BEFORE THE

CALIFORNIA STATE WATER RESOURCES CONTROL BOARD

CALIFORNIA WATERFIX WATER RIGHT CHANGE PETITION HEARING	)))

JOE SERNA, JR. BUILDING

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

COASTAL HEARING ROOM

1001 I STREET

SECOND FLOOR

SACRAMENTO, CALIFORNIA

PART 1

Thursday, April 27, 2017

9:30 A.M.

Volume 37

Pages 1 - 272

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

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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
Conny Mitterhofer, Supervising Water Resource Control Engineer
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 Biggs-West Gridley Water District (BWGWD) and Glenn-Colusa Irrigation District (GCID):

Andrew M. Hitchings

For The City of Roseville, Sacramento Suburban Water District, San Juan Water District, The City of Folsom, Yuba County Water Agency and The City of Roseville:

Ryan Bezerra

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 City of Antioch:

Matthew Emrick

For California Sportfishing Protection Alliance (CSPA), California Water Impact Network (C-WIN), and AquAlliance:

Michael Jackson

For Clifton Court, L.P.:

Suzanne Womack

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.

For North Delta Water Agency & Member Districts:

Meredith Nikkel

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 Wasiewski

For California Water Research:

Deirdre Des Jardins

APPEARANCES (Continued)

INTERESTED PARTIES (Continued):

For The City of Stockton:

Kelley Taber

For County of San Joaquin, San Joaquin County Flood Control and Water Conservation District, and Mokelumne River Water and Power Authority:

Thomas H. Keeling

For North San Joaquin Water Conservation District:

Jennifer Spaletta

For State Water Contractors:

Stefanie Morris

For Nevada Irrigation District (NID), Butte Water District (BWD), Richvale Irrigation District (RID), Anderson - Cottonwood Irrigation District, Plumas Mutual Water Company (PMWC), Reclamation District 1004, South Feather Water and Power Agency, Western Canal Water District (WCWD) and Paradise Irrigation District:

Dustin C. Cooper

I N D E X

Thursday, April 27, 2017 9:30 a.m.

PROCEEDINGS

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CO-HEARING OFFICER DODUC: Good morning, everyone. It is 9:30.

Welcome back to the State Water Board Water Rights Change Petition hearing for the California WaterFix Project.

I am Tam Doduc. Joining us shortly will be, sitting to my right, Board Chair and Co-Hearing Officer Felicia Marcus, and also joining us will be Board Member Dee Dee D'Adamo.

To my left are Dana Heinrich, and please welcome Conny Mitterhofer, our new Supervising Water Resource Control Engineer, who will be now joining us, then Diane Riddle's next, and Kyle Ochenduszko to my far left.

Also assisting us today will be Miss McCue and Mr. Hunt.

Usual announcement: Speak into the microphone, speak clearly, begin by identifying yourself and your affiliation because this is being Webcasted, recorded, and our court reporter is here. Make arrangements with her separately if you would like to have the transcript sooner than at the end of Part 1, which is when we will

have it posted.

Second announcement is -- Actually, I switched the order.

Second announcement is to identify: If you need to the exit closest to you in the event of an alarm, follow Mr. Herrick.

Mr. Herrick will lead us down the stairways, not the elevator, to the first floor and across the street, observing all traffic signal directions, to the park where we will gather and wait for the all-clear signal to return.

And, finally, and most importantly, as always, please take a moment and put all your noise-making devices on silent or vibrate. And I'm particularly sensitive to this, as you know, because I listen intently to every word that is spoken during this hearing. So please take a moment and double-check.

All right. Before we get into it, Miss Heinrich, I will ask you to clarify an issue that I believe was raised by Miss Des Jardins yesterday regarding the final EIR/EIS.

MS. HEINRICH: Yes. So during cross-examination yesterday, Miss Des Jardins commented on the fact that we don't have a link on our website to the Final EIR which is identified as a Board staff

exhibit.

And I think that we've indicated previously that because staff are no longer planning on offering staff exhibits into evidence, we don't plan to update that page. So it's incumbent on any parties who want to offer those exhibits into evidence to do so on their own.

And because the Final EIR is a public document and it's already posted, I believe, on DWR's website, we don't believe it's necessary to create a link on our own website.

I confirmed with Mr. Mizell yesterday that DWR does not intend to offer that exhibit into evidence during this phase of the hearing, so if parties wish to use excerpts from that document for purposes of cross-examination, they should reproduce those excerpts and label them as a cross exhibit when we introduce the excerpts on the Final EIR.

CO-HEARING OFFICER DODUC: Any questions about that?

Any other housekeeping matter that we need to get into?

Okay. Mr. Bezerra.

MR. BEZERRA: Ms. Doduc, in the previous portion of the hearing, we had a no-ties-on-Friday policy, and I don't want to anger the Hearing Officer

by -- I'm wearing a tie now so I want to confirm --

CO-HEARING OFFICER DODUC: On Friday, that will always be the case, as long as I'm the Hearing Officer.

MR. BEZERRA: Thank you very much. Much appreciated.

CO-HEARING OFFICER DODUC: All right. Also, I've been advised that it might be a bit inhumane to go from 9:30 to the lunch break without a break, yes, so we will strive to take a break and I'll look to Mr. Hitchings and other cross-examiners to find a natural break between 10:30 and 11:00 for us to take a very short break.

Miss Meserve.

MS. MESERVE: Good morning.

CO-HEARING OFFICER DODUC: I don't believe that microphone's on.

MS. MESERVE: Good morning. I just wanted to -- Osha Meserve for Land, et al.

On the FEIR subject, I do note that some of the DWR exhibits do cite to the Final EIR. So I don't know how to handle that issue as -- you know, in terms of this apparent position of the Petitioners that the Final EIR is not part of the evidence for this proceeding because their own witnesses have, in fact, cited to it and those portions are not included as excerpts otherwise, I do not

believe.

So I believe it does sort of pose an evidentiary problem, and I don't know what to do about it, but I do want to raise that to you.

CO-HEARING OFFICER DODUC: Okay. Mr. Mizell.

MR. MIZELL: Tripp Mizell, Department of Water Resources.

It's not the position of the Department that it won't be admitted into evidence. It's the position of the Department it'll be admitted into evidence during Part 2 once the Final EIR is certified.

We feel that it would be inefficient to belabor the hearing record with two full copies of the Final EIR/EIS, and the more appropriate one to use, in our opinion, would be the Certified Final EIR/EIS.

So it doesn't pose an evidentiary issue because the record won't be closed until the conclusion of Part 2.

So, at this point, it's our feeling that we can cite to the Final EIR/EIS. It's a public document. People have had access to it for quite some time now, and it will be admitted into evidence before the close of the entire hearing.

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

Miss Meserve.

MS. MESERVE: Sorry.

CO-HEARING OFFICER DODUC: I see you are not satisfied.

MS. MESERVE: Yes. I guess I'd just object to that procedure. I don't think it makes any sense.

If they've cited to the Final EIR, they should be -- just like the other parties to this case, be required to put forth. They should have put forth those parts of the Final EIR on which the testimony relies so that we could review it and what not, and so that it would be part of Part 1.

Because their experts have identified that this is somehow relevant to Part 1 and -- you know, so I had noticed this with respect to some of the testimony of Bryan cites to the Final EIR.

However, you know, in discussions with the previous panel on groundwater, of course, they're referring to mitigation measures that have been revised in the Final EIR and what not.

So it doesn't -- I understand not having a hearing record that is overly burdensome, but I believe that the Petitioners should have at least provided the excerpts of the things upon which their experts rely on, if not the entire Final EIR if they expect the

evidentiary weight to be given to their citations to this document.

The fact that it's out there available somewhere, I think we disposed of that kind of argument back with the modeling, that it needed to be brought forth as evidence, and I think the same would be here for the Final EIR.

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

Before you get up, Mr. Mizell, I see nodding heads in the audience. Let's get it on record.

Does anyone wish to join in on Miss Meserve's objection?

MR. EMRICK: Thank you, Chair Doduc. Matthew Emrick, City of Antioch.

And I'll join in with Miss Meserve's objection.

MR. JACKSON: Michael Jackson on behalf of the CSPA parties.

We think the objection is well taken and we -- and we join.

MS. WOMACK: Suzanne Womack, Clifton Court L.P.

I would like to join in as well. Thank you.

MR. HERRICK: John Herrick, South Delta Water Agency, et al.

Any portions that have been cited to need to be

provided. We join in the objection.

CO-HEARING OFFICER DODUC: Thank you.

Now, Mr. Mizell.

MR. MIZELL: The citations that our witnesses provide in their testimony are quite clear. They reference to page numbers, chapter numbers, section numbers. The document is public and all of these parties who have objected actually probably have a copy of it already in their offices.

So I would think that by following the page numbers and section numbers and other citations that our witnesses provide, they can clearly find where we're citing to in the large document.

Again, I think it's duplicative if we start submitting large portions of this final document ahead of when the whole is submitted into evidence.

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

We will take it under advisement and we will get back to you shortly on that.

With that, we are now up to the cross-examination of Mr. Milligan.

Did you have a question, Miss Aufdemberge?

MS. AUFDEMBERGE: Yeah. This is back on house cleaning. This is -- This one (indicating microphone)?

CO-HEARING OFFICER DODUC: Yes, use that one.

MS. AUFDEMBERGE: Mr. Milligan informs me he's available until 1 o'clock today. So if we have any -- I think we've estimated cross-examination to be about three hours. If it goes longer than that, we might have to schedule another day for him to appear.

CO-HEARING OFFICER DODUC: Okay. Let's see how it goes.

Let me -- Before we do that, let me run down the list. I see some new faces, particularly Mr. Jackson. So let me run down who I currently have for cross-examination, and then we will amend -- append as necessary.

I have Mr. Hitchings, who is already ready, for 45 to 60 minutes, followed by Mr. Bezerra for about 30 to 45 minutes, and that will be Group 7.

Group 8, Miss Nikkel has estimated five to 10 minutes.

Then I have, I believe, Group 18 for about 15 minutes.

Miss Meserve, Group 19, for 10 minutes or so.

Mr. Herrick estimated five to 10 for Group 21.

And Miss Des Jardins, Group 37, estimated 45 minutes.

And what else wishing to cross-exam? Please

come up, identify yourself, and give me a time estimate, please.

MR. JACKSON: Michael Jackson on behalf of the CSPA parties. I would estimate 15 to 20 minutes.

CO-HEARING OFFICER DODUC: And you are Group 31.

MR. JACKSON: Yes.

CO-HEARING OFFICER DODUC: All right. Mr. Hitchings, please begin as soon as Mr. Milligan and his counsel come up and have a seat.

Ready, Mr. Milligan?

WITNESS MILLIGAN: Yes, I am.

CO-HEARING OFFICER DODUC: Mr. Hitchings.

MR. HITCHINGS: Okay. Good morning, Board Members, Board staff. And good morning, Mr. Milligan.

Andrew Hitchings for protestants Glenn-Colusa Irrigation District and Biggs-West Gridley Water District.

I'll be doing the lead cross-examination for the Sac Valley Water User Group, and then there will be some other questions following after I do the lead for that group.

CO-HEARING OFFICER DODUC: And before Mr. Hitchings begins, I would like to get clarification from Mr. Berliner.

I do not have you as representing the Department of the Interior.

MR. BERLINER: I've been asked by Miss Aufdemberge if I would provide assistance to her, so I'm here on a temporary basis, just providing assistance to the Department -- to the Bureau of Reclamation. I'm not counsel of record.

CO-HEARING OFFICER DODUC: Okay.

Mr. Hitchings, please begin.

MR. HITCHINGS: Yes. If you'd like, I can just go through quickly the topics.

CO-HEARING OFFICER DODUC: Yes.

MR. HITCHINGS: It's actually going to track pretty much the key points on rebuttal that are summarized in Mr. Milligan's rebuttal testimony, and those are the bullet points with regard to operational philosophy and water supply reliability, using fall exports, and Joint Point of Diversion, conveying fall water, and with regard to storing water in upstream reservoirs, and then the health and safety pumping levels issue.

CO-HEARING OFFICER DODUC: Thank you.

MR. HITCHINGS: And I have a highlighted copy of Mr. Milligan's testimony that -- I have additional copies that I have ready to bring up on the screen. I

have additional written copies. I'm not sure if the Board Members or staff would like those. It might help Mr. Milligan and counsel. But it will be brought up on the screen, if that's helpful.

(Documents distributed.)

MR. HITCHINGS: And if you could bring up -- It's labeled GCID-22. And this is the next exhibit in -- in order.

(Document displayed on screen.)

MR. HITCHINGS: Actually, I'm sorry, it's GCID-21. I apologize.

(Document displayed on screen.)

MR. HITCHINGS: Thank you very much.

RON MILLIGAN,

called as a witness by the Petitioners, having been previously duly sworn, was examined and testified as follows:

CROSS-EXAMINATION BY

MR. HITCHINGS: So, Mr. Milligan, I'd like to start out if I could:

Did anyone assist you in preparing your rebuttal testimony?

WITNESS MILLIGAN: Yes.

MR. HITCHINGS: And who was that that assisted you?

WITNESS MILLIGAN: Several of my staff, and several of the other modeling folks that will be testifying, provided some information about.

MR. HITCHINGS: And did you prepare the figures and tables that are in your testimony?

WITNESS MILLIGAN: They were prepared under my supervision.

MR. HITCHINGS: Who in your staff assisted you with the preparation of rebuttal testimony?

WITNESS MILLIGAN: Miss Parker and Kristin White with the Bureau of Reclamation.

MR. HITCHINGS: And did Ms. Parker assist with the preparation of the figures and tables that are in your testimony?

WITNESS MILLIGAN: I believe she -- she did but she may have also had some help from Miss White.

MR. HITCHINGS: Okay. I'd like to start with -- If you can refer to the four citations and quotations of excerpts of prior testimony by Mr. Bourez, and those are at the -- at the outset of your testimony here on GCID-21. And this is just a highlighted version of your actual written rebuttal -- rebuttal testimony DOI-36.

And in referring to those four citations, is there anything that's stated in those excerpts of

testimony that indicates that MBK's modeling submitted in this proceeding fails to follow any rule, regulation or written policy?

WITNESS MILLIGAN: (Examining document.)

Of the category of things that you mentioned, not that I'm aware of.

MR. HITCHINGS: And is it at least possible that, with Cal~WaterFix Project in place, the CVP and SWP could be operated as Mr. Bourez states in those excerpts of testimony?

WITNESS MILLIGAN: (Examining document.)

There are many ways that the two Projects could be operated, and this is a possible way, at least as it relates to the monthly time step and the resolution you would see in CalSim.

MR. HITCHINGS: Okay. Thank you.

I'd like to move on to the operational philosophy portion of your testimony.

MR. HITCHINGS: And if you can scroll down to the bottom of Page 1, and then it continues on to the top of Page 2, that highlighted section.

(Document displayed on screen.)

MR. HITCHINGS: And if you could just quickly read that, I'd like to ask a few questions associated with that highlighted section.

CO-HEARING OFFICER DODUC: I don't think we need to verbally read it.

MR. HITCHINGS: No, I'm sorry. I'm sorry.

THE WITNESS: (Examining document.)

MR. HITCHINGS: Just to get your bearing.

And I think the key item is that (reading):

"The CVP is and always has been operated to make full use of excess water during wet periods and used stored water to supplement releases and deliveries when adequate water is not otherwise available. The use of Cal WaterFix would not change this operational philosophy."

WITNESS MILLIGAN: Yes, I see that.

MR. HITCHINGS: And, to your knowledge, does the Petitioners' modeling for the Project reflect this operational philosophy?

WITNESS MILLIGAN: I think generally it does, yes.

MR. HITCHINGS: And is this operational philosophy, is it mandated under any particular rule, regulation or written policy?

WITNESS MILLIGAN: Specifically, no, but it has been the practice over the decades of the operations of the Projects and, to a large part, how the Project would -- particularly the CVP was designed and

contemplated certainly does.

MR. HITCHINGS: Okay. So is it possible that, with the Cal~WaterFix Project in place, the CVP could be operated in a manner that does not comply with this operational philosophy?

WITNESS MILLIGAN: It is possible that the Project could -- could be reoperated either with or without California WaterFix to change that operational philosophy.

MR. HITCHINGS: And can you say with certainty that Reclamation's operational philosophy for the CVP will never change in the future?

WITNESS MILLIGAN: I would say no, but I -- You know, my current understanding as to whether contractual obligations and regulatory requirements would be, this -- this has proved to be the most efficient way to use the -- both the infrastructure that we have available to us and our current understanding of the hydrology.

MR. HITCHINGS: But -- But your answer to the question is, is that it's possible that that -- that operational philosophy could change in the future.

WITNESS MILLIGAN: It is possible it could.

MR. HITCHINGS: Okay. I'd like to move on to the portion of your testimony that emphasizes using fall exports to increase allocations south of the Delta and

that really has bearing with the use of the Joint Point of Diversion.

So if we could refer to Page 3, first full paragraph. There's a highlighted section there.

(Document displayed on screen.)

MR. HITCHINGS: And if you could just read that to yourself and let me know when you're finished.

WITNESS MILLIGAN: (Examining document.)

MR. HITCHINGS: And the key sentence that we will focus on is the -- that my questions will focus on is the last underlined sentence.

WITNESS MILLIGAN: I see it there.

MR. HITCHINGS: So, consistent with this written rebuttal testimony of yours, Petitioners' modeling assumptions for the proposed action do not incorporate the use of Joint Point of Diversion as part of the South-of-Delta allocations process; correct?

WITNESS MILLIGAN: I am speaking to the typical allocation process that we do in actual operations. And typically we do not factor in the use of joint point and large quantities when making allocations.

MR. HITCHINGS: And for the actual modeling assumptions for -- with the Cal WaterFix in place, the Petitioners' modeling doesn't incorporate the use of Joint Point of Diversion as part of the allocations

process; is that correct?

WITNESS MILLIGAN: This may be more of a modeling intricacies of CalSim. I do know that CalSim does identify some use of joint point.

To agree that that joint point is driving the allocations in CalSim, that is possible, but the reality is that joint point is typically not something that has proved to be reliable enough to actually incorporate to our true allocation process year to year.

MR. HITCHINGS: So are you saying you don't know whether the use of joint point is included in Petitioners' modeling with regard to South-of-Delta allocations process?

WITNESS MILLIGAN: I do not know if the current version of CalSim as included in Petitioners' submittal is actually driving the allocations in a particular year, no.

MR. HITCHINGS: Petitioners' own modeling shows that, with the Cal~WaterFix Project in place, there would be less water available on average for CVP's South-of-Delta deliveries than under the No-Action Alternative; isn't that correct?

WITNESS MILLIGAN: That is correct, on average.

MR. HITCHINGS: And do you know how much less water on average those deliveries will be with the

Project in place as compared to the No-Action Alternative?

WITNESS MILLIGAN: In terms of the modeling, no, I do not, top of my head.

As we've stated in some of our other testimony, that the exact proportions between the CVP and the State Water Project have yet to be worked out.

But as illustrated in the modeling specific as CalSim has identified it, if one were to parse out between the CVP and the State Water Project, the CVP in a number of years would have received less water than we would under the No-Action.

MR. HITCHINGS: And going back to the last underlined sentence in this section of your testimony, it is still possible that, with the Cal~WaterFix Project in place, the use of Joint Point of Diversion could be incorporated into the allocation process; isn't that correct?

WITNESS MILLIGAN: With a number of criteria and to address, let's say, potential uncertainties, it is possible in the future that some level of joint point could be used in a future allocation process, but that is not necessarily consistent with what's currently done.

So the answer is, yes, it could be possible in the future.

MR. HITCHINGS: Thank you.

Are you aware whether Reclamation in the past regularly conveyed CVP water through the Banks Pumping Plant when Reclamation was operating the CVP under State Water Board decision D-1485?

WITNESS MILLIGAN: Yes.

MR. HITCHINGS: Do you know to what extent this did occur?

WITNESS MILLIGAN: This preceded the period where I was working within CVP operations, but there were some years there, is my recollection from the record, that were fairly high. But, again, those were later in the fall and typically after the irrigation season had played out.

MR. HITCHINGS: And are you familiar with the -- You are familiar with the 2008 OCAP Biological Opinion --

WITNESS MILLIGAN: Yes, I am.

MR. HITCHINGS: -- correct?

WITNESS MILLIGAN: The Fish and Wildlife Service.

MR. HITCHINGS: I'm sorry?

WITNESS MILLIGAN: The Fish and Wildlife Service 2008 opinion.

MR. HITCHINGS: Yes. Thank you.

If we could pull up GCID-22.

(Document displayed on screen.)

MR. HITCHINGS: This is a -- a highlighted excerpts of State Water Board staff Exhibit 87 and so I'm going to -- I've labeled this GCID-22 which is the next exhibit in order for that Protestant.

CO-HEARING OFFICER DODUC: Hold on, Mr. Hitchings.

Mr. Jackson.

MR. JACKSON: Yes.

CO-HEARING OFFICER DODUC: Is your microphone on?

MR. JACKSON: Thank you.

I'd actually like to hear sort of an offer of proof for this document.

As someone who has been rigorously revised in regard to Fish and Wildlife, I don't really understand why this is a Part 1 issue and not a Part 2 issue.

CO-HEARING OFFICER DODUC: Good question.

Mr. Hitchings?

MR. HITCHINGS: I think we're going to get to that. This portion, the excerpted highlights that I have in this document, it's a lengthy document and so this is 8 pages. I've highlighted the section that talks about the use of the Joint Point of Diversion within the

Project description for OCAP operations, which includes CVP operations.

CO-HEARING OFFICER DODUC: Please proceed, Mr. Hitchings.

But, Mr. Jackson, I appreciate that note. You're on your toes today.

CO-HEARING OFFICER MARCUS: He probably won't be given any brownie points any time soon.

CO-HEARING OFFICER DODUC: No. No brownie points, Mr.~Jackson.

MR. HITCHINGS: Okay. Thank you.

If we could move to -- I think it's on .pdf Pages 8 and 9 of this document, and it's Page 27 of the BiOp, 26, 27.

(Document displayed on screen.)

MR. HITCHINGS: This is the section of the BiOp, the Fish and Wildlife Service BiOp, that includes the Project description of this evaluated for ESA consultation.

And looking at the second highlighted bullet, this -- If you actually go up a little bit higher on this page --

(Scrolling up document.)

MR. HITCHINGS: Yeah.

-- it says (reading):

"In general, the Joint Point of Diversion capabilities will be used to accomplish four basic objectives."

And if we could scroll down to that second highlighted bullet point of the four objectives --

(Scrolling down document.)

MR. HITCHINGS: -- it indicates that (reading):

"When summertime pumping capacity is available at Banks . . . and CVP Reservoir conditions can support additional releases, the CVP may elect to use Joint Point of Diversion capabilities to enhance annual CVP South-of-Delta" deliveries.

So with that as part of the project description, under current CVP operations, Reclamation could use Joint Point of Diversion capabilities consistent with this objective; isn't that correct?

WITNESS MILLIGAN: When -- When both capacity is available and can be supported by additional releases upstream, yes.

MR. HITCHINGS: And are you aware whether Reclamation may have any plans to seek dedicated capacity at Banks if the Cal~WaterFix Project is approved?

WITNESS MILLIGAN: That would be -- That would kind of fall under the -- the efforts of trying to understand how the two Projects would operate in

conjunction with the WaterFix in place. And as I said, that has not come -- that has not been completed. There's still a lot of work to be done there.

One element of that could be some -- some dedicated capacity, but we are far from coming to any resolution of that.

MR. HITCHINGS: But does -- does that mean that Reclamation does have current plans in the work to seek that dedicated capacity?

WITNESS MILLIGAN: Our only plans are to work with the State on how we would share available supplies with WaterFix in place because, as you pointed out, that without any changes, it does appear that the CVP would receive virtually the same or just slightly less water than the No-Action Alternative.

MR. HITCHINGS: And are you aware whether any CVP contractors south of the Delta have requested Reclamation to obtain dedicated capacity at Banks if the Cal~WaterFix Project is approved?

WITNESS MILLIGAN: There is -- I've heard some discussion of that but I've not seen a formal proposal.

MR. HITCHINGS: And so it is possible that Reclamation could obtain dedicated capacity at Banks if the Cal~WaterFix Project is approved; isn't that correct?

WITNESS MILLIGAN: The -- It is -- Well, it is

possible. It is possible without approval of the WaterFix that we could negotiate some dedicated capacity with the State Water Project at Banks as well.

MR. HITCHINGS: Okay. And I'd like to refer back to your rebuttal testimony and that's going back to the highlighted GCID Exhibit 21.

(Document displayed on screen.)

MR. HITCHINGS: And if we could go to Page 3 of that, bottom of the page, and it's within that last whole paragraph.

If you could just take a moment to read that portion of your testimony.

WITNESS MILLIGAN: (Examining document.)

Yes, I see it there.

MR. HITCHINGS: In that first sentence, Item 2 provides that California WaterFix is expected to reduce the risk of diverting allocated water to its South-of-Delta contractors; correct?

WITNESS MILLIGAN: (Examining document.)

We talk about the greater ability to capture excess unstored excess flows in the wet periods.

And to --

MR. HITCHINGS: And -- Sorry.

But one of the points of that is, it's expected to reduce the risk of delivering allocated water to

South-of-Delta contractors; correct?

WITNESS MILLIGAN: Due to -- Through Delta restrictions, yes.

MR. HITCHINGS: And the way to reduce that risk is to allow Reclamation to convey water in upstream reservoirs for Delta exports more throughout the year.

Is that a fair characterization?

WITNESS MILLIGAN: That's probably not how I would have recharacterized this particular point.

I think the point here was driving at something like Old and Middle River flow constraints where it may not be excess conditions. We may be in balanced condition potentially in the Delta.

But because of constraints under the current Fish and Wildlife Service Biological Opinion, restrictions on the amount of reverse flow in Middle and Old River could be alleviated by the existence of new conveyance in the northern diversion point.

And that's really what that second point was -- was driving at, not an ability to move greater volumes of CVP water in the summer period.

MR. HITCHINGS: Well, has Reclamation produced any plan for how it would operate the CVP with Cal WaterFix in place to use that greater ability to convey stored water throughout the year?

WITNESS MILLIGAN: We have not completed any plans along those lines.

But generally between -- It does appear, with the joint operations of the two Projects, these are the two benefits that we see from the Projects as it's currently configured.

MR. HITCHINGS: And has Reclamation proposed any operational limits on its exercise of that greater ability that Cal WaterFix would provide for conveying stored water throughout the year for export?

WITNESS MILLIGAN: Not beyond what's generally described in the CalSim modeling at this point.

MR. HITCHINGS: And that's to -- Those are just modeling assumptions, not operational limits; correct?

WITNESS MILLIGAN: That is -- That -- That's a fair statement.

MR. HITCHINGS: In the second sentence in that highlighted portion there, you state that (reading):

". . . Prioritizing upstream storage in the fall . . . would likely be further emphasized once the California WaterFix is operational."

Is there any rule, regulation or written policy that requires Reclamation to prioritize upstream storage in the fall?

WITNESS MILLIGAN: No.

MR. HITCHINGS: And when you say this priority would likely be further emphasized, it's still possible that may not occur; correct?

WITNESS MILLIGAN: Well, we may find that we're not able to capture as great of the excess flows in the Delta in the wintertime, so we may end up being back at the similar position that we are today.

But we do anticipate a greater ability to capture wintertime flows and to be able to operate entrainment risks better in more balanced conditions in the winter and spring.

So we do believe that is a benefit and the byproduct of the new conveyance and Point of Diversion, and that is -- if that does come to fruition, then we would probably have less emphasis to try to reposition stored water in the fall upstream and move that into San Luis Reservoir.

MR. HITCHINGS: Well, I --

WITNESS MILLIGAN: That's the --

MR. HITCHINGS: -- appreciate the detail on that, but the question was:

It's -- It's possible -- Even though you say it's likely to be further emphasized, it's possible that may not occur; correct?

WITNESS MILLIGAN: That is possible.

MR. HITCHINGS: And then in the third sentence, you state (reading):

". . . It is unlikely Reclamation would choose to move additional stored water in the fall with the Cal WaterFix in place at the expense of overall upstream . . . storage."

Again a similar question: Although you state it is unlikely, it's still possible that Reclamation could choose to move additional stored water; correct?

WITNESS MILLIGAN: It is possible.

MR. HITCHINGS: And notwithstanding any modeling assumptions, under actual operations with the Cal WaterFix in place, Reclamation will still have some discretion to decide whether to release more stored water from upstream reservoirs and export it; correct?

WITNESS MILLIGAN: I believe Reclamation will assess the particulars at that point in time, hydrology, relative storage amounts, and make a decision if available capacity is available, yes.

MR. HITCHINGS: And so they -- they would retain that discretion to release more stored water provided they meet any baseline regulatory requirements; correct?

WITNESS MILLIGAN: I think we would make that decision, though, also in light of the various

contractual obligations we have in addition, yes.

MR. HITCHINGS: And you'll make that decision within Reclamation's discretion as to how to operate the Project; correct?

WITNESS MILLIGAN: Yes.

MR. HITCHINGS: Okay. I'd like to refer to SVWU-107. And I have that on the flash drive. If we could just pull that up.

(Document displayed on screen.)

MR. HITCHINGS: And it's on Page 14, Figure 7.

(Document displayed on screen.)

MR. HITCHINGS: And this is the MBK written testimony during the Sac Valley Water User case in chief.

And Figure 7, this shows the Petitioners' modeling of the preferred alternative in the modeling under the preferred alternative.

Jones exports decrease by an annual average of 24,000 acre-feet; is that correct?

WITNESS MILLIGAN: That does appear what MBK's analysis shows, yes.

MR. HITCHINGS: And had you reviewed that analysis as part of preparing your written rebuttal testimony?

WITNESS MILLIGAN: Yes. But I will say, in light of our previous testimony, that we -- that the

specific breakdown between CVP operations and State Water Project operations still has yet to be determined, so these specific breakdowns between exact -- And this is a good example.

Up at Jones Pumping Plant, although that's what is in the CalSim modeling, may not ultimately be how we divide up the available supplies between the two Projects.

MR. HITCHINGS: Well, under actual operations with Cal WaterFix in place, in your opinion, do you believe Reclamation would decrease South-of-Delta deliveries and increase upstream storage as the modeling of the preferred alternative suggests?

WITNESS MILLIGAN: I think it is very possible that, with -- a scenario that we do increase upstream storage and have an agreement with the State where we would have equal or slightly better Delta pumping for delivery to CVP.

And that will all depend on how we proportion ownership or -- and/or payments, or renting, if you will, of capacity within the new tunnel facility, all yet to be negotiated.

MR. HITCHINGS: But if you have water available to -- which would be a tradeoff versus increasing upstream storage as opposed to reducing South-of-Delta

deliveries, do you believe that Reclamation would operate the Project -- operate the Project with the Cal WaterFix in place under that scenario?

WITNESS MILLIGAN: The scenario that you describe, probably not the only choice, but I don't think that we would -- we would ultimately come to agreement to an operating scenario that comes to that kind of conclusion.

In essence, if I understand your question, is, that is an operational scenario that limits the CVP's ability to move water South-of-Delta and leaves it stranded upstream is probably not a scenario that we would ultimately find acceptable.

MR. HITCHINGS: Okay. Thank you.

I'd like to go back to GCID Exhibit 21.

(Document displayed on screen.)

MR. HITCHINGS: This is the highlighted version of your testimony.

And if we could go to Page 6, there's a highlighted section there as well.

(Document displayed on screen.)

MR. HITCHINGS: In this section of your testimony, you generally criticize MBK's modeling because it includes too many years in which there is a zero allocation to the CVP South-of-Delta contractors.

Is that a fair characterization?

WITNESS MILLIGAN: Well, I probably wouldn't characterize it quite that way.

But in our earlier land discussion where there is a possible scenario of operations, I think that if this was a proposal of shifting our operational strategy, it probably has a -- it skews, although potentially on an average annual basis, higher deliveries, it does create many more zero allocation years for Water Service Contractors than we would probably find acceptable and/or probably a futility to our contractor base.

MR. HITCHINGS: Well, let's -- let's go through that, then. So if we look at Figure 1.3A --

(Document displayed on screen.)

MR. HITCHINGS: And if we can scroll up on that a little bit to see the whole --

(Scrolling up document.)

MR. HITCHINGS: I'm sorry. So you can see the whole figure.

(Document displayed on screen.)

MR. HITCHINGS: Correct.

So this compares CVP South-of-Delta allocations in the Petitioners' modeling and MBK's modeling under the No-Action Alternative; correct?

WITNESS MILLIGAN: Yes. This 1.3(a) is the

comparison of No-Action alternatives.

MR. HITCHINGS: Okay. And so a dot on the bottom line that's designated 0 percent indicates a year in which the relevant modeling depicts a 0 percent allocation to South-of-Delta contractors; correct?

WITNESS MILLIGAN: Yes.

MR. HITCHINGS: And in Figure 1.3A, there's seven dots on the 0 percent allocation line, which reflects MBK's modeling, and there's three blue dots -- So there's seven red dots for MBK and three blue dots on that line that reflect Petitioners' modeling; correct?

WITNESS MILLIGAN: Yes.

MR. HITCHINGS: And so for the No-Action alternatives, there -- there are four years in which Petitioners' modeling shows an allocation to CVP South-of-Delta contractors when MBK shows a 0 percent allocation to those contractors; correct?

WITNESS MILLIGAN: Yes. Or additional years, yes.

MR. HITCHINGS: And then if we could go to Figure 1.3B.

(Document displayed on screen.)

MR. HITCHINGS: And your understanding is, this is the comparison with the Cal WaterFix in place; correct?

WITNESS MILLIGAN: Yes. We've got a nomenclature that we -- the H3+ and Alt 4A for MBK.

MR. HITCHINGS: And -- And in this instance, there are six red dots on the 0 percent allocation line that reflect MBK's modeling and two blue dots on that line that reflect Petitioners' modeling; correct?

WITNESS MILLIGAN: Yes.

MR. HITCHINGS: So in this figure, for the Alt 4A, which is the Cal WaterFix scenario, again there's four years in which Petitioners' modeling shows an allocation of the CVP South-of-Delta contractors when MBK's shows a 0 percent to those contractors; correct? Four more years.

WITNESS MILLIGAN: (Examining document.)

I believe that's the case, although there -- it's hard to say, because there's one dot there that's a little blurry so I can't tell if it's two dots very close together or one. There may be five there but . . .

MR. HITCHINGS: Okay. Fair enough.

So referring back to 1.3(a).

WITNESS MILLIGAN: Yes.

(Document displayed on screen.)

MR. HITCHINGS: For the No-Action alternatives, in the four years in which Petitioners' modeling shows an allocation to CVP South-of-Delta contractors while MBK --

while their modeling does not, do you know in how many of those four years any of the CVP's upstream reservoirs are drawn down to their minimum model level?

WITNESS MILLIGAN: I'd have to cross -- cross-check those. The -- There are -- Some of those are fairly low years because the way in which this was kind of set up was, these are inflow forecasts which probably coincide with some pretty low storage levels as well, so -- and we don't have a chart that shows that.

MR. HITCHINGS: Do you know sitting here today whether even in any of those years, the CVP's upstream reservoirs were drawn down to their minimum water level?

WITNESS MILLIGAN: It would not surprise me. CalSim as it's currently configured does tend to do that and -- so -- But I don't know for sure. I'd have to get it out and line it up specifically and identify which years these actually are and cross-reference that.

MR. HITCHINGS: Okay. So let's assume that in any of those four years, one or more of the CVP's reservoirs would be drawn down to the lowest level CalSim can model.

Do you believe it's appropriate, in your opinion, to allocate water to the CVP South-of-Delta contractors in those years?

A. If -- Again, this is a modeling question.

Again, CalSim is a comparative tool. I think we're talking about something that's outside the realm of that.

If we had a real-life situation where reservoirs were drawn down to near dead pool, or very low levels, that we'd have to look very hard at what the allocations are and see if that is -- if those allocations are appropriate given those storage levels.

There may be idiosyncrasies about distribution of hydrology in a particular year that may make it -- make some sense to make some water available, in a year where one reservoir may be very low.

But that's the real-life situation and not necessarily the modeling. But CalSim does tend to drive the reservoirs down further.

I think that my critique of -- the take-away from this data is not so much the number of zeros but the -- the fact that it takes the reservoirs down lower.

It seems to me that there's a strategy here which, although be it possible and not precluded given our current policies and regulations, that somewhat shifts the philosophy that pushing, being very aggressive to bank higher allocations, even though you may end up with overall lower allocations in a number of these years, it's not just the dots line on the zeros but also the pattern within, let's say, when the inflows are below

7,000 -- 7,000 thousand-acre-feet, that it seems consistently lower and I think that's a product, is a carryover, of being more aggressive than other parts of the operation within the CalSim simulation.

So it's more than just the zero allocations. But I think that that does highlight a little bit of some aggressiveness in this particular presentation of how the CVP could be operated, both in the No-Action case, then it seems to highlight some other concerns in a -- with California WaterFix in place.

MR. HITCHINGS: The point is, Mr. Milligan, in some of those years where there are allocations to South-of-Delta contractors, under the Petitioners' modeling -- as opposed to years where MBK's modeling does not provide for allocations to those contractors, Petitioners' modeling actually did draw the reservoirs down to their minimum model level; isn't it correct?

WITNESS MILLIGAN: I think both -- both did. And there could possibly be a few of these years, if we're -- Again, unless we're talking about looking at the specifics of a year, this may be allocations that are the product of carryover storage in San Luis that are independent of where Folsom or Shasta storages may be going in a particular year.

MR. HITCHINGS: But you don't know that,

sitting here today, whether that's the case; correct?

WITNESS MILLIGAN: I think -- No, I don't.

MR. HITCHINGS: Okay. I'd like to --

WITNESS MILLIGAN: I'd like to be able to say --

MR. HITCHINGS: -- move on to --

WITNESS MILLIGAN: -- that it's pulling on the reservoirs to make allocations South-of-Delta.

MR. HITCHINGS: Okay. Let's move on to your health and safety pumping levels in your testimony.

If we could move to Page 4, and it's the last paragraph, first sentence.

And if you could just take a moment to read that -- that section.

WITNESS MILLIGAN: I'm sorry. I went in the wrong direction.

Page 4?

MR. HITCHINGS: Yes.

WITNESS MILLIGAN: What's the paragraph?

MR. HITCHINGS: Page 4, last full paragraph, is a sentence -- There's a number of highlighted sentences there and a couple questions on the first sentence.

WITNESS MILLIGAN: Okay. Yes, I see this.

MR. HITCHINGS: Okay. So in that first sentence, are you asserting that providing water for

refuges is for public health and safety purposes?

WITNESS MILLIGAN: We -- During the drought, we actually have had some discussion along these lines, and given the potential for fish -- excuse me -- bird kills and the dire conditions for water foul, that some water for refuges in very low conditions would, in fact, be a public health and safety concern.

MR. HITCHINGS: And then how much of that 1500 cfs minimum is periodically used for refuge supplies under those conditions when pumping is reduced to meet minimum health and safety needs?

WITNESS MILLIGAN: I would say, depending on the time of the year, and . . . but typically that might be more of a fall or a winter type operation, not so much in the -- Most likely, a fall is a -- would relate potentially to a health and safety concern but typically not a summertime operation.

So where we have run into the 1500 cfs in the past, in many times talking about minimum health and safety level pumping, has been in the spring and summer period.

MR. HITCHINGS: Let's look at your second sentence there, and that says (reading):

"An operation that assumes a minimum pumping of 300 cubic feet per second from Jones . . . for an

extended period of time is impractical and not consistent with safe operation . . . As such, Reclamation would not operate the CVP in a manner that would require the pumping levels depicted in MBK's modeling."

Reclamation did, in fact, operate the Jones Pumping Plant in 2014 and '15 at the pumping levels depicted in MBK's modeling; isn't that correct?

WITNESS MILLIGAN: I -- It appears to me that the level of minimal cycling and pumping that would be required was much more often in the MBK modeling.

MR. HITCHINGS: No. But just for 2014 and '15, Reclamation did operate Jones in the way that it's depicted in MBK's modeling; is that correct.

WITNESS MILLIGAN: My point isn't the pumping level.

Yes, there were periods of time where we did have to pump at that level, but the amount or the occurrences of that were far less than what we would typically think. We'd only be in the most extreme circumstances, like '14 and '15, where that may be the last resort operation. And my observation of the MBK modeling is that's occurring more often, so . . .

Although, as a snapshot within CalSim, is that an occurrence that we saw in those particular years? The

answer's yes. But we're seeing it far more often than we think would be appropriate in the overall MBK model, and that's --

MR. HITCHINGS: Well, let me ask --

WITNESS MILLIGAN: -- the point of our --

MR. HITCHINGS: -- this:

Would Reclamation bring Shasta or Folsom down to dead pool levels or below the NIMS Biological Opinion RPA levels to support Jones pumping above 300 cfs?

Biological Opinion: We would -- That is a very general question.

Under certain circumstances, yes, we would. We would work with NOAA fisheries. And, frankly, if it was a controlling feature within the Fish and Wildlife Service, the Biological Opinion, we do have processes in place that, if this is a question of public health and safety, that we would analyze that and find it's the least risky operation from a fisheries standpoint to be able to carry that off --

MR. HITCHINGS: And that would --

CO-HEARING OFFICER DODUC: -- but we would certainly consider it.

MR. HITCHINGS: That would require you to go through a consultation process and potentially a Temporary Urgency Change Petition process?

WITNESS MILLIGAN: Well, as it relates to -- As it relates to the Biological Opinions, we probably would enter into some form of consultation. I don't know if it would be formal or not.

But given the urgency of the situation, we would probably be actively speaking with the fishery biologists and the -- the ESA folks within both NOAA fisheries and Fish and Wildlife Service and probably reaching out to State Fish and Wildlife as well about the circumstances and see what our options are.

But we would -- That would be a very -- Because it's a public health and safety concern, we'd be acting fairly quickly.

Now, we'd also have to evaluate the situation as it was to see if a Temporary Urgency Change Petition was necessary in that circumstance. Not knowing all the specifics, it would be very difficult to know.

MR. HITCHINGS: Well, let's go to Page 9 of your testimony, first paragraph.

(Document displayed on screen.)

MR. HITCHINGS: And if you'd just take a moment to read that.

WITNESS MILLIGAN: (Examining document.)

Yes, I see that.

MR. HITCHINGS: So according to this testimony,

Petitioners exercise their judgment within the modeling to set the minimum pumping at Jones and Banks during extreme conditions as part of their modeling for the Cal~WaterFix Project; correct?

WITNESS MILLIGAN: Yes.

MR. HITCHINGS: And, conversely, MBK exercised their judgment on this modeling assumption for their modeling for the Project; isn't that correct?

WITNESS MILLIGAN: Yes, they did.

MR. HITCHINGS: Because, as you state, it's not a hard constraint within CalSim; correct?

WITNESS MILLIGAN: It is obviously something you can change within CalSim. So, obviously, a modeler has -- can go into the code and modify the code to manipulate this input.

MR. HITCHINGS: So do you know whether MBK's modeling results with regard to the Cal WaterFix Projects' potential effects on upstream storage would be different if their modeling had used the same minimum pumping levels at Jones and Banks as the Petitioners' modeling did?

MS. AUFDEMBERGE: I'm going to object to this question.

We're getting further into the realm of modeling and Ron is -- has used modeling results to

discuss operations, but he is not here today as a modeling expert. We have modeling experts in the next upcoming panels.

CO-HEARING OFFICER DODUC: Mr. Hitchings.

MR. HITCHINGS: I am asking ask him whether he knows that, and he has referred to the modeling results within his rebuttal testimony and this question's directly relevant to that.

CO-HEARING OFFICER DODUC: Okay. Mr. Milligan, please.

Mr. Bezerra.

MR. BEZERRA: I just want to anticipate possible further objections along this line.

Mr. Milligan's testimony is all about critiquing MBK's modeling and presents extensive modeling results.

CO-HEARING OFFICER DODUC: Thank you.

Mr. Milligan, please answer.

WITNESS MILLIGAN: As I understand the question, if MBK had used the same assumptions related to health and safety export levels, would that have changed the upstream storage levels in -- in their modeling results?

MR. HITCHINGS: Correct.

WITNESS MILLIGAN: And the answer is, no, I

haven't seen those results so I don't know if that's -- if that is -- and I'm not asserting that it wouldn't or would be different. I just don't know what it is.

But I am concerned that the assumption that MBK has used here would create a circumstance that we don't think would be supportable, and we want to avoid that type of operations for health and safety, particularly as it relates to Jones Pumping Plant.

MR. HITCHINGS: Okay. Thank you.

I think that's all the cross that I have at this point. Thank you.

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

And as Mr. Bezerra's coming up, let me handle a couple of housekeeping issues.

Miss Aufdemberge told us this morning that Mr. Milligan would not be available after 1 o'clock.

MS. AUFDEMBERGE: Correct.

CO-HEARING OFFICER DODUC: In the future, I would like prior -- at least the day before being informed of that for the purpose of everyone else who's planning to conduct cross-examination of Mr. Milligan.

Secondly, I will expect, then, Mr. Mizell, that your next three witnesses, Bryan, Owen and Preese, will be available immediately this afternoon so that there is

no gap this the hearing.

Is that correct?

MR. MIZELL: That's correct.

CO-HEARING OFFICER DODUC: And Mr. Mizell has concurred.

And, finally, for the court reporter, as well as everyone's sake, given this change in Mr. Milligan's scheduling, we will then take our break at 11 o'clock and not take our lunch break until 1 o'clock.

THE REPORTER: (Nodding head.)

CO-HEARING OFFICER DODUC: All right.

Mr. Bezerra.

And, Mr. Hitchings, you did -- wherever you are -- a very good job at estimating your time. Thank you very much.

MR. HITCHINGS: Thank you.

CROSS-EXAMINATION BY

MR. BEZERRA: I think you -- Good morning, Mr. Milligan. My name's Ryan Bezerra. I'm attorney for Protestants City of Folsom, City of Roseville, San Juan Water District and Sacramento Suburban Water District in this hearing.

WITNESS MILLIGAN: Good morning.

MR. BEZERRA: I'd like to start off:

First of all, your testimony generally is a

critique of MBK's modeling testimony; correct?

WITNESS MILLIGAN: I would say it's maybe a critique or at least comments on some of the assumptions within that modeling.

MR. BEZERRA: Okay. Thank you.

Could we please pull up SVWU-107?

(Document displayed on screen.)

MR. BEZERRA: And in particular Page 28.

(Document displayed on screen.)

MR. BEZERRA: Thank you.

And could we scroll down a little so we can pick up all of Table 3 there.

(Scrolling up document.)

MR. BEZERRA: Thank you.

Okay. Mr. Milligan, do you see the table labeled "Average Annual Change in CVP Delivery by Water Year Type DWR/USBR BA Alternative 4A versus" -- excuse me -- "minus DWR/USBR BA NNA"?

WITNESS MILLIGAN: I see the table but please don't ask me to read it.

MR. BEZERRA: Understood.

If we could blow that up a little.

(Document on screen enlarged.)

WITNESS MILLIGAN: Thank you.

MR. BEZERRA: Mr. Milligan, does this --

does -- You see the section on the table labeled "South of Delta"?

WITNESS MILLIGAN: Yes, I do.

MR. BEZERRA: And do you see the column "Ag Service"?

WITNESS MILLIGAN: Yes.

MR. BEZERRA: And do you see that, in "All Years," there's a minus 13 representing minus 13,000 acre-feet?

WITNESS MILLIGAN: I see the -- the row that's labeled "All Years" and that number, minus 13.

MR. BEZERRA: Does -- Is it your understanding that Petitioners' modeling shows that the average of all years CVP South of Delta Ag Service Contractors would receive an average of minus 13,000 acre-feet with the proposed action versus the No-Action Alternative?

WITNESS MILLIGAN: If . . . Again, to clarify:

That is what the modeling is showing if there is no changes to any of the number of criteria and sharing between the CVP and the State Water Project, for example, according to the Operating Agreement or otherwise, that it would be less water for the CVP South of Delta.

MR. BEZERRA: And that is -- This minus 13 acre-feet as an annual average, is that consistent with

your understanding of what Petitioners' model show would be the effect on South-of-Delta CVP ag deliveries as a result of the implementation of California WaterFix?

WITNESS MILLIGAN: Again, without any additional negotiations about how the two Projects would share the available water South of Delta, this is -- this is a number I think is consistent with other modeling that's been done to -- to evaluate effects, yes.

MR. BEZERRA: And so you are the Operator of the CVP currently; correct?

WITNESS MILLIGAN: Yes.

MR. BEZERRA: So in that --

WITNESS MILLIGAN: Operations Manager for the --

MR. BEZERRA: I'm sorry?

WITNESS MILLIGAN: I'm Operations Manager for the operations office.

MR. BEZERRA: Okay. Thank you very much. I appreciate that.

So, in that role, you expect that the CVP and the SWP will be negotiating alternative operating arrangements with California WaterFix that are different than what is assumed in the modeling presented in this hearing?

WITNESS MILLIGAN: I think in terms of sharing

available supplies that would be diverted in the Delta, yes.

MR. BEZERRA: So just to confirm: You do expect that the CVP and the SWP will be negotiating different operating arrangements for California WaterFix than have been presented in the modeling in this hearing.

WITNESS MILLIGAN: I think that what's been presented in this hearing has been not to be specific about the split of water between the two Projects at South of Delta, that that still needs to come.

And this particular modeling is saying, well, setting that aside, what has been done has -- would suggest that you have less water for the CVP. And it's my expectation that Reclamation -- that some of the water that's being currently shown, just like the companion chart for the State Water Project, shows additional water that you're getting -- you see a plus here -- that we would find a way to share that water, to be able to identify the minus -- to take care of this minus.

Now, CVP does have a benefit in the dry year, if you looked at that row. But my expectation is, we would see slightly different sharing of the available water in the Delta.

MR. BEZERRA: So, just again, it's a yes-or-no question.

As the Operator of the CVP, do you expect that the CVP and the State Water Project will negotiate different operating criteria for California WaterFix than has been presented in the modeling for this hearing?

MS. AUFDEMBERGE: I'm going to object if he's going to ask that again. Not only is it asked and answered, but the -- I think there's a confusion on his definition of "operating criteria."

CO-HEARING OFFICER DODUC: Mr. Bezerra, your definition of "operating criteria"?

MR. BEZERRA: It would be whatever Mr. Milligan indicates the CVP and SWP will be negotiating in the future.

CO-HEARING OFFICER DODUC: It's an important point.

Mr. Milligan, please answer.

WITNESS MILLIGAN: I guess as the Operations Manager, this really has not been my functional tasks.

My task would be to operate the Project, and I'm not in a position to be dictating the terms between Reclamation and the Department of Water Resources as to how they're going to operate.

So I will say again, this is my understanding, is that this modeling, as currently presented, would show slightly less water for the CVP, particularly South of

Delta, but that has also coincided with an increase of supplies for the State Water Project.

And it had been my understanding and has been my testimony, particularly when myself and Mr. Leahigh testified, that we collectively made our presentations about the total amount of water between the two Projects be made available.

MR. BEZERRA: Okay. Thank you again.

But you are here to testify as the CVP Operator to critique MBK's modeling of how the CVP would operate with California WaterFix; correct?

WITNESS MILLIGAN: Yes.

MR. BEZERRA: Thank you.

Now, in answering Mr. -- similar questions of Mr. Hitchings, you said there's a lot of work to be done to determine how the CVP and the State Water Project would work to share water with California WaterFix in place; correct?

WITNESS MILLIGAN: That's my -- That's my observation, yes.

MR. BEZERRA: What work do the CVP and the SWP have to do to determine how to share water with California WaterFix in place?

WITNESS MILLIGAN: Well, one would be to evaluate, as this process goes further, as to what the

final set of operating criteria would be with regard to exactly how the protections would be laid out.

MR. BEZERRA: No. Can . . .

MS. AUFDEMBERGE: Objection.

MR. BEZERRA: The witness isn't answering the question.

CO-HEARING OFFICER DODUC: One at a time.

Miss Aufdemberge?

MS. AUFDEMBERGE: I have an objection to this line of questioning: It's beyond the scope of his rebuttal testimony.

CO-HEARING OFFICER DODUC: Mr. Bezerra.

MR. BEZERRA: I don't believe it's beyond the scope of his rebuttal testimony. His entire rebuttal testimony is a critique of how MBK depicted the Projects would operate with California WaterFix in place.

So if he has some lack of understanding as to that, we are -- should be able to answer -- excuse me -- ask questions to determine how -- what needs to be done so we can understand how the Projects would operate.

CO-HEARING OFFICER DODUC: Mr. Mizell.

MR. MIZELL: I'm going to join in Miss Aufdemberge's objection.

What Mr. Bezerra is seeking is to predetermine negotiations that have yet to occur, and Mr. Milligan has

not testified to what those negotiations would consist of, nor what the result would be.

MS. AUFDEMBERGE: I -- Can I add?

CO-HEARING OFFICER DODUC: Miss Aufdemberge.

MS. AUFDEMBERGE: His critique does not go to how the model's aggