and I do not know who the best person on the panel would be to answer my questions, so I'll direct them to the panel and just ask that whoever feels they can address the questions, feel free to speak up.

And I would ask if the staff could please put

up Exhibit SWRCB-21, just to orient ourselves. I don't intend to rely on this.

(Document displayed on screen.)

MS. TABER: And go to Page 190, please.

(Document displayed on screen.)

MS. TABER: Thank you.

So this, as you can see, is from District 1641, and it includes a formula for calculating the Net Delta Outflow, and it also has as part of that the formula for calculating Delta inflow.

And you'll see that, if I understand this correctly, the formula includes the average daily discharge from the Sacramento Regional Wastewater Treatment Plant for the previous week.

And my question is: Did the modeling of the No-Action Alternative include an assumption as to a specific volume of discharge from the Sacramento Regional Wastewater Treatment Plant?

WITNESS MUNÉVAR: It does. We're looking for the value in the documents here, so . . .

MS. TABER: Okay. So, while you're looking, because I -- I am curious about the value. We can wait while you look, or I have some questions for --

WITNESS MUNÉVAR: Well, they're described in Appendix 5A, so maybe if we can -- we can look for it,

but they're also in the documents of evidence submitted.

MS. TABER: Okay. I'm -- Just -- And I apologize, because I haven't been able to be present for all of the cross-examination.

When you refer to Appendix 5A, what is -- that's Appendix 5A to -- to which document?

WITNESS MUNÉVAR: I think it's the 5A that's included in the -- in the Draft and the Recirculated Draft. I believe it's also in the Biological Assessment. They're all called Appendix 5A that outline model assumptions.

MS. TABER: Okay. So that assumption is included in the modeling of the No-Action Alternative -- An assumption is included in there, but -- And is anyone here on the panel today able to address the specific volume that was assumed or answer questions as to what that volume was?

WITNESS MUNÉVAR: I don't recall the volume.

MS. TABER: Okay. And do -- If you recall, was it a constant volume? Did it vary over time?

WITNESS MUNÉVAR: I do not recall.

MS. TABER: Okay. And this may wrap up my questioning very quickly.

But did the modeling of any of the alternatives include an assumption as to a specific volume of

discharge from the treatment plant?

WITNESS MUNÉVAR: Any of the alternatives would have the exact same assumption as the No-Action.

MS. TABER: Okay. So the -- Based on your understanding, there wouldn't have been an adjustment for growth over time in the discharge, or a fluctuation in discharge volume?

WITNESS MUNÉVAR: I don't believe so. The No-Action also represents a future condition, so it would -- it would be the same as the -- as the Project alternatives.

MS. TABER: Okay. So would it be likely to be a constant volume?

WITNESS MUNÉVAR: Yeah. Again, I --

MS. TABER: Okay.

WITNESS MUNÉVAR: I don't know at this point.

MS. TABER: If you can, can you point to any -- be any more specific as to where we would look in Appendix 5A to find that information?

WITNESS MUNÉVAR: At this point, I can't, but if we were able to locate the location, we'll point that out to you.

MS. TABER: Okay. Great.

Thank you. Those are all my questions.

CO-HEARING OFFICER DODUC: Thank you,

Miss Taber.

Number 14. Is there someone here from the County of Yolo?

All right. 15, EBMUD and Sacramento County Water Agency.

MR. SALMON: Good morning.

CO-HEARING OFFICER DODUC: Your microphone is not on.

And, Mr. Salmon, how much time do you anticipate needing, and what subject matters will you be covering?

MR. SALMON: I'm Jonathan Salmon from East Bay MUD. I'll try to keep it under an hour.

I'm going to be asking mostly questions of Mr. Nader-Tehrani. And generally my questions pertain to the issue of reverse flows at Freeport. So I'll be asking him about his knowledge of the Freeport Project and the reverse flow issue, and the extent to which reverse flows were analyzed in the modeling.

I'll also ask about the decision to use DSM-2 and the 16-year modeling period, and some questions related to the adequacy and boundaries of that period.

Finally, I have a few additional questions about the North Delta bypass flow criteria which was touched on earlier this morning.

So, Mr. Ferguson of Sacramento County Water Agency, I understand, has some questions following that about groundwater impacts --

CO-HEARING OFFICER DODUC: All right.

MR. SALMON: -- that relate to his agency.

CO-HEARING OFFICER DODUC: Thank you. Please --

MR. SALMON: And he'll --

CO-HEARING OFFICER DODUC: -- proceed.

MR. SALMON: -- appear after.

CROSS-EXAMINATION BY

MR. SALMON: Mr. Nader-Tehrani, are you aware of the Freeport Regional Water Project?

WITNESS NADER-TEHRANI: I am somewhat familiar with it.

MR. SALMON: Are you aware that reverse flows that exceed a certain threshold will result in a shutdown of the Freeport Project intake?

WITNESS NADER-TEHRANI: I'm somewhat familiar with that, yes.

MR. SALMON: Do you have an understanding of why those shutdowns occur?

WITNESS NADER-TEHRANI: Yes, I -- I believe I do.

It has to do with the Sacramento Regional, you

know, discharges that are occurring downstream from the Freeport facility. If there are reverse flows that are strong enough, it could affect the operations of Freeport facility.

MR. SALMON: I'd like to ask about a couple of meetings that took place several years ago. These meetings discussed the predecessor project to WaterFix, the BDCP, but bear with me.

Would staff please display Document 2 from our flash drive?

(Document displayed on screen.)

MR. SALMON: I'd like to identify this as Exhibit East Bay MUD. Can I do X-1 to signify Cross-X?

(East Bay Municipal Utilities District Exhibit X-1 marked for identification)

MR. SALMON: So this is a document titled, "Meeting Minutes, Modeling of BDCP Impacts on FRWA's and East Bay MUD's Operations."

And the document refers to a meeting that took place on May 26, 2009, and indicates that the witness, Mr. Nader-Tehrani, attended along with representatives from DWR, East Bay MUD, and Sacramento County Water Agency.

Mr. Nader-Tehrani, do you recall if you

attended this meeting?

WITNESS NADER-TEHRANI: I -- I recall, but I've forgotten the details.

MR. SALMON: Can you look at the third bullet point. I think we have to scroll down. Under --

(Scrolling down document.)

MR. SALMON: There, the highlighted, under Roman Numeral II.

It reads, quote (reading):

"Parviz said that DWR will consider using a 'fingerprint' analysis using the DSM-2 model to examine the reverse flow issue. The 'fingerprint' analysis could determine the percent volume of the wastewater effluent at any specific location."

Do you recall --

WITNESS NADER-TEHRANI: That is --

MR. SALMON: -- if that fingerprint --

WITNESS NADER-TEHRANI: That is -- That is a way to look at the -- the effects of the discharges. That is a way of describing that, yes.

MR. SALMON: Do you recall if that analysis was performed after that meeting?

WITNESS NADER-TEHRANI: We did not use the fingerprint approach, if that's what you're asking, to -- to look at the effects of the discharges on Freeport

facility.

MR. SALMON: Thank you.

Can staff please display document three from the flash drive.

(Document displayed on screen.)

MR. SALMON: I'll identify that as East Bay MUD X-2.

MR. OCHENDUSZKO: Mr. Salmon?

MR. SALMON: Yes.

MR. OCHENDUSZKO: Just for point of clarification, you didn't submit an exhibit identification index for these exhibits; did you?

MR. SALMON: I did not. My understanding was, that was required for the case in chief.

MR. OCHENDUSZKO: All right. We'd like to work with you during lunch to make sure that we properly identify these and can post them online for everybody's use.

MR. SALMON: Sure. Be glad to work with you. Thank you.

CO-HEARING OFFICER DODUC: For Mr. Salmon and anybody that might be confused about that, an e-mail was sent out last week, and also emphasized during the hearing, that we would want a similar thing for the cross-examination exhibits.

MR. SALMON: Okay. My apologies.

MS. McCUE: Just one more thing.

Since there's no labels on them, can you just, like, read the title just for the record so that we can make sure we have the right one.

MR. SALMON: I will.

CO-HEARING OFFICER DODUC: And that is --

MR. SALMON: I believe I did.

CO-HEARING OFFICER DODUC: And that is why we wanted that information in the Exhibit List ahead of time.

MR. SALMON: Understood. My apologies again.

So this document, which I would like to identify as East Bay MUD X-2, is a document titled, "BDCP Modeling-for-Modelers Meeting," and refers to a meeting that took place June 18th, 2010, at CH2M Hill's Sacramento office.

(East Bay Municipal Utilities District Exhibit X-2 marked for identification)

MR. SALMON: Mr. Nader-Tehrani, do you recall this meeting?

WITNESS NADER-TEHRANI: Very vaguely.

MR. SALMON: Can you please look at the first two bullets under Roman Numeral V on Pages 2 and 3 of

this document.

(Document displayed on screen.)

MR. SALMON: The bottom of Page 2, it starts --

Perhaps we could display the pages.

(Document displayed on screen.)

MR. SALMON: There we go.

So that portion of the document appears to summarize modeling results regarding flow reversals; is that right?

WITNESS NADER-TEHRANI: Let me read it. Sorry.

MR. SALMON: Okay.

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

MR. SALMON: Okay. Does that appear to you to summarize modeling results regarding flow reversals?

MR. MIZELL: Objection: Vague and ambiguous.

This document's referring -- well, was created at a point in time when we were dealing with a different Project than what's before the Board today. So if he could refer to what modeling results he's referring to, we could have clarity in the record.

CO-HEARING OFFICER DODUC: Mr. Salmon.

MR. SALMON: I actually don't know what modeling results. That's what I'm asking about is whether modeling was performed of reverse flow impacts at

Freeport.

CO-HEARING OFFICER DODUC: Then let's just get to that question.

WITNESS NADER-TEHRANI: Right.

So, at the time they proposed -- The Projects that we were looking at included restoration areas, and they're not part of the -- the Project that is presented to the Board today.

CO-HEARING OFFICER DODUC: So, is your answer that reverse flows were not modeled and considered?

WITNESS NADER-TEHRANI: No, they -- they -- I have looked at those, if that's the question.

CO-HEARING OFFICER DODUC: Okay.

WITNESS NADER-TEHRANI: But -- But with respect to, you know, the statement I see up there, it talks about the tidal marsh restoration, and what I'm seeing is, those are not included in the current Project.

CO-HEARING OFFICER DODUC: So, Mr. Salmon, perhaps instead of referring to previous meetings and documents, please just ask directly what is it that you want to get from Mr. -- Dr. Nader-Tehrani in terms of the analysis that he conducted --

MR. SALMON: Sure.

CO-HEARING OFFICER DODUC: -- for this Project.

MR. SALMON: Sure. Well, I'm -- At this point,

I'm asking about analysis that was done at that time.

My question is whether there was analysis -- whether you recall an analysis -- I can see what the document says, but do you recall performing an analysis of reverse flow impacts at Freeport of the BDCP Project without tidal marsh restoration?

CO-HEARING OFFICER DODUC: And how does that project relate to the project that's before us right now? Why does -- Why are you pursuing that analysis instead of the analysis that was done for this Project? Help me understand that.

MR. SALMON: Yes. There's a similarity between the Projects, acknowledging that there are differences. There's a similarity between the BDCP without tidal marsh restoration and the Project currently being proposed in that both had North Delta Intakes.

And so where I'm going with this is, if reverse flow impacts were analyzed for North Delta Intakes back then, I'm -- what I want to know is whether now anything has changed.

CO-HEARING OFFICER DODUC: Let's just ask that question.

WITNESS NADER-TEHRANI: Right. I mean, I can describe the effects of reverse flow with the -- with respect to the Project as presented in the testimony, if

that's what you're after.

MR. SALMON: Okay.

CO-HEARING OFFICER DODUC: Yes, please do that.

MR. SALMON: Yes.

WITNESS NADER-TEHRANI: Okay. So what is specifically -- You -- You're asking what kind of analysis has been done?

MR. SALMON: Okay. So I --

WITNESS NADER-TEHRANI: For reverse flows on East Bay MUD operations.

MR. SALMON: Yes. I -- Well, on the Freeport Regional Water Project intake.

WITNESS NADER-TEHRANI: Correct.

So, my understanding -- and correct me if I'm wrong -- when I read the documents with regards to the Freeport operation, and the way it's described is, if the -- if the reverse flows that are occurring in Sacramento River have an effective distance of .9-mile or greater from -- measured from the Sac Regional, you know, discharge location upstream towards Freeport facility, if the reverse flow distance is greater than .9 miles, then the Freeport facilities have to shut down their operations, because they don't want to see the effect of that discharge.

So I -- I have looked at the reverse flows. It

is now part of the testimony that I presented. But I have looked at it and compared the reverse flow distances that are -- with respect to H3 scenario and compared it to the No-Action.

And what I found is, there -- yes, there is a -- an increase in the frequency of those reverse flows, but those reverse flows are of the short duration and the short distance, meaning up to about a .2-mile reversal distance. That's the frequency of the reverse flows that are increased with the H3 scenario.

The reason for those increased flows are the reduction of flow in the river because of the taking of water. Those occur -- The reverse flows typically occur during low flows. At high flows, we don't see reverse flows in Sacramento River, nor at Freeport facility.

And during low flows, the Project as described does not take a large volume of water. And that's why we are seeing the results that we're seeing, is that during low flows, the volume of water that's going to be taken from the three intakes is nowhere close to the capacity of 3,000 cfs, and because of that, we are not seeing any increase in frequency of the reverse flows that grow larger than -- longer than .2 miles.

And for that reason, it is my belief that the Projects are not going to affect the East Bay MUD

operation.

MR. SALMON: Thank you.

You mentioned an increase of .2 miles?

WITNESS NADER-TEHRANI: No, I did not say an increase of .2 miles.

What I said -- Because the -- You know, the shorter duration of reverse flows and -- as opposed to a longer duration, higher distance.

What we are seeing is a small increase in the events that go upstream between zero and 2.2 miles. It's not an additional .2 miles. It is just within the zero to .2-mile category of the reverse flows, we are seeing an increase of those events.

So I want to be clear, it's not an additional .2 miles.

MR. SALMON: You mentioned earlier the criteria for shutdown, the point --

WITNESS NADER-TEHRANI: .9 miles.

MR. SALMON: .9 miles at mega transport.

WITNESS NADER-TEHRANI: That's correct.

MR. SALMON: So that when you were looking at the reverse flow issue, did you compare the modeled results to those criteria to determine whether there would be a shutdown in that?

WITNESS NADER-TEHRANI: I did not see any

increase in the frequency of the reverse flows that go beyond .9 miles. In fact, I didn't see an increase that go beyond .2-mile.

MR. SALMON: Are you aware of whether there are already shutdowns at the -- in Freeport intake that are caused by reverse flows?

WITNESS NADER-TEHRANI: Yes, I think I heard there are four events that happened since 19 -- 2014.

MR. SALMON: So --

WITNESS NADER-TEHRANI: And those happened naturally because of the low flows in the river, especially occurring during the drought that we had, the extreme low flows that we had.

MR. SALMON: So, do I understand you correctly to -- that you're saying that there will -- there are no increases in the number of reverse flow shutdown events at Freeport and that you have analyzed that?

WITNESS NADER-TEHRANI: And I have looked at it, and the answer is, we are -- the Projects do not increase the frequency of events even close to .9 miles. It does not include a frequency of the events that cause a shutdown, lead to the shutdown.

MR. SALMON: The frequency. So there --

WITNESS NADER-TEHRANI: Meaning the number -- If you look at the number of events that are modeled,

yes, you do see some events that go .9 miles.

But when you compare the No-Action to, in this case, H3, you see a similar number. It's not there is no increase in the number of events.

MR. SALMON: Did you examine the velocity output of DSM-2 to reach this conclusion?

WITNESS NADER-TEHRANI: Yes.

MR. SALMON: And would you say that there is no increase in reverse flow velocities . . . at Freeport? Or downstream of Freeport?

WITNESS NADER-TEHRANI: Only a very small low duration -- in the low duration between -- that cause an upstream effective distance of 0.2 miles. That's it.

MR. SALMON: Based on your review of the velocity output from DSM-2 --

WITNESS NADER-TEHRANI: Yes.

MR. SALMON: -- is it -- is there a possibility that the length of a shutdown event, based on those criteria for shutdown that you mentioned before, could be increased due to the change that you just mentioned?

WITNESS NADER-TEHRANI: No.

MR. SALMON: Why -- why is that your opinion.

WITNESS NADER-TEHRANI: Because, as I said, my understanding of the shutdown procedure is, whenever the effective distance caused by the reverse flow above

.9-mile, that that would lead to a shutdown.

And based on what I see, we are not seeing any increase in the frequency of such events.

MR. SALMON: Okay.

WITNESS NADER-TEHRANI: Therefore, I don't expect the Projects will lead to higher frequency of those shutdowns.

MR. SALMON: Okay.

CO-HEARING OFFICER DODUC: Mr. Salmon, before you move on.

I understood his question to not only be frequency but the duration of the occurrences.

WITNESS NADER-TEHRANI: No.

CO-HEARING OFFICER DODUC: Okay.

MR. SALMON: Thank you.

So, you mentioned your testimony focused on possible changes to water quality in the lower levels; is that correct?

WITNESS NADER-TEHRANI: That's correct.

MR. SALMON: And which outputs of the DSM-2 model did you rely on to analyze water quality and water level changes?

WITNESS NADER-TEHRANI: For water level, we used a module called the DSM-2 Hydro. And for water quality, we used EC -- electrical conductivity -- output

from DSM-2 Qual.

MR. SALMON: Okay. And did you use Stage EC?

WITNESS NADER-TEHRANI: Stage from DSM-2 Hydro, and EC from DSM-2 Qual. Chloride, we used the EC-to-chloride conversion.

MR. SALMON: And when you were analyzing reverse flows, which of those outputs did you look at? You mentioned velocity --

WITNESS NADER-TEHRANI: Velocity.

MR. SALMON: Are there any others?

WITNESS NADER-TEHRANI: That's all you need to compute the effective distance, you need the velocity output, which is generated for every 15 minutes. And based on that, it's just a formula velocity times distance accumulated when it's negative to compute the -- the effective distance in the reverse direction.

MR. SALMON: So the velocity is what you use to analyze the --

WITNESS NADER-TEHRANI: That's correct.

MR. SALMON: -- frequency and duration of shutdowns?

WITNESS NADER-TEHRANI: That's correct.

MR. SALMON: Okay. Are you aware of whether any other hydrodynamic modeling has been performed using any model to analyze whether the Delta tunnels may change

flow or velocity in the Sacramento River between Steamboat Slough and Freeport?

WITNESS NADER-TEHRANI: I know there was some modeling but I was not involved in that activity.

MR. SALMON: Do you -- Can you describe at all the nature of the additional modeling that you're aware of?

WITNESS NADER-TEHRANI: I'm sorry. I was not included in that activity, so I don't know. I don't want to speculate what it was.

MR. SALMON: Okay. So, returning to the DSM-2 model, how was that model modified to represent the new North Delta Intakes, if at all?

WITNESS NADER-TEHRANI: Well, the input for the volume of water that's going to be taken from each of the three proposed intakes come from CalSim model. And so we have nodes in DSM-2, and those volumes are assigned to the nodes that correspond to physical location along Sacramento River and the timing.

And then DSM takes into account other concentrations that are not included in CalSim, including the -- the fish passage velocity that was described by Mr. Munévar, you know, making sure that water is diverted only at times when you need the certain velocity required by the fish passage, of course.

MR. SALMON: Were there any new coefficients introduced in the model to represent the new intakes?

WITNESS NADER-TEHRANI: I -- I don't recall changing any coefficients.

MR. SALMON: And you mentioned changes to the nodes?

WITNESS NADER-TEHRANI: The nodal -- The physical locations of nodes may have been adjusted to better reflect the physical location of the intakes.

MR. SALMON: I'd like to ask some questions about the simulation period chosen for DSM-2.

WITNESS NADER-TEHRANI: Correct.

MR. SALMON: Basically, I want to determine when were the start and stop dates for the modeling that was done.

Can we bring up the witness' written testimony?

WITNESS NADER-TEHRANI: That's DWR-66.

MR. SALMON: Thank you.

(Document displayed on screen.)

MR. SALMON: So on Page 4, Lines 2 and 3, it states -- you stated (reading):

"All DSM-2 model runs (hydrodynamics and water quality) were based on 16 years of record (1976 to 1991)."

Does that mean that your testimony, as it

relates to the DSM-2 modeling, is based on model data starting with Water Year 1976 that began in October of '75?

WITNESS NADER-TEHRANI: That's correct.

MR. SALMON: Thanks.

Can we look at DWR-513, please.

(Document displayed on screen.)

MR. SALMON: So we can just look at this slide for the moment.

Actually, the first five pages contain similar bar graphs to this that contain monthly averages; is that --

WITNESS NADER-TEHRANI: That's --

MR. SALMON: -- correct?

WITNESS NADER-TEHRANI: -- correct, yes, um-hmm.

MR. SALMON: So there aren't any labels on this exhibit -- this chart to tell us which time period is being averaged.

Do these graphs show averages for October 1975 through September 1991?

WITNESS NADER-TEHRANI: That's correct.

MR. SALMON: Okay. Thank you.

Can we look at Document 4 from the flash drive, please.

(Document displayed on screen.)

MR. SALMON: Thanks. I'll identify this as East Bay MUD X-3.

(East Bay Municipal Utilities District Exhibit X-3 marked for identification)

CO-HEARING OFFICER DODUC: And what is it for the record?

MR. SALMON: So, this is a screenshot of DSSVue software showing DSM-2 model output.

Do you, Mr. Nader-Tehrani, recognize that as such?

WITNESS NADER-TEHRANI: Yes.

MR. SALMON: Do you see in the filing box near the top of the letter that appears in the lower half where it says it's a DSM-2 model file prepared for the CWF hearing?

WITNESS NADER-TEHRANI: Yes, um-hmm.

MR. SALMON: And in the column where the red box is, "Part D/range" --

WITNESS NADER-TEHRANI: Yes.

MR. SALMON: -- do you see that?

WITNESS NADER-TEHRANI: Yes.

MR. SALMON: I just want to -- And I'm asking this just so that we -- for informational purposes. I

want to make sure we understand what data is included in the model output.

So that data there says October 1st, 1974 through September 1st, 1991; right?

WITNESS NADER-TEHRANI: That's correct.

MR. SALMON: Okay. Is -- Why do you -- Do you know why it says October 1974 instead of 1975?

WITNESS NADER-TEHRANI: Yes, I can explain that.

MR. SALMON: Okay.

WITNESS NADER-TEHRANI: We routinely use actually simulator models for 17 years, and so there's an extra year in the beginning. We call that the warmup period because we don't -- in order to run the model, we need what's called an initial condition, which is -- means that they -- what is the Delta flows and -- and water quality throughout the Delta?

Because we don't have a good information on that, we actually run the model for a year, and then at the end of the year, now we have a much better estimate of what the flows and water levels and water quality is.

So we basically ignore that first year. We call that the warmup period, and only report the 16 years' followup after that.

MR. SALMON: Okay. So the Water Year 1975

data, which began in October 1974, is not included within any of the results presented in your testimony --

WITNESS NADER-TEHRANI: That's correct.

MR. SALMON: -- is that correct?

WITNESS NADER-TEHRANI: That's correct.

MR. SALMON: All right. Thanks. That is helpful.

The time period modeled with DSM-2 concluded in September 1991 with the end of Water Year '91; is that right?

WITNESS NADER-TEHRANI: That's correct.

MR. SALMON: Why wasn't the full '87 to '92 drought period simulated? And by -- What I'm referring to as the Water Year 1992, why was that not included?

WITNESS NADER-TEHRANI: There -- I think there was a -- This decision goes back several years ago as part of the choice for the -- the years that are simulated. This goes back to, probably, late 1990s.

DWR has an exhibit -- and I can point to that exhibit -- that kind of discusses the rationale for choosing the 16-year period.

The goal was to have a similar spectrum of Water Year types in the 16-year period as opposed to the larger -- the longer time period included in CalSim.

MR. SALMON: Is it your understanding that

Water Year '92 was excluded based on the similar spectrum rationale?

WITNESS NADER-TEHRANI: I don't remember specifically what, you know -- There was no special reason to exclude '92 -- 1992 water year. It's just -- They're -- Within the 16-year period, we have a number of wet years and dry years '76-77, very extreme dry year, and the drought that extends from '87 to '91.

MR. SALMON: Is -- So, to the best of your knowledge --

WITNESS NADER-TEHRANI: One second.

MR. SALMON: Sorry.

WITNESS BRYAN: That memo that he referred to is in Appendix 5A, Section D12 of the Draft EIR/EIS.

MR. SALMON: And that explains the rationale for why the specific years were chosen?

WITNESS BRYAN: It explains -- It compares why the 16 years were chosen as opposed to an 82-year period in those 16 years, yes.

MR. SALMON: I don't have that in front of me. Was that the memorandum to Cathy Crothers or was that a different document?

WITNESS BRYAN: It's also DWR Exhibit 511.

MR. SALMON: So it is that document that you're --

WITNESS BRYAN: Yes.

MR. SALMON: -- referring to?

Thank you.

To the best of your knowledge, Mr. Nader-Tehrani, was there any data quality reason why Water Year '92 is not included?

WITNESS NADER-TEHRANI: No.

MR. SALMON: What about the years after '92, from '92 up to 2015? Is it the same -- Well, let me just ask:

Is there any reason that you're aware of why that -- those water years were not included in the model?

WITNESS NADER-TEHRANI: Well, CalSim only goes up to 2003, if I'm not mistaken, so the hydrology information required to do DSM-2 modeling beyond 2003 is not even available.

MR. SALMON: So how about for between '92 and 2003? Is there a reason why that was not included?

WITNESS NADER-TEHRANI: No. Again, the goal behind the choice of the 16 years was, we wanted a period that represent the kind of conditions that are encountered in the entire spectrum of water years. And we feel the 16 years that were chosen is an appropriate indication of what you would see under the longer period.

MR. SALMON: Okay. I'd like to ask you about

that.

Yeah. You mentioned a similar spectrum in your testimony.

WITNESS NADER-TEHRANI: Yes.

MR. SALMON: And I think you've explained what you meant by "similar spectrum," but let me make sure I understand.

You mean a similar distribution of Water Year types?

WITNESS NADER-TEHRANI: Not exactly the same, but similar.

MR. SALMON: Can we look at DWR-511.

(Document displayed on screen.)

MR. SALMON: And Page -- The page numbering is a little different but it's 5A-D212. Looks like about five pages down.

(Scrolling down document.)

MR. SALMON: There's a table on the page. You should be able to spot it.

(Scrolling down document.)

MR. SALMON: That's it. Thanks.

So do you -- You can take a moment to look at it, but do you know what this table is showing?

WITNESS NADER-TEHRANI: Yes. Regarding this document, I would -- I would like for Miss Tara Smith

to -- because she's better familiar with this document.

MR. SALMON: That's fine.

WITNESS SMITH: I -- I generally remember what this table is in regard to, yes.

MR. SALMON: Can you describe what the table is showing?

WITNESS SMITH: We're looking at -- You have the different year types on the left, wet, above normal, below normal, dry and critical. On the top, you have the 82-year, 16-year percentage types, and then number of years in type, and years in type. And then you can see the percentage number of years.

So, in a wet year, the '82-year percentage is 32 and the 16-year is about 25, above normal is 15 and 16-year percentage is 13, below normal 17 and 6, dry 22 percent, 25 percent, and critical 15-year versus 31 percent.

MR. SALMON: Okay. So the table is comparing the distribution of water years in the CalSim water period to the DSM-2 model period; is that correct?

WITNESS SMITH: That is correct.

MR. SALMON: Okay. And what . . .

Okay. Would -- Is it fair to say that the dry and critically dry years receive greater representation in the 16-year period on a proportionate basis than they

did in the CalSim 82-year period?

WITNESS SMITH: Yes. On a percentage basis, the dry and critical year, there was a higher percentage in the 16-year.

MR. SALMON: Okay. And I would ask this to anyone on the panel.

Why is a 16-year period that gives a greater representation to drier year types than the longer term average used for -- or longer term data set used for CalSim appropriate to model the WaterFix Projects' impacts?

WITNESS NADER-TEHRANI: I think I can make a comment about that.

I have -- Regarding the suitability of the 16-year period, I have specifically looked at the water quality hydrodynamic results at different locations in the Delta. We've -- I've -- We've looked at the 82-year DSM-2 runs and compared them to the 16-year.

And, like I said and was said earlier, the proper use of the model is looking at the incremental changes between a base and a project.

And what I looked at was, looking at the incremental changes that are shown in the 16-year simulation and compare that with the 82 years of simulation, the question is, do we reach a similar

conclusion when you we that?

And -- And -- And, consistently, what I saw was that I would -- I would reach the same conclusion with respect to water quality, flows, in terms of incremental changes of a project, in this case the California WaterFix, to the No-Action Alternative.

And so that would make me feel that the 16-year would be an adequate representation of what you would expect to see under the 82 years.

MR. SALMON: Are you saying that, after the model runs were complete, you compared -- you did a comparison to see whether the DSM-2 matched the CalSim?

WITNESS NADER-TEHRANI: No.

MR. SALMON: Okay. I'm --

WITNESS NADER-TEHRANI: Let me -- So take an example, Emmaton, water quality at Emmaton. You saw the bar graphs that describe the changes in water quality at Emmaton comparing base versus the alternative.

Now, imagine we repeat the same analysis but this time based on 82 years. And what I saw is that you would see a similar pattern in terms of changes in water quality when you look at the 16-year and compare it to what you would expect to see under 82-year. And for that reason, I believe the 16-year would be an adequate representation of the effects of the Project.

MR. SALMON: Is it possible that a different mix of Water Year types in the 16-year sample could affect the patterns that show up in that analysis that you just described?

WITNESS NADER-TEHRANI: I think the analysis that -- that I just described proved to me the adequacy of the 16-year.

MR. SALMON: Is it possible that a different mix of water types would change what you see when you do that analysis?

WITNESS NADER-TEHRANI: Of course. If I choose a different 16-year period, I may reach a different conclusion.

MR. SALMON: So your conclusion about the adequacy of the 16-year period is limited to the specific 16 years that were chosen?

WITNESS NADER-TEHRANI: That is correct.

MR. SALMON: The WaterFix modeling shows that North Delta Diversions would tend to occur primarily in winter and spring, especially in wetter years.

Do you agree with that?

WITNESS NADER-TEHRANI: I would say the higher -- I mean, perhaps Armin should . . .

WITNESS MUNÉVAR: Yeah. I think that's generally correct, although not exclusively in winter and

spring.

MR. SALMON: Okay. So given that the DSM-2 model period overweights drier years compared with the 82-year period, and given that the WaterFix -- the new North Delta Intakes will tend to be used more often in wetter conditions, why are you not -- why are you not concerned about the adequacy of the representation of the effects of WaterFix?

WITNESS NADER-TEHRANI: Well, if -- If there was an issue with respect to the choices that were made in terms of a -- a bias towards the Water Year types, I would have been able to detect it with the analysis I made when I compared the 16-year results versus the 82, and because of the fact that I didn't see, you know, a difference that would lead me to a different conclusion, I -- I feel that the -- that the choice of the period was appropriate.

MR. SALMON: Okay. Maybe Ms. White could answer this because it's -- I have a question about the Draft BA analysis.

Is it true that 82 years were simulated under DSM-2 for purposes of the Draft BA analysis?

WITNESS WHITE: I'm going to refer to more people familiar with the water quality analysis in the Draft BA.

In my experience, it's the CalSim modeling of the Draft BA.

WITNESS BUCCHOLZ: Yes, the Draft BA analysis included the 82 years.

MR. SALMON: Do you know why a decision was made to model 82 years for purposes of the Draft BA under DSM-2 but not for the WaterFix hearing analysis?

WITNESS MUNÉVAR: My understanding is that was at the request of the fishery agencies, to conduct the 82-year DSM-2 simulation.

MR. SALMON: Okay. Did you review those results, Mr. Nader-Tehrani, the 82 years?

WITNESS NADER-TEHRANI: Not specifically for BA.

MR. SALMON: Okay. So you're not aware whether there are different patterns displayed in the 82-year data set?

WITNESS NADER-TEHRANI: Not for the BA. The analysis I made was actually based on the California WaterFix alternatives.

MR. SALMON: Okay. Okay. One more clarifying question that's related.

Exhibit DWR-513.

(Document displayed on screen.)

MR. SALMON: On Page 10 of that document.

(Document displayed on screen.)

MR. SALMON: So the -- This again relates to the period that was modeled.

This graph on the X-Axis goes from 1975 through 1990.

Why does that differ from the '76 to '91 period that's described in your testimony?

WITNESS NADER-TEHRANI: Yeah. This particular graph refers to meeting the 150-milligram per liter chloride concentration for a certain number of days in a Calendar Year, and the simulations ended in September of 1991. There were not enough days in the simulation to show the results for 1991.

MR. SALMON: And, similarly, 1975 was included?

WITNESS NADER-TEHRANI: Well, that's because we -- we actually had the simulations for 1975.

MR. SALMON: So this is one place where the 1975 data from Calendar Year '75 was --

WITNESS NADER-TEHRANI: Yeah. Because that was, again, nine months into the simulation. So, as far as the adequacy of the warm water period I was referring to, that there is -- there is adequate information that we can rely on the first two months of 1975.

MR. SALMON: So at least for purposes of this analysis shown on this graph, there was a different --

different data -- data set period used than for --

WITNESS NADER-TEHRANI: Yes. Those three months for this purpose.

MR. SALMON: Okay. I'd like to ask a few additional questions about the North Delta bypass flows and how they were modeled.

So, Mr. Nader-Tehrani, can you explain physically where the bypass flow requirement would apply?

Or any of the panel?

WITNESS MUNÉVAR: Well, physically, it would -- it would apply at the downstream of the most downstream intake.

MR. SALMON: And were the specific criteria developed using the DSM-2 model?

WITNESS NADER-TEHRANI: No.

MR. SALMON: Were they developed using any model?

WITNESS MUNÉVAR: Criteria were largely based on -- on fishery agency input on the adequacy of flows in the river at certain time conditions.

There -- There was also a consideration for the flows in the river that might provide substantial unidirection or downstream flow and to protect those periods in which there could be some possibility of reverse flows. That was the basis for the -- for the

tables that I presented.

MR. SALMON: Do you recall which stretch of the river the reverse flows factored into that analysis? Reverse flows where?

WITNESS MUNÉVAR: It was a broad consideration along the Sacramento River, primarily for looking at fishery impacts.

MR. SALMON: Okay. So, north of -- Or upstream of Georgiana Slough up to Freeport, were reverse flows taken into account, to your knowledge, in the development of the bypass flow criteria?

WITNESS MUNÉVAR: There was a consideration of -- of net flows in the Sacramento River in which unidirectional flows might occur on an hourly basis. There was a broad consideration over 2007 through 2010.

MR. SALMON: What do you mean by "unidirectional"?

WITNESS MUNÉVAR: The flows in the Sac -- If you look at a daily Sacramento River flow, at which flows might you not see any single 15-minute or hourly reversal on the tidal cycle.

MR. SALMON: Okay.

WITNESS MUNÉVAR: So on very high flows, you don't get -- there is no reversal; at low flows, there are reversals over some time period; and at moderate

flows, there's a chance there may be a few 15-minute or hourly intervals in which you have reverse flows.

MR. SALMON: Okay.

WITNESS MUNÉVAR: These are reverse flows not caused by the Project; it's tidal action in the system.

MR. SALMON: Understood.

So those -- The reverse flows were taken into account in the development of the North Delta flow criteria but with an eye towards fisheries' concerns; is that accurate?

WITNESS MUNÉVAR: I think that's accurate, yes.

MR. SALMON: Okay. Were the DSM-2 model simulations for the two boundary scenarios checked for compliance with the North Delta bypass flow criteria?

WITNESS NADER-TEHRANI: Yes, and to basically use the information from CalSim. And, yes, so if CalSim enforced a certain bypass flow, that would be naturally met.

MR. SALMON: So there's no additional check that you perform.

WITNESS NADER-TEHRANI: That's not, either.

MR. SALMON: Okay. And did CalSim -- What -- What CalSim checking was done to assess compliance of the boundary scenarios with the North Delta bypass flow criteria?

WITNESS MUNÉVAR: The boundary scenarios and the WaterFix scenarios have an identical implementation of the North Delta bypass flows, so those are -- are simulated -- or input parameters into the CalSim II model, and -- and the output has confirmed that the operations are per the input, per the required inputs.

MR. SALMON: Okay. I'd like to look at DWR-5, or 5e, let's make it.

(Document displayed on screen.)

MR. SALMON: Page 26.

(Document displayed on screen.)

MR. SALMON: That's a slide from the Modeling presentation that's titled "NDD bypass Flow Requirements Example - Dry year (1987)."

So, I'd like a little help interpreting the slide, so the questions are for whichever Panel Members are most knowledgeable about this chart.

Does this chart show model results?

WITNESS MUNÉVAR: This chart shows model results but it's an example, so I -- it's not necessarily from one of the -- the operations that are -- that were shown for the WaterFix. It's an example.

MR. SALMON: The model -- There was a model run that was done to generate this output; is that correct?

WITNESS MUNÉVAR: Correct. But this -- This

model run was -- is meant to be an illustration but not necessarily a 1987 output of one of the alternatives. I believe this might have been -- might have been the alternative in the BA H3+.

MR. SALMON: Okay. Thanks.

WITNESS MUNÉVAR: The graphic is meant to be illustrative of the -- of the operation criteria under a particular dry-year technology.

MR. SALMON: Okay. And is that a daily time-step in that output data that's plotted on this chart?

WITNESS MUNÉVAR: That's correct.

MR. SALMON: Was -- So this example was not included within the DSM-2 or the CalSim modeling? Is this a separate -- Well, just the first question:

Was this included within the modeling analysis that's presented in the testimony?

WITNESS MUNÉVAR: This operation is -- is from a CalSim modeling that applies specifically for the North Delta Diversion as a sub-monthly time-step, a daily analysis that enables it to operate the North Delta Diversion more adequately than a monthly analysis.

MR. SALMON: Did -- Did you perform the analysis, Mr. Munévar?

WITNESS MUNÉVAR: I did.

MR. SALMON: Did you analyze October 1986 hydrodynamics? That's the first month there.

WITNESS MUNÉVAR: Well, hydrodynamics would be related to the DSM-2 modeling, not the CalSim modeling --

MR. SALMON: Okay.

WITNESS MUNÉVAR: -- and I did not perform that.

MR. SALMON: Did any member of the panel analyze the hydrodynamics during that period?

WITNESS NADER-TEHRANI: I believe these are also based on CalSim flows; aren't they?

WITNESS MUNÉVAR: These are CalSim flows.

MR. SALMON: Okay. So were reverse flows above or below the intakes analyzed in the development of this chart?

WITNESS MUNÉVAR: No. Again, this chart is illustrative of the North Delta requirement. I think Dr. Nader-Tehrani talked about the reverse flows that have been analyzed for the whole 16-year period.

MR. SALMON: Yeah. We're just trying to figure out how that would -- how that would operate, how operations -- modeled operations would interact with those criteria, how the criteria would affect the operations.

WITNESS MUNÉVAR: I understand.

MR. SALMON: So, in November 1986, just using that as an example -- it's the second monitor -- is there any reason why that green line, which I understand -- It's labeled "ND Diversion."

So the green line I understand to represent use -- water diverted through the North Delta facilities.

Is there any reason, during that month of November '86, why that green line could not be higher? Why more -- In other words, why more water could not be taken through the North Delta Intakes during that model?

WITNESS MUNÉVAR: My understanding would be that we may be having a constant low-level pumping criteria applied to this period.

MR. SALMON: Would that be a limiting factor on these new North Delta intake?

WITNESS MUNÉVAR: No. I'm not -- There could be other factors that are driving the operation this particular November, so this has a -- This operation considers many other things that are occurring in the Delta, so it could be a salinity control that's limiting the amount of diversion, or it could be an outflow, it could be a Fall X2 condition.

MR. SALMON: So --

WITNESS MUNÉVAR: I don't know, per se.

MR. SALMON: So the D-1641 requirements and the

RPAs and requirements along those lines are incorporated into the assumed level of North Delta Diversions in this chart?

WITNESS MUNÉVAR: Yes.

MR. SALMON: Okay. But you don't know sitting here which -- which limiting factor might be limiting the use of the North Delta Diversion in this example?

WITNESS MUNÉVAR: Not for that particular November.

MR. SALMON: Okay. How about the summer months of 1987, July, August, September 1987? That's the last three months on this chart, I believe.

So it appears there's constant low-level pumping going on at the North Delta intake during that period; is that right?

WITNESS MUNÉVAR: Correct. But I think what you're seeing here, and may be similar to the November, is that there are other controlling requirements that are limiting the amount that could be diverted from the North Delta Diversion, not necessarily the bypass flows themselves.

MR. SALMON: Okay. So, do you -- Could there have been North Delta Diversions above the level of diversion shown for those three months during that period, to the best of your knowledge?

WITNESS MUNÉVAR: To the best of my knowledge, it would be highly unlikely. These are low Sacramento River flows. Generally, we find flows between 10 and 12,000 cfs in the summer are likely required to meet Emmaton's salinity standard.

So it would be highly unlikely that the other controlling requirements would enable North Delta Diversions to occur.

MR. SALMON: So it's, in your view, likely an in-Delta salinity standard that's limiting the level of diversion at the new intake there?

WITNESS MUNÉVAR: Correct.

And then we also have a criteria in the North Delta Diversion which says, in the summer, we would prefer to take the first 3,000 cfs of diversion from the South Delta intakes as opposed to the north.

I don't know what the specific South Delta diversions are, but they would be preferred over the North Delta in July, August and September.

MR. SALMON: Is that an assumption incorporated into the model, that preference?

WITNESS MUNÉVAR: It is.

MR. SALMON: Is there any operational requirement that's been proposed to require that, or is it an assumption of Operator flexibility, or something

else?

WITNESS MUNÉVAR: It's an assumption in the modeling. I believe it's described in the modeling details of Appendix 5A. And it was -- it was developed largely for operational discretion for water quality in South Delta.

MR. SALMON: Are you aware of whether it's a requirement of operation that you were asked to model or is it --

WITNESS MUNÉVAR: It's not an existing requirement, and I'm not aware of it being applied as a requirement on this Project.

MR. SALMON: Okay. So were you trying to simulate Operator judgment in incorporating that 3,000 assumption?

WITNESS MUNÉVAR: Well, I think both Operator judgment and it's been written into the assumptions for the Proposed Project that, during those conditions, July, August and September, preferential pumping would occur from the South Delta in order to facilitate movement of fresher water into the South Delta as opposed to diverting from the North Delta.

MR. SALMON: Okay. You said there were assumptions. You're referring to the modeling assumptions?

WITNESS MUNÉVAR: Modeling assumptions. And I don't recall if it's written in the Proposed Project description. It may be.

WITNESS BUCHHOLZ: It's also in the alternative assumptions in Chapter 3 in the EIR/EIS, and also in 5 of the Biological Assessment.

MR. SALMON: Okay. Thank you.

I have no further questions for the panel.

My colleague, I believe, has some questions for Sacramento County Water Agency.

CO-HEARING OFFICER DODUC: Thank you.

Mr. Ferguson?

MR. FERGUSON: Yes.

CO-HEARING OFFICER DODUC: How much time do you expect needing for your groundwater-related questions?

MR. FERGUSON: Maybe 10 minutes.

CO-HEARING OFFICER DODUC: Okay.

MR. FERGUSON: Yeah.

CO-HEARING OFFICER DODUC: Proceed.

And we will take our lunch break after that.

MR. FERGUSON: Good morning. My name's Aaron Ferguson. I'm here on behalf of the Sacramento County Water Agency.

CROSS-EXAMINATION BY

MR. FERGUSON: I just have a few questions

related to groundwater levels and the potential groundwater service water interaction and -- and groundwater impacts.

So, I'll direct my questions initially at Mr. Tehrani.

You testified that there will not be negative effects to legal users of water due to water level changes; is that correct?

WITNESS NADER-TEHRANI: That is correct.

MR. FERGUSON: Okay. How did you reach the conclusion that there wouldn't be negative effects based on the model changes in water levels?

WITNESS NADER-TEHRANI: The graphs I showed, and perhaps we should put that on the . . .

MR. MIZELL: Mr. Long, if we could put DWR-5e up for Mr. Tehrani.

WITNESS NADER-TEHRANI: Page 76.

(Document displayed on screen.)

MR. MIZELL: Page 76?

WITNESS NADER-TEHRANI: Page 76.

(Document displayed on screen.)

WITNESS NADER-TEHRANI: Four more down.

(Document displayed on screen.)

WITNESS NADER-TEHRANI: So, this is the plot I showed. This is the water level output corresponding to

the location along Sacramento River downstream from the three proposed intakes.

This represents the -- the largest change cause in water surface elevation. And in order to look at the changes in water level, I'm comparing the results for the No-Action represented by the black line to all other ones that kind of line up.

And looking at the changes in water level, again, to reiterate, the points that are towards the right end -- the left end of the graph represent the high flows, and I -- and I explained that's about a foot, and toward the low flows, about half a foot.

But I further explained that the water level corresponding to the -- the four operational scenarios go below the No-Action Alternative. Only three days in the entire 16 years. That's five days in a year.

And also the fact that those low events only occurred during a short duration of time. There is a tidal influence at this location and the low flows. The tidal amplitude, the difference between low and high, is between 2 to 4 feet, so -- And during the rest of the time, the water levels are going to be much higher than the low waters that are reflected here.

And for those reasons, I made the -- reached the conclusion that there would not be a -- an impact to

the legal users of water based on water level.

All other locations showed a lower change.

MR. FERGUSON: So it appears you're focused on changes in minimum water levels in the river; is that correct?

WITNESS NADER-TEHRANI: That is correct.

MR. FERGUSON: Okay. Were -- Were you -- Were you directed to conduct such an analysis of minimum water levels to assess injury to legal users of water?

WITNESS NADER-TEHRANI: That -- That was a choice I made, but I consulted with the attorneys. I was trying to figure out. I -- You know, I assume there are farmers they're diverting water from -- from within that area. And in order to assess whether WaterFix would affect their ability, I assumed that the biggest concern would be the lowest water levels, so that's the choice I made at that point.

MR. FERGUSON: So it sounds like the concern was a -- potential effects on surface water diversions; is that correct?

WITNESS NADER-TEHRANI: That is correct.

MR. FERGUSON: Okay.

WITNESS NADER-TEHRANI: I must add that I have looked at the -- the maximum daily stage plots, and they look very similar, with similar changes.

MR. FERGUSON: Okay. Thank you.

So, did you run any other types of water level comparisons between the No-Action Alternative and the Project alternatives?

For example, did you assess long-term changes in water -- in average water levels?

WITNESS NADER-TEHRANI: What -- What you see here is the long-term effects on water levels. This line -- This graph represents a 16-year simulation, so the entire spectrum from the very wet years to the very dry years.

MR. FERGUSON: But it's only with respect to minimum water levels; correct?

WITNESS NADER-TEHRANI: As I -- As I described earlier, I have looked at the similar chart represented by the daily maximum water levels, and I saw a similar shape and similar change.

But I chose this one because that was my assumption, that I'm looking at how it's going to affect anybody who's diverting surface water from that area. That was the choice I made.

Now, in hindsight, I perhaps should have included the higher one, but I have looked at it, the maximum daily water levels. And I saw it's very similar shape and a similar change, you know, indicated by

those -- those levels.

MR. FERGUSON: So if you'd shown the high side, as you indicated, what -- what -- what sort of information would that give you with respect to -- to water levels? Why did you suggest that?

WITNESS NADER-TEHRANI: Why -- What is your question?

MR. FERGUSON: Sorry.

What sort of information would that give you with respect to change in water levels comparing the No-Action Alternative to the various Project alternatives if you were to include the -- the maximum?

WITNESS NADER-TEHRANI: Well, that chart, if I chose the maximum stage, it would show the effect or the reduction in water level based on maximum water level at a given location. So that's really the basic different between that and the plot that you see in front of you.

MR. FERGUSON: Did you or anyone else on the Modeling Team assess stream or groundwater interactions in the area of the North Delta Diversions?

WITNESS NADER-TEHRANI: I did not. I don't know.

MR. FERGUSON: Do you know if changes in water levels are relevant in assessing stream water interactions in the area of the North Delta Diversions?

Would there be?

WITNESS NADER-TEHRANI: That's not an area of my expertise.

MR. FERGUSON: Does anybody else on the Modeling Panel?

WITNESS BUCHHOLZ: What we did is, we used the outputs -- We have a groundwater -- regional groundwater model called Central Valley Hydrologic Model. It's prepared by the United States Geological Survey.

And so that model, coming from the U.S. Geological Survey, they provided all of the -- the hydrogeological characteristics of the Delta -- well, actually the entire Central Valley.

Based upon those characteristic assumptions, we inputted the CalSim flows and ran a long-term basis to see whether or not we'd see any changes along the rivers because of the groundwater surface water relationship due to changes in flows when the river's coming out of CalSim output.

MR. FERGUSON: When you say changes along the rivers, what do you mean?

WITNESS BUCHHOLZ: So, CalSim changed the -- the frequency and the flow patterns along the Sacramento River as compared to the different alternatives as compared to No-Action. And also with respect to

Sacramento River, American River, the changes in Steamboat/Sutter Slough, the different parts of the -- if we would see anyplace that we would have in CalSim output.

MR. FERGUSON: Okay. So you're saying as part of that, that analysis, you did assess stream water interactions in the area in or around the North Delta Diversion?

WITNESS BUCHHOLZ: Right.

And then we looked, based upon using -- well -- and I'll just the vernacular instead of saying it out -- CVHM, which is the acronym.

We used that to determine whether or not we would see higher or lower groundwater levels along those rivers due to the change in -- for operations.

MR. FERGUSON: Where -- Where are those -- Are those modeling results contained in the modeling package that's been presented somewhere? Where would I find those?

WITNESS BUCHHOLZ: So the -- the results that we show for a peak -- for the maximum incremental difference between No-Action and alternatives are in figures for Chapter 7 of the Draft EIR/EIS. And there is a -- I don't believe that the CVHM model runs are up on the State Water Resources Control Board website, but I

know that State Water Resources has made them available to whoever's asked for them.

MR. FERGUSON: Okay. So did those modeling results should -- And maybe you said this. You said it for a bit there.

Did those modeling results show a change in groundwater recharge in what's called the South American Subbasin adjacent to the intakes?

WITNESS BUCHHOLZ: Along the intakes, it's actually interesting, because this set of model runs had a -- another set of assumptions that's been subsequently changed for the Project that we have in front of the Board right now.

And -- And that was the change I spoke to in a previous panel, the Engineering Panel, about the use of slurry walls.

So we actually had a fair amount of additional groundwater recharge occurring because of the Intermediate Forebay.

And now that we have the slurry walls around the Intermediate Forebay, that seepage has an adverse impact that was occurring to groundwater because it was raising the groundwater way high, and so that recharge doesn't occur.

However, just based upon the river changes, we

showed there's a slight increase in -- of -- let me get my colors correct here -- of 1 to 5 feet around the Freeport area. However, it could also go down -- down, and then also along the Rio Vista area.

We also show that we could have a change of -- of a -- of a reduction in groundwater levels along the American River area.

MR. FERGUSON: So, I think you -- you mentioned that change. Did you say 1 to 5 feet?

WITNESS BUCHHOLZ: 1 to 5 feet increase, or 1 to 5 -- along the Sacramento River and a 1- to 5-foot decrease along the Sacramento River.

MR. FERGUSON: And what sort of time period is that over in terms of that change?

WITNESS BUCHHOLZ: So -- I knew you were going to ask me that and I can't remember the years. It's not the full 82 years on that. I -- Let me check Chapter 7 on the -- on the -- the period of time we did it.

What it's done is, the analysis is run as a GIS model output animation. And so what we did was, we looked for the peak incremental differences during the time frame that we -- the 42-year timeframe that we ran the model runs.

MR. FERGUSON: So you mentioned levels. Was there any attempt to assess overall impacts on volume in

the basin --

WITNESS BUCHHOLZ: No.

MR. FERGUSON: -- volume of water in the basin?

WITNESS BUCHHOLZ: We did not analyze it in a volumetric manner.

MR. FERGUSON: Okay. Do you -- Was that an intentional decision not to analyze it in a volumetric manner?

WITNESS BUCHHOLZ: We were focused in the EIR/EIS on looking at where we anticipated -- how -- In the EIR/EIS, we talk about in each of our chapters, and including in Chapter 7 for groundwater, what would be the best way to describe any changes that would occur under the alternatives versus -- that would be meaningful as compared to the No-Action and existing conditions.

We made a decision that water -- groundwater elevations would be the most appropriate one to focus on.

MR. FERGUSON: Well, in -- in your opinion, would a -- would a change in volumetric level be an appropriate component for assessment of injuries to legal users of water?

WITNESS BUCHHOLZ: The change in volumetric level would be related to the change in groundwater elevations, so --

MR. FERGUSON: So you -- In your opinion, you

felt comfortable that -- with the assessment in the change in levels that served as a -- That's a surrogate for -- or not surrogate?

WITNESS BUCHHOLZ: I think it's indicative of the change in models --

MR. FERGUSON: Okay.

WITNESS BUCHHOLZ: -- you know.

MR. FERGUSON: And, so, is it your opinion with the -- with the modeling indicating those changes in levels, that there would not be injury to groundwater users in the South American Subbasin?

WITNESS BUCHHOLZ: What we recommended in the -- We -- We acknowledged that there potentially could be, and we had mitigation measures within Chapter 7 of the Draft EIR/EIS.

We recognized that this is a regional groundwater model, and so during design phase, there would have to be very specific geotechnical surveys to determine the types of hydrologic characteristics that occur in the aquifer near the rivers as well as in the intakes that could be affected by this, and that would -- especially near the intakes because that's where we're going to see the maximum change in elevations in most cases.

And so we would also be looking at any specific

locations of water wells in that area at that time, as I -- as I previously testified.

MR. FERGUSON: Right. I think we had a conversation about some of these items.

I'm just trying to look a little more broadly beyond the immediate impacts associated with the construction, which is what I think we discussed previously in talking --

WITNESS BUCHHOLZ: And those monitoring, according to the mitigation measures, would be continuing in post as -- as operations start up, yes.

MR. FERGUSON: I'm trying to get you to answer a little more broadly with respect to the area -- the Reaches, you know, up and downstream of the intakes and in the surface water/groundwater interaction there, and what we're seeing overall if there are any potential impacts to the basin --

WITNESS BUCHHOLZ: And we don't see that --

MR. FERGUSON: -- water levels or water volumes.

WITNESS BUCHHOLZ: We don't see that in the results of CVHM or CVHMD. The results in the -- in Appendix 7A, as I said, or -- Actually, we show increases, but that's because of the sea beach that would have occurred at the Intermediate Forebay.

And we also show increases in groundwater elevations down by Suisun Marsh in Rio Vista area, but that was because of the tidal habitat restoration.

We did not redo these sets of models for any of the other subsequent documents.

MR. FERGUSON: Okay. Thank you.

Was . . . I'm going to come back to some of your testimony, Mr. Tehrani.

Your testimony states that, with respect to the water quality impacts, that except for Boundary 2 in the months of July and August, there's an increase in EC at Emmaton about 18 or 19 percent when compared to the No-Action Alternative; is that correct?

WITNESS NADER-TEHRANI: July and August, yes, um-hmm.

MR. FERGUSON: Okay. So, in your opinion, under these scenarios where EC is 18 or 19 percent higher as compared to the No-Action Alternative, would you expect to see a change in EC near the North Delta Diversion?

WITNESS NADER-TEHRANI: Not near the North Delta Diversion, no.

MR. FERGUSON: And why is that?

WITNESS NADER-TEHRANI: Because it -- My -- My understanding how Delta works, and I've actually looked

at the water quality data -- water quality output from the model, and there's -- there's -- there is not a salinity intrusion that go that far upstream.

MR. FERGUSON: So, in your opinion, it's the salinity intrusion coming from the Bay which would -- which causes the salinity issues and the levels to go up and down Emmaton. Is that what you're saying?

So you'd expect that same relationship, if you will, or that same sort of . . . scenario, I guess, near the North Delta Diversions; is that correct?

WITNESS NADER-TEHRANI: Well, as I said, I have looked at the water quality results, and I see no trace of ocean salinity intrusion anywhere near the intakes.

MR. FERGUSON: Okay. Thank you.

That concludes my questions. Thanks.

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

Let's do a quick check-in. Group Number 16?

Okay. We will resume at 1:15 with cross-examination by the South Valley Water Association and Friant and et al., Group 16.

(Luncheon recess was taken at 12:14 p.m.)

WITNESS NADER-TEHRANI: Then perhaps, Armin, you can --

WITNESS ANDERSON: I will go ahead and say:

For the DSM-2 model, it does not make any adjustments. The flows that come into the DSM-2 model come straight out of CalSim and are not further adjusted in the DSM-2 model.

WITNESS NADER-TEHRANI: Right.

And maybe you, Armin, can then explain what would happen in the model if there is D-1641 water quality objective.

WITNESS MUNÉVAR: Yeah.

As Parviz mentioned, CalSim believes it's providing sufficient volumes of flow or export reductions in order to achieve the water quality results.

And through the -- the course of translating CalSim to DSM-2, and daily time-stepping, those exceedances are what Parviz has shown.

So there is no op -- There is no operational response to a non-achievement in CalSim because it believes it has achieved.

MS. MESERVE: Okay. Does the model look at -- Does it consider whether there would be any impacts on levee stability due to the fluctuations in water level we discussed earlier? Does it provide any information, I guess I should say.

WITNESS NADER-TEHRANI: No.

MS. MESERVE: What steps are being taken now to

try to validate the model against real-time conditions in the Delta that we've seen recently?

MR. BERLINER: Objection: Asked and answered.

CO-HEARING OFFICER DODUC: Remind me, please.

Please answer.

WITNESS SMITH: So, with DSM-2, we periodically update the calibration of the model given new information, new data, whether that's new telemetry data, or we make changes to the model, we'll update the calibration, when there is significant enough change to where we think that that's going to make a change in the modeling studies.

So we continually work on that, including consumptive use-related and drought-related activities.

MS. MESERVE: Okay. So it sounds like -- Is your response that it's ongoing or . . .

WITNESS SMITH: Yes. Calibration is ongoing.

What we have currently for the California WaterFix is the -- I would say there is no major changes to significantly change what the calibration is. There's been an updated calibration, but it's not significant enough to -- to really affect the results of the California WaterFix.

MS. MESERVE: Let's see. I believe I already asked that one.

Do the models try to include any assumptions regarding seepage out of the channels as the water is traveling, say, from a release from the storage into the system?

WITNESS SMITH: Within the Delta Island Consumptive Use Model, there is seepage included, so -- but . . . you're talking about seepage out of the islands or seepage --

MS. MESERVE: Yeah. Actually, just to clarify, I -- I believe the question refers to seepage upstream of the Delta, if that's being taken into account somehow in your model.

WITNESS MUNÉVAR: That's a different -- Yeah, that's included in the CalSim model. There's a stream groundwater interaction which incorporates the -- the loss or the gain of water from groundwater into the stream.

MS. MESERVE: Okay. Does the model try to -- Is there any assessment in the modeling to try to look at the possible formation of the harmful algal blooms in the Delta?

WITNESS BRYAN: Yeah. The -- So, in the EIR, we looked at harmful algal blooms, microcystis in particular. And one of the things that we can do is use DSM-2 and its Particle Tracking Model to look at

residence times.

And the other aspect of hydrology that's very important in microcystis is channel velocity, and we talked about that earlier today, I think.

And so we looked at both residence time and how that would differ between the Proposed Project and the No-Action, as well as channel velocities.

MS. MESERVE: Did you use any specific models that were designed for assessment of harmful algal blooms, or were you just looking at those two factors?

WITNESS BRYAN: The way we did our assessment, in a nutshell, is that if you look at microcystis, we looked at its life history and how it accomplishes blooms in the Delta, what it needs in order to bloom in the Delta.

It needs adequate nutrients, adequate light, adequate temperature and typically doesn't bloom until mid-to-late summer, and then adequate hydrology.

And so when you look at how the California WaterFix alternatives can affect microcystis, they're not going to affect those first three requirements very much at all. So, really, the only way that the Proposed Project can really affect microcystis is through the hydrodynamic aspects, the hydrology aside.

So, we had tools available through DSM-2 to

look at what's important here, both residence time and velocities.

MS. MESERVE: Are there other models that you're aware of that you didn't use for harmful algal blooms?

WITNESS BRYAN: None that I'm aware of.

MS. MESERVE: Let's see. So you mentioned about the late summer.

We've seen in the operational rules that -- that there would be a preference -- I believe it's a preference for pumping out of the South Delta in the summer.

How is that preference expressed in the operational assumptions?

WITNESS MUNÉVAR: Yeah. During July, August and September, if water can be ex -- diverted from either the North or the South Delta facilities, then the preference is to divert from the South Delta up to 3,000 cfs before utilizing the North Delta Diversions.

MS. MESERVE: Is that part of the -- what would be the proposed operational rules under, say, H3 or H4, or is -- Well, I'll just leave it at that.

WITNESS MUNÉVAR: Yes.

MS. MESERVE: Okay. So -- Because when -- What I heard was that it was a preference, and I didn't -- and

I guess I'm wondering, is there anything that would make that preference a requirement that we're seeing in this proposal that we're discussing today?

MR. BERLINER: We have the same continuing.

CO-HEARING OFFICER DODUC: (Nodding head.)

MR. BERLINER: Thank you.

WITNESS MUNÉVAR: So whether it's a requirement or not, I don't -- I cannot say.

But I believe the operational preference will be the same as that was modeled, because during summer and lower flow conditions, there may be a preference to meet water quality considerations in the South Delta by diverting from the south; therefore, bringing more Sacramento water into the interior part of the Delta.

MS. MESERVE: But in any case, if other standards weren't being violated, we would still be diverting the 900 cfs so-called low-flow -- low-flow pumping in the north; is that correct?

WITNESS MUNÉVAR: As long as that water were not required for any other downstream Delta requirement.

MS. MESERVE: Would another reason why that low-level pumping could still occur would be if there was a TUCP in place?

WITNESS MUNÉVAR: I -- I can't say. I don't know.

MS. MESERVE: All right. That concludes my questions.

Thank you.

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

Group 20?

Group 21, Mr. Herrick.

Uh-oh. He has an entire box.

MR. HERRICK: This is my lunch.

(Laughter.)

CO-HEARING OFFICER DODUC: Just quickly to check in with the witnesses.

How are you doing? You need a five-minute break or are you good?

WITNESS ANDERSON: Five minutes?

CO-HEARING OFFICER DODUC: Okay. Five-minute break? Let's take a five-minute break.

You should have been faster, Mr. Herrick.

We will resume at 3:50, a six-minute break. I'm so generous.

(Recess taken at 3:44 p.m.)

(Proceedings resumed at 3:50 p.m.)

CO-HEARING OFFICER DODUC: (Banging gavel.)

All right. Welcome back. It's 3:50 and you can all thank Miss Anderson for that break. If it wasn't

for her, we would have just rushed through.

Mr. Herrick, a time estimate?

MR. HERRICK: I think it will take upwards of two hours.

CO-HEARING OFFICER DODUC: All right. And not that I'm agreeing to give you those two hours, but on that, I just wanted to let -- I believe Miss Taber was up next -- that we will not get to you until the morning.

Okay. The topics that you'll be exploring, Mr. Herrick?

MR. HERRICK: Yes. I have some background on modeling assumptions and outputs that have not been covered.

Then I move into the specifics of the models with regard to South Delta water quality, how averaging and daily amounts may compare, the problems with the reliance on the modeling outputs, Head of Old River Barrier operations and impaction, water level impacts, affects of increased exports on river salts, a couple issues on the prior modeling, just for context, and then I have things like -- small things like Term 91 and there may be one or two others, if that's a good enough summary for now.

CO-HEARING OFFICER DODUC: Okay. We will start you with an hour and see where that leaves us at close to

5 o'clock.

MR. HERRICK: I appreciate that. I believe none of my questions deal with topics covered yet but I certainly don't want to take too much time.

CROSS-EXAMINATION BY

MR. HERRICK: Thank you, Hearing Officers, Board Members. My name is John Herrick. I represent the Central Delta Water Agency and some other parties.

I know a couple members of the panel so I hope nobody is offended if I refer to Parviz as "Parviz" or Tara as "Tara," but the other members I'm not familiar so I won't be disrespectful if I don't use your name.

I'd like to start with Mr. Munévar.

There's still some confusion, I think, as to how the model treats the conditions under which it predicts dead pool conditions.

In the CalSim modeling that you performed, are there instances in the 82-year timeframe where the model shows dead pool being reached?

WITNESS MUNÉVAR: Yeah. As I indicated in my exhibits, there are periods of time in both No-Action and WaterFix in which dead pool is released, in Shasta and Folsom in particular.

MR. HERRICK: And in normal day-to-day -- not day-to-day.

In normal operations, though, actions are taken well before dead pool is reached to avoid dead pool; is that correct?

MR. BERLINER: Objection: Asked and answered.

We covered this with Mr. Lilly at some length.

CO-HEARING OFFICER DODUC: I assume you're asking a few preliminary questions to get to your main point.

MR. HERRICK: Yes.

CO-HEARING OFFICER DODUC: Yes. Just a few.

WITNESS MUNÉVAR: In actual operations, I think they have more flexibility and improved forecasts to understand when those conditions would occur.

MR. HERRICK: So would you say that the modeling for -- produced by CalSim II, then, doesn't accurately represent what actions would be taken in those years when dead pool would be a threat?

WITNESS MUNÉVAR: I think the -- the CalSim II modeling does not anticipate or include the dynamic actions that might include -- be incorporated under extreme dry conditions.

MR. HERRICK: And those dramatic (sic) actions, would they or would they not affect the next year's, say, carryover operations?

WITNESS MUNÉVAR: They could. To the extent

that they would increase storage or reduced deliveries, it could impact next year's operations.

MR. HERRICK: Thank you.

Parviz, there have been some questions on this but I just -- dealing with DSM-2.

We've discussed the -- The prior people have discussed the 16-year period that was used.

Is there a reason why we -- why we didn't model any years that included D-16 -- D-1641 obligations being in effect? And by that, I mean the years after the plan was -- or the -- excuse me -- the decision was adopted in 2000.

WITNESS NADER-TEHRANI: Again, these are the historical simulations. These are planning simulations, so they're not meant to replicate a condition that occurred in the past.

The same 16-year -- You know, it's been a standard practice for the last 17, 18 years, ever since the DSM was brought in, the same 16 years for reasons, you know, that was expressed earlier.

There is no rationale beyond what I have already described.

MR. HERRICK: If we did model years that included the timeframe D-1641 was in effect and then compared them to actual data, wouldn't you think that

would allow people to get a better idea of what the potential effects might be?

WITNESS NADER-TEHRANI: I'm --

MR. BERLINER: Objection: Argumentative.

CO-HEARING OFFICER DODUC: Well, I believe you can answer whether you agreed or not.

WITNESS NADER-TEHRANI: Would you mind repeating the question? I want to make sure . . .

MR. HERRICK: Yes.

Since the models are just comparative between each run --

WITNESS NADER-TEHRANI: Yes.

MR. HERRICK: -- would you think it would be more -- I forget the word I used -- more beneficial to examine model years with actual data so that we could get a better feel of how the model might really affect the -- any legal user?

WITNESS NADER-TEHRANI: In this particular mode of operation, I think, as it was explained, the conditions we're looking at include climate change and sea-level rise.

These are not conditions that have occurred in the past and, therefore, it does not make it very easy to, you know, compare results with anything that really occurred in the past.

MR. HERRICK: And if we could pull up DWR-513, please, Page 3.

(Document displayed on screen.)

MR. HERRICK: Parviz, I believe this is the exhibit referred to in much of your testimony.

Do you see the figure EC5 at the top of that page?

WITNESS NADER-TEHRANI: Yes.

MR. HERRICK: And that shows the modeling results from DSM-2 for all months over the timeframe that you -- the averaging over the timeframe that you did; correct?

WITNESS NADER-TEHRANI: That's correct.

MR. HERRICK: Okay. And so each bar is a -- an average of all of the monthly results for that scenario.

WITNESS NADER-TEHRANI: That's correct.

MR. HERRICK: So when you average monthly scenarios over numerous years, one would expect that the average would consist of both numbers above that and numbers below that; correct?

WITNESS NADER-TEHRANI: That's correct.

MR. HERRICK: Have you broken out anywhere what those -- what any of the increases are and -- for presentation to the Board?

WITNESS NADER-TEHRANI: I -- I have not. It's

not part of my testimony, no.

MR. HERRICK: In your opinion as a Modeler, would that be helpful in evaluating whether or not a project has adverse effects on certain parties to be able to see when and how often increases in salt occur? Or EC. Excuse me.

WITNESS NADER-TEHRANI: Well, with respect to this particular place, position, I believe I explained the -- the only factor that seems to be causing a change in EC at this location has to do with the Head of Old River Gate operation. That's the only thing that's different.

All the assumptions with respect to San Joaquin flows and salinity that really affects the salinity at this location are identical among No-Action and other operational scenarios.

What this picture illustrates to me is that the fact that it was assumed Head of Old River Gate was completely closed, and that that was the assumption for Boundary 2 for the months of March, April and May, are the -- is the cause for the increase that you're looking at.

And that was kind of the main reason -- You Know, I think that's the main message, I think, be -- you know, behind this graph here that you're looking at.

MR. HERRICK: Did you check through the daily average EC data to see if there were increases in EC that you didn't attribute to the Head of Old River Gate?

WITNESS NADER-TEHRANI: There -- There's nothing else that lead me to believe that anything be -- besides the Head of Old River Gate operation is causing the increases that you see here.

MR. HERRICK: Did you check the daily data to see if there were indications that something other than Head of Old River Barrier was causing an increase in EC?

WITNESS NADER-TEHRANI: I did not necessarily include each and every day in the 16-day -- you know, years of simulation, if that's what you're asking.

MR. HERRICK: No. I'm talking about --

WITNESS NADER-TEHRANI: But having looked at water quality results and -- you know, and especially in the South Delta, and the familiarity I have with the model, I -- I can convincingly say, you know, with a great deal of confidence, that that's what I think the result of that is.

MR. HERRICK: Well, hypothetically, then, if the data showed a daily jump for a day, or three days, or five days, or a month, which is not associated with a change in Head of Old Barrier (sic) operations, would that indicate to you that it was something other than

Head of Old River Barrier?

WITNESS NADER-TEHRANI: If I had seen something other than those three months, you know, all other months, everything else is the same, why would those three months be any different than the other months?

MR. HERRICK: Okay.

WITNESS NADER-TEHRANI: And the only difference in those three months is the Head of Old River Gate assumption. With that -- With that, I think I don't have to look anything further beyond that.

MR. HERRICK: That's why I asked you about checking the daily data.

WITNESS NADER-TEHRANI: No, I did not check every day, no.

MR. HERRICK: So, my understanding, you're looking at the average day.

WITNESS NADER-TEHRANI: That's correct. That's correct.

MR. HERRICK: (Distributing documents.)

Parviz, I've handed you what is labeled SDWA-27, and for speed, I'll just identify it as an e-mail, the cover page of an update on the Department of Water Resources and the Bureau of Reclamation's Notice to people about ongoing transfer pumping.

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(Central Delta Water Agency, South Delta Water Agency (Delta Agencies), Lafayette Ranch, Heritage Lands Inc., Mark Bachetti Farms and Rudy Mussi Investments L.P. Exhibit 27 marked for identification)

MR. HERRICK: Do you -- Do you recognize that document?

WITNESS NADER-TEHRANI: I have not seen it before.

MR. HERRICK: Okay. Are you not on the mailing list of these?

WITNESS NADER-TEHRANI: I do not get -- If I do, you know, I might -- I've been super busy with other things, actually.

MR. HERRICK: That, I can understand.

WITNESS NADER-TEHRANI: Yeah. So I'm not being connected to South Delta issues for a while. So I may be on that e-mail list but it's not -- it's not something I've looked at.

MR. HERRICK: No, I'm not trying to trick you. I didn't see your name on these. I just wanted to know if you were familiar.

Are you familiar with the fact that updates for

transfers are sent out and those updates include both water quality and water level predictions, I'll say?

WITNESS NADER-TEHRANI: I only can take your word on it.

MR. HERRICK: Okay. The document talks about, in the -- in the very first sentence of the text, that (reading):

". . . Transfers which began on July 1st, and will continue through September. The daily rate of planned transfer is currently at 350 cfs during July."

Can you see that?

WITNESS NADER-TEHRANI: Can you help me? When you talk about "transfer," can you explain more what -- what -- the transfer?

MR. HERRICK: Well, apparently the Department or the Bureau are pumping transfer water at this time, and there's certain limitations on that, as I understand it. And so they're notifying the public pursuant to --

WITNESS NADER-TEHRANI: That's additional -- additional export.

MR. HERRICK: That's my understanding.

WITNESS NADER-TEHRANI: Okay.

MR. HERRICK: So assuming that's correct for now, if you'll turn the page and maybe go to the third

page, which is titled, "Forecasted Daily EC @ Old River near Middle River."

(Document displayed on screen.)

MR. HERRICK: Do you see that?

WITNESS NADER-TEHRANI: Yes, I see that.

MR. HERRICK: And do you know whether or not the simulation done on this to produce this chart -- Because it goes beyond the current date it predicts.

Do you know whether the simulation is a result of DSM-2 or some other model?

WITNESS NADER-TEHRANI: I did not do it, but I can imagine the tool that was used to get that answer -- I mean, to get this. It would have had to have been DSM-2.

MR. HERRICK: Okay. And so you see that there are three lines indicated. One of them is -- You'll have to bear with me on the color.

I believe one of them is bluish and it says "Historic EC," and the second one says "Base Case" and it's dark -- sorry -- and the third one says "Without Transfer" and a dashed line.

Do you see that?

WITNESS NADER-TEHRANI: Yes, I see that.

MR. HERRICK: And you see that, when we get over to, say, beginning on August 22nd of 2016, that the

Without Transfer in the Base Case but With Transfer start separating.

Do you see that?

MR. BERLINER: Point of clarification: July and August?

MR. HERRICK: It says -- Oh, did I say that wrong? It says July 7. I'm starting at 7/21/2016 which is about, what, three-quarters of the way through there.

Do you see that, Parviz?

WITNESS NADER-TEHRANI: I see that, um-hmm.

MR. HERRICK: And the two lines start diverging for a while; is that correct?

WITNESS NADER-TEHRANI: Now, can you remind me when you say "Old River near Middle River" with respect to Old River, Tracy Road?

MR. HERRICK: Old River near Middle River would be one of the South Delta compliance stations --

WITNESS NADER-TEHRANI: Yeah.

MR. HERRICK: -- and it's basically the Head of Old River, not the Middle.

WITNESS NADER-TEHRANI: Okay. In this assumption, may I ask:

Was the Vernalis flow or EC changed between the Base Case and Without Transfer?

MR. HERRICK: I don't know if the Board wants

you to testify, but this is not at a time when the standard is changing back and forth. The standard is from April through the end of August --

WITNESS NADER-TEHRANI: Right.

MR. HERRICK: -- and then September --

WITNESS NADER-TEHRANI: I'm --

MR. HERRICK: -- through --

WITNESS NADER-TEHRANI: I'm just asking whether the assumptions that were used in the model --

MS. MORRIS: This is Stefanie Morris, State Water Contractors.

I think it's unclear what we're looking at. I understand the witness said he's familiar with it.

But what transfer are we talking about? Is this a transfer on the San Joaquin River, or is this some other transfer coming from Sacramento River that's being analyzed with the -- with this table?

CO-HEARING OFFICER DODUC: Mr. Herrick?

MR. HERRICK: Well, I don't know if anybody wants me to testify, but --

CO-HEARING OFFICER DODUC: Okay. Instead of testifying, then, help me understand -- Make the connection for me.

Why are you doing this?

MR. HERRICK: Well, I'm doing this -- and I'll

get to these questions in a minute -- because this indicates how the -- two things.

I'll soon be comparing it to the actual ECs which are significantly different than the DSM-2 ECs presented here; and then I'll be asking questions about if 350 cfs of change of diversions at the South Delta Pumping Plants can cause a change of 100 EC, isn't that relevant to this process?

CO-HEARING OFFICER DODUC: And what is it that's being shown on this graph?

MR. HERRICK: Well, the graph shows the projected changes in EC at Old River near Middle River under a scenario with the 350 cfs transfer and under scenario without the 350 cfs transfer.

And as everyone can see on the left part of the graph, there's a historic EC number, which is some sort of average or something. I don't know what that is.

CO-HEARING OFFICER DODUC: And how does that relate to the modeling results that these witnesses are testifying to, which includes adjustments for climate change and other factors?

MR. HERRICK: Well, I --

CO-HEARING OFFICER DODUC: Because you're --

MR. HERRICK: -- didn't know I had --

CO-HEARING OFFICER DODUC: -- trying to compare

the two results --

MR. HERRICK: I know.

CO-HEARING OFFICER DODUC: -- and I'm trying to understand.

MR. HERRICK: I appreciate that. You know, I don't know how long you want me to talk about this, but I guess it's an offer of non-proof.

The -- The proponents have provided us with modeling that shows averages --

CO-HEARING OFFICER DODUC: Um-hmm.

MR. HERRICK: -- and it shows very little differences between the scenarios for EC changes.

The averages they all give are -- add up to well below the standards when, in fact, the actual ECs are above the standards. The modeling doesn't accurately predict that; they say it won't. That's fine.

CO-HEARING OFFICER DODUC: They say it won't.

MR. HERRICK: But then we see that small changes in export pumping have big effects on EC.

So if the modeling is being presented on averages that don't show violations, I think it's very relevant to show that, during violations, small changes in pumping can result in significant increases in EC.

CO-HEARING OFFICER DODUC: And why would this not be your case in chief -- part of your case in chief?

MR. HERRICK: Because this is challenging the Proponents' assertion with regard to the effects on EC.

CO-HEARING OFFICER DODUC: But did these modelers -- Did -- Did you do this analysis and provide this information?

WITNESS NADER-TEHRANI: I did not do this analysis, no.

WITNESS SMITH: I believe this -- these forecasts are done by John Leahigh's group, the modeling forecasts --

MR. HERRICK: Let me start over.

WITNESS SMITH: -- for this particular thing.

MR. HERRICK: Because I -- I -- Just for the record, no offense to the chairpersons --

CO-HEARING OFFICER DODUC: I won't take offense. I'm just trying to understand --

MR. HERRICK: I understand.

CO-HEARING OFFICER DODUC: -- Mr. Herrick.

MR. HERRICK: The notion that I have to explain where I'm going to go in my questioning seems rather odd, but let me just lay it out.

If the model, the comparative results, indicate, say, a 10 percent change in EC, the question then falls from that:

If the modeling is not near what the actual EC

is, does that 10 percent then mean 10 percent of it is real or does that percentage change under the real conditions?

And it's the real conditions which will cause injury, not the modeled conditions or the average conditions.

So I think this is perfectly relevant to question whether or not the data being presented indicates there's no injury to third parties.

CO-HEARING OFFICER DODUC: No injury from a -- comparison purposes of the various alternatives with the No-Action alternatives.

MR. HERRICK: But that -- But that's the problem with the -- with the Petition. We have statistical analysis of averaging -- of impacts. Nobody has taken a, say, 10 percent change in EC at any particular time and then compared that to a legal user.

So let's just hypothetically say there's a 10 percent change at the location I've -- I have on this chart. Under real conditions -- Rather than the modeling results, under real conditions, if the standard's already being violated and there's a 10 percent increase, nobody on this panel or any other panel has the background or has offered an explanation as to why or why not that doesn't constitute injury to anybody.

And so, of course, if the panel -- if the Petitioners haven't presented the connection between data and impacts -- which I think has clearly happened -- I don't know why we would proceed.

CO-HEARING OFFICER DODUC: Thank you for the commentary, Mr. Herrick.

Do you have anything to add, Mr. Mizell?

MR. MIZELL: Very briefly.

I would agree with your point that this seems relevant to Mr. Herrick's case in chief, and to the extent that the line of questioning relies upon facts that have not yet been presented into evidence, it seems disconnected from the purpose of cross, which would be to ask the witnesses to provide information helpful to this Board on the evidence that they presented and their expertise as they've outlined it to you.

So I would agree with you: This is -- This is relevant to his case in chief but not cross-examination.

MR. HERRICK: I -- I -- I don't think it's an objection or a basis for a ruling that somebody thinks it should be in a case in chief.

The cross-examination of the witnesses is not limited to what they've said specifically.

CO-HEARING OFFICER DODUC: All right. I see people starting to stand up.

Very quickly, please. Ms. Morris.

MS. MORRIS: If we're going to go into this level of detail, Mr. Herrick hasn't laid a foundation for this document.

He can't testify. He can't lay the foundation he has no foundation. He has no witness to say where this document came from, how it was prepared, what assumptions were used, and, therefore, shouldn't be allowed to ask questions about it.

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

Mr. Jackson.

MR. JACKSON: Yeah. I think my question is somewhat different.

We have a due process problem, as far as I'm concerned, having listened to this.

Basically, all the testimony about legal injury that we've heard so far is some models that do a limited number of parameters in terms of injury.

If we can't show the weakness of the model results, how are we ever going to be allowed to convince you that modeling like this is simply predicting that there's no injury? And yet they keep saying it's only useful for comparative purposes.

This whole set of testimony seems to be a red

herring. And I think Mr. -- I -- I -- John Herrick can speak for himself. I'm up sometime probably tomorrow morning.

But we're going to go through it again tomorrow morning because I can't cross-examine a model, so I have to cross-examine the modelers. And that's what John's doing here.

CO-HEARING OFFICER DODUC: All right. Thank you, Mr. Herrick, with all of that back and forth.

I will allow the line of questioning, acknowledging that the witnesses may be limited in terms of their ability to answer. And if they do not know the answer to something, they will say so.

Proceed, Mr. Herrick.

MR. HERRICK: Okay. Parviz, back to that third page of SDWA-27. And, again, we're on the Forecasted Daily EC at Old River near Middle River.

You said you did not produce this and you don't necessarily know who did, but I'm going to ask you to interpret it as best you can, if you will.

And back where we started: You see that beginning on about August, or -- excuse me -- July 21st, the Base Case and the Without Transfer start diverging; is that correct?

WITNESS NADER-TEHRANI: Yeah, I see that.

MR. HERRICK: Okay.

WITNESS ANDERSON: Excuse --

MR. HERRICK: Now --

WITNESS ANDERSON: -- me.

Could you please clarify: Does the Base Case have a transfer in there? This is the double line is without transfer. Are we supposed to assume that?

MR. HERRICK: Well, just in time, I didn't read the entire e-mail, but that's all covered in the e-mail.

WITNESS MUNÉVAR: I think it's important to know where the transfer is occurring from as well --

MR. HERRICK: Well, it's not --

WITNESS MUNÉVAR: -- whether it's Sacramento or --

MR. HERRICK: -- your time to cross-examine me. All I can do is go over the document DWR gave me.

CO-HEARING OFFICER DODUC: You opened the floodgates.

WITNESS SMITH: Well, and --

MR. HERRICK: If they want me to answer those questions, I will. I don't know if the Board wants me to.

WITNESS SMITH: I think that would be very helpful. I think you already said, you know, where you were trying to get at this.

I think the calibration of the model is online. And for this BDCP process of the model that was used for that process, and for California WaterFix, is online. And the differences, the concerns that you have, are that they be shown with observed data on there also.

And we'd probably be more comfortable, I think, looking at that because we're more familiar with that. We haven't reviewed this.

MR. HERRICK: Okay. Parviz.

WITNESS NADER-TEHRANI: Just by -- Just by looking at this information, and if I don't -- I don't know all the details, and I tried quickly to read the e-mail to see if I can get some of the answers to the questions I had.

But just by looking at this e-mail, my guess as to why you're seeing this difference -- best guess, it's a guess -- is that the assumptions that were used to drive the models in the base case and without transfer differ on the assumptions on Vernalis flow and EC, in addition to the transfer.

That's my best guess.

But if I look at the results, you know, and the assumptions -- and I'll talk to the person who did it -- then I'll get a better answer. But that's based on what I see. That's the best answer I can give.

MR. HERRICK: Well, I appreciate that. I wasn't asking you to explain the difference.

WITNESS NADER-TEHRANI: Yes. But you -- I guess you were trying to -- I think the way you presented this information, you were looking -- you know, showing those two lines and -- and implied that those are the only changes in transfer.

And I'm trying to explain what I think is happening in the model is that there probably are other changes in the model besides the changes in the export level.

But I don't know. Until I ask the person that did it, I can't say for sure. But that's the best most likely answer I can give.

MR. HERRICK: Is it reasonable to conclude that the DWR personnel who produced a forecast to measure or indicate the difference between a transfer and a non-transfer would change the criteria and the assumptions and that would be responsible?

WITNESS NADER-TEHRANI: I don't know. I'm just saying, based on past experience, a 350 cfs exchange in export level, and the place that you're showing me should not show in a -- an exchange in EC of the magnitude I'm looking at.

MR. HERRICK: And, of course, that would depend

upon whether it's a Federal or State Project taking the water in, whether the water rises, whether or not changes in flow at Vernalis has occurred, or EC has occurred; correct? All those things are factors.

WITNESS NADER-TEHRANI: All those things are factors.

So if the only change that takes place is in-basin without transfer, it's an additional 300 cfs.

And I'm assuming that 350 -- that extra 350 cfs came from somewhere, either Sacramento or San Joaquin. Then, yeah.

So I don't -- I don't anticipate a change of that magnitude in the exports, CVP or SWP, would result in the changes we're looking at.

CO-HEARING OFFICER DODUC: Miss Morris.

MS. MORRIS: I'm going to renew my objection of where the transfer is coming from, because -- Not to testify, but since everybody else seems to be, it seems that whether or not this water transfer is coming from the San Joaquin River and that's what's happening, it could require waterfront -- it would allow more fresh water to come in, and that may be showing, for instance, in this pot.

But since Mr. Herrick hasn't identified that, we have a long record where we don't really have any --

any meaningful testimony coming out of this.

CO-HEARING OFFICER DODUC: Thank you, Miss Morris. So noted.

MR. HERRICK: I don't even know what that means.

The -- The -- The whole idea of the questioning is -- I just went through was to show that different factors control and that makes differences in the outputs.

So, the fact that I didn't --

CO-HEARING OFFICER DODUC: Just proceed with your questions.

MR. HERRICK: Thank you.

(Distributing documents.)

MR. HERRICK: Okay. Parviz, as in our earlier discourse with the Hearing Officers, I'd like to ask you questions about the changes in modeling and how that translates into real-world effects. And you may not know, but let me just ask this string of questions.

Let's say that a modeling result shows a, you know, 10 percent change, and whatever the reasons for that, is there any way we know whether that 10 percent would be a 10 percent change to the real or actual numbers, or would it -- or how it might be less or more? Is there any way we can determine that ahead of time?

WITNESS NADER-TEHRANI: I don't know if there is a -- No. It's just -- What we can say is just 10 percent -- You know, if there's a 10 percent increase, that's the best estimate in terms of the changes.

MR. HERRICK: Okay. And I'm not trying to beat a dead horse, but it's possible that the 10 percent of the modeling may be some different percentage change from the actual data when the -- when that -- whatever necessarily occurs.

So let me just put it into an example.

So, if the modeling shows a 10 percent change from -- you know, during one week.

WITNESS NADER-TEHRANI: Right.

MR. HERRICK: If you took the actual data -- And you've predicted.

If you took the actual data from that week, would we expect 10 percent of that to be from the Project or would we not really know what the exact percentage would be?

WITNESS NADER-TEHRANI: I -- It would be hard, you know. This particular location is where sometimes there is a deviation between model and, you know -- and I think that's probably what you're getting at.

And this is a location that we've had issues with before. And it is somewhat -- So I would say not

the same percentage but the same actual difference, you know, would be closer to the -- You know, if you take the absolute difference between the alternative and the model and the baseline and say that that would -- that would be the best estimate for the increase over the actual, if that makes sense.

WITNESS ANDERSON: And I think the word "modeling" is being used to represent two different things here.

Sometimes modeling is talking about the modeling that was done for this Project, which was a future planning Project, and then -- But when you're comparing model to data, you're talking historical simulation of a historical period and observed data.

Because they're two different things. Because comparing the future modeling to observed data would be an incorrect kind of comparison, because they're kind of apples and oranges.

So I don't know if you can be -- When you're talking about just modeling, it's unclear to me if you're asking us questions about historical modeling or if you're asking us questions about modeling that was done for WaterFix. That is a future scenario.

MR. HERRICK: Well, both of those questions are before the Board here.

So let me ask Parviz again:

When we look at a model prediction, and say, again, there's a 10 percent change from one scenario to another, and then we look at the historical data from that same timeframe, now that we can look back, would you expect the actual data to be reflective of a different change also or may it be a different change?

WITNESS NADER-TEHRANI: It may not be 10 percent.

I would say the best estimate for the change would not be the percentage change but what would be the actual change, you know, the absolute difference between them.

MR. HERRICK: But the historical data doesn't show two scenarios. It shows one.

WITNESS NADER-TEHRANI: No.

MR. HERRICK: There's nothing to compare.

WITNESS NADER-TEHRANI: If you're planning a simulation, you run a case, and a base case, and an alternative. And you -- You know, you subtract those two and those give you an absolute change. And you can add that to your -- whatever the historical simulation -- historical observed data would show later on.

That would be the best -- That would be the best that I could say.

(Central Delta Water Agency, South Delta Water Agency (Delta Agencies), Lafayette Ranch, Heritage Lands Inc., Mark Bachetti Farms and Rudy Mussi Investments L.P. Exhibit 35 marked for identification)

MR. HERRICK: All right. So I've handed out SDWA-35.

Do you have that in front of you?

WITNESS NADER-TEHRANI: Yes, um-hmm.

MR. HERRICK: And SDWA-35 is -- I'll represent to the Board -- a printout from the Department of Water Resources' Operations and Maintenance page -- web page -- excuse me -- and from there, you can get export flows, water quality data.

And this, I guess, chart, I guess, includes the days from July 4th, 2016, to August 2nd, 2016.

Do you see that, Parviz?

WITNESS NADER-TEHRANI: Yes.

MR. HERRICK: And then it's got the four South Delta Stations with the measured EC and the 30-day running average EC; correct?

WITNESS NADER-TEHRANI: I see that, yes.

MR. HERRICK: And the reason I've handed this

out is to compare what actually happened with what was forecasted on SDWA-27 on Page 3 of that.

And so if we could just pick -- And we'll start on, let's say, July 22nd. Let's go to July 21st, excuse me.

And the forecasting shows approximately that the water quality at that location, whether it's with or without the transfer, is somewhere around 500 EC; is that correct?

WITNESS NADER-TEHRANI: At what period again?

MR. HERRICK: On July 21st.

WITNESS NADER-TEHRANI: July 21st. Yes, um-hmm.

MR. HERRICK: Yeah. And then if we go to the actual data, we see that July 21st at Old River near Middle River is .84 EC; correct? That's on SDWA-35.

WITNESS NADER-TEHRANI: I see that, yeah, um-hmm.

MR. HERRICK: So when DSM-2 modeled the future predictions under this transfer scenario, it thought that the EC at this location would be 500 EC but, in hindsight, it was actually 800 EC; is that -- 840 EC; is that correct?

WITNESS NADER-TEHRANI: That's what I see here, um-hmm.

MR. HERRICK: So, is -- As that -- As those two lines on SDWA-27 diverge, we see a difference in predictions of somewhere around, what, 100 EC at the max or maybe a little more than that?

(Witnesses confer.)

WITNESS NADER-TEHRANI: Okay. So, I think what it shows -- what it shows me, this deviation, is probably an indication of, the estimates that are used in the forecasting were significantly different from what actually occurred.

MR. HERRICK: Correct. The way one would --

WITNESS NADER-TEHRANI: I'm talking --

MR. HERRICK: -- assume that --

WITNESS NADER-TEHRANI: -- about --

MR. HERRICK: -- there's --

WITNESS NADER-TEHRANI: I'm talking about the assumptions that were used in deriving the model, not the observed data at the interior locations.

MR. HERRICK: You keep giving excellent answers to questions I haven't asked.

WITNESS NADER-TEHRANI: Okay.

MR. HERRICK: But, yes, the model is not predicting, because it's not present to predict or not -- Let me start over.

The model is not predicting what they actually

see was; correct?

WITNESS NADER-TEHRANI: I'm --

MR. HERRICK: In hindsight.

WITNESS NADER-TEHRANI: -- just saying -- Well, in order to get diagrams such as the one you put in front of me, there was some assumptions to run the model. That includes, for example -- as an example, flow at Vernalis and EC at Vernalis. That's just one example of information that's used.

What I'm trying to say is, when you get deviations such as the one you're showing me, it is a reflection -- it is possibly a reflection of the fact that the information that was used to run these model -- not the model output -- the information that was used to run the model were significantly different than what actually occurred.

MR. ADAMS1: Again, thank you for that, but I'm not asking you that.

WITNESS NADER-TEHRANI: Well, okay.

MR. HERRICK: The -- The -- The question is: A short-term prediction in the model --

WITNESS NADER-TEHRANI: Yes.

MR. HERRICK: -- and that's all this is; right? It's only, what, a month prediction.

WITNESS NADER-TEHRANI: Yes.

MR. HERRICK: A short-term prediction is substantially off from what actually happened; correct?

WITNESS SMITH: I don't know if I'd agree with "prediction."

So, I think John Leahigh -- and he may have testified to this -- is that they -- they used the forecasts to do comparisons, and sometimes they operate to that forecast and sometimes they don't.

And within that forecast, there could be issues. He did talk about issues in terms of operational issues, not being able to see storms or -- or -- or barometric effects.

But it doesn't -- These -- Either -- Looking at differences, sometimes they'll shift it up based on, you know, what happens three days later. They might change how they're going to do the operations, which may be -- you know, you could consider a prediction, but I don't think they've looked at it as a prediction.

It's a tool to look at what might happen given two different alternatives in the future.

Now, if you hindcast it and see, okay, how we did it, or if we did a historical case, that's a different situation.

MR. HERRICK: Okay. Let me get back to my questions instead of very good justifications as to why

things are wrong; okay?

I'm going to run out of time here real quickly.

Parviz, the model -- we assume it was DSM-2 -- that was trying to forecast water quality during the month of July, in hindsight, did not accurately forecast what the EC was; correct?

You've already given a long explanation as to why it might not have, but I'm just trying to get you to answer that question.

WITNESS NADER-TEHRANI: Yes. The observe -- The model output did not match the observed data.

MR. HERRICK: Okay. So does that give you any pause when you make conclusions about this Petition's modeling that might end up misleading the Board?

In other words, when you have model results that show averages over 16 years that don't exceed the standard, is that giving the Board a -- an incorrect impression as to what the actual conditions may be?

MR. MIZELL: Objection: Argumentative; assumes that the witness is trying to mislead the Board.

CO-HEARING OFFICER DODUC: I don't assume that, so I will await the answer.

WITNESS NADER-TEHRANI: I guess so.

So, we -- we use DSM-2 in two modes of operations. There's a planning mode, and that's --

that's the way we use the model when we presented the information and use information from CalSim.

And then there is -- There are the challenges that you see in front of you in trying to meet the observed data.

And I think the Board has heard issues related to the water quality issues in the South Delta before, and -- and -- and the challenges in terms of figuring out estimates that are used in the forecasting.

And I think the deviations that you're showing me is a reflection of the -- the challenges in figuring out what the assumptions should be, talking -- used in forecasts, and not necessarily a model's weakness.

WITNESS ANDERSON: So, I'd like to clarify:

There's actually three ways we use the DSM-2 model. There's the future planning, there's forecasting, and then there's historical simulations.

WITNESS NADER-TEHRANI: Yeah.

WITNESS ANDERSON: With the historical simulations, that's where we have calibrated and validated our model to observed data.

And those results would give more of a feel for the comfort level that you would want to have in using these models for planning studies, not looking at how well it forecasts something, or the operations might very

well have changed.

Do you want to look at the historical simulation where we use the actual operations and then compare it to the observed data?

WITNESS NADER-TEHRANI: And whatever Jamie said.

(Laughter.)

CO-HEARING OFFICER DODUC: Thank you, Miss Anderson.

MR. HERRICK: I appreciate the witness' desire to make this a workshop.

CO-HEARING OFFICER DODUC: Enough with the commentary, Mr. Herrick. Let's --

MR. HERRICK: But I haven't --

CO-HEARING OFFICER DODUC: Ask your question.

MR. HERRICK: I do have limited time.

CO-HEARING OFFICER DODUC: Ask your question.

MR. HERRICK: I did, and I'm not sure it's been answered yet.

Parviz, let me go back to DWR-513 and Page 3, which are your charts -- your charts of the monthly averages EC, and we were looking at EC at Old River at Tracy Boulevard.

WITNESS NADER-TEHRANI: Can we put that up, please?

MR. HERRICK: DWR-513, Page 3.
(Document displayed on screen.)
WITNESS MUNÉVAR: Yes, um-hmm.
MR. HERRICK: Now, there are only a few times when the average of your bar charts go above 700 EC; is that correct?
WITNESS NADER-TEHRANI: That's correct.
MR. HERRICK: And those are the months where the standard is 1,000 EC; correct?
I'm not trying to test you.
WITNESS NADER-TEHRANI: Yes.
MR. HERRICK: Those months are December --
WITNESS NADER-TEHRANI: That's correct.
MR. HERRICK: -- January, and those are -- those are within the time period where the .1 EC or the 1,000 EC is.
WITNESS NADER-TEHRANI: Yes, that's correct.
MR. HERRICK: Okay. Now, if the State Board is trying to analyze impacts to people and you show them a chart that are always under the standard, isn't that significantly different than presenting them with charts which show times when the standards were being violated what the effect of the Project might be?
WITNESS NADER-TEHRANI: To start off, I think we -- we -- I think we made it clear that the assumptions

at San Joaquin River, whether it's flow or salinity, is not changing. I think we made that clear.

And with that information, I think it's clear that if you're not making the changes, then the only -- and I am clear -- the only parameter that's really going to affect is salinities at Head of Old River. And, you know -- And that's the reason for the exceedance at those higher salinity that you see here.

There is nothing else to lead me to believe that any portion of California WaterFix, whether it's the North Delta Diversions or changes in the South Delta exports, would cause any salinity changes at this location.

MR. HERRICK: Okay. Should I repeat my question?

WITNESS NADER-TEHRANI: I gave you the best answer I could.

MR. HERRICK: Well --

CO-HEARING OFFICER DODUC: Perhaps if you can ask your question without insinuating devious machinations from the Department, Mr. Nader-Tehrani would be best able to answer it, Mr. Herrick.

MR. HERRICK: Well, let me approach it this way.

Under H3 scenario, aren't there additional

exports?

WITNESS NADER-TEHRANI: When you add both north and south, yes.

MR. HERRICK: Okay. Has the -- Has any of your modeling results -- Or maybe this is for Mr. Munévar.

Have -- Do any of the modeling results indicate that there'll be an increase of salt delivered south of the valley -- south end of the valley?

WITNESS NADER-TEHRANI: South of the valley. Can you describe what geographic area?

MR. HERRICK: CVP service area south of Tracy.

WITNESS NADER-TEHRANI: We only looked at EC results. And then if somebody wants to find mass of salt, they can do that.

MR. HERRICK: I don't understand that.

Does the modeling show any incremental amount of salts being delivered to the CVP service areas south of Tracy under H3?

WITNESS NADER-TEHRANI: Can you -- The exports come from either north or south. The exports that come from north are usually better quality water, so if -- and if you -- if you blend it altogether, the EIR would contain, you know, the EC output that reflects that blend.

So the overall blend results in better quality

of water. And so even with that additional volume of water, but with the better quality water, so in terms of mass purposes, we don't necessarily increase the mass of salt.

But I think a better indicator would be the actual concentration. And the answer is, no, we're not increasing the concentration at the export locations.

MR. HERRICK: I'm going to need about 10 hours apparently.

Parviz, buddy --

WITNESS NADER-TEHRANI: Yes, sir.

MR. HERRICK: -- the question was -- Let's -- Let's change it slightly.

Under any WaterFix scenario, is additional salt delivered to the CVP service area south of Tracy?

WITNESS NADER-TEHRANI: By "additional salt," you're talking about mass flow times?

MR. HERRICK: Additional salt. I'm not talking about concentrations.

WITNESS NADER-TEHRANI: Well, the only model output that I continue to look at is the water quality reflected in EC. I do not compute mass of salts.

MR. HERRICK: Is that a "yes" or a "no"?

WITNESS NADER-TEHRANI: I have not looked at mass of salt, so I don't have the answer. I gave the

best answer in terms of what I expect to see. I have not looked at it.

MR. HERRICK: Okay. So has anybody examined through modeling the potential impacts of additional salt being delivered to that service area making its way back into the river? Has any of the modeling done that?

Please don't explain to me --

WITNESS NADER-TEHRANI: No.

MR. HERRICK: Okay.

WITNESS NADER-TEHRANI: I'm not aware.

MR. HERRICK: Thank you.

So if there were additional salt load coming down the river, that would be one of the factors that determines water quality from Vernalis north into the Delta; correct?

WITNESS NADER-TEHRANI: I don't agree with that.

MR. HERRICK: Additional salt would not --

WITNESS NADER-TEHRANI: No.

Well, when you say "salt," if you talk about mass of salt, a greater mass of salt, if it comes with a greater volume of water, that doesn't necessarily affect the salinity at the South Delta.

MR. HERRICK: I didn't say it would. I asked you if it could.

WITNESS NADER-TEHRANI: It can go either way. And, so, to me, because the salinity -- combined salinity at the south, when you add the north and south, is expected to be less -- you know, going down -- in concentration, I don't -- I don't expect that there will be -- that would lead to an increase in the EC.

MR. HERRICK: This is very difficult for me to be nice.

Thank you, Parviz.

WITNESS NADER-TEHRANI: I don't mean to give you a hard time. I'm -- I'm just --

CO-HEARING OFFICER DODUC: I'm staying out of this.

WITNESS NADER-TEHRANI: I'm giving the best answer I can.

MR. HERRICK: I don't mean to give you a hard time. Okay.

WITNESS NADER-TEHRANI: I've not been computing mass of salt because, to me, that's not a driver in terms of water quality at a record location.

MR. HERRICK: But just for the record, Parviz, do you understand that the Regional Board criteria is in massive amounts of loads, not even concentrations?

WITNESS NADER-TEHRANI: I don't know the answer.

CO-HEARING OFFICER DODUC: I think, at this point, I'm going to call a timeout. I think we need to adjourn for the day, unless, Mr. Herrick, you'd like further punishment this afternoon.

MR. HERRICK: I will agree to that.

And I will try to hone my questioning skills to -- to expedite this process.

CO-HEARING OFFICER DODUC: I would appreciate that, Mr. Herrick. I -- I firmly believe you have some valid issues that you would like to cover, and I strongly encourage you to reframe your question in a manner that would facilitate the witness answering of those questions.

MR. HERRICK: I will abide by your wisdom.

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

And on that note, thank you all, and we will reconvene at 9 o'clock tomorrow.

Hang on. Hold on.

Mr. Herrick, you need to talk to staff because you apparently have not submitted a form for your exhibits.

MR. HERRICK: He already told me that.

CO-HEARING OFFICER DODUC: And a reminder -- Okay. I guess perhaps as a reminder for everyone else.

Reminder: If you're using exhibits for cross-examination, please fill out an exhibit I.D. Index form, submit it to staff.

And with that, we will -- Mr. Jackson.

MR. JACKSON: If you're not -- If you haven't used the State Board's exhibits and the exhibits that --

CO-HEARING OFFICER DODUC: Hang on. Hang on.

We're still on the record, so if you could please come up so that the court reporter can hear you.

MR. JACKSON: If you're not planning on introducing any new documents, you don't need to fill out this form?

CO-HEARING OFFICER DODUC: That's correct.

MR. JACKSON: Thank you.

CO-HEARING OFFICER DODUC: All right. With that -- we've given Mr. O'Laughlin enough amusement for the day -- we'll adjourn and re-convene at 9 o'clock tomorrow.

(Proceedings adjourned at 4:42 p.m.)

State of California)
)
County of Sacramento)

I, Candace L. Yount, Certified Shorthand Reporter for the State of California, County of Sacramento, do hereby certify:

That I was present at the time of the above proceedings;

That I took down in machine shorthand notes all proceedings had and testimony given;

That I thereafter transcribed said shorthand notes with the aid of a computer;

That the above and foregoing is a full, true, and correct transcription of said shorthand notes, and a full, true and correct transcript of all proceedings had and testimony taken;

That I am not a party to the action or related to a party or counsel;

That I have no financial or other interest in the outcome of the action.

Dated: August 31, 2016

_____
Candace L. Yount, CSR No. 2737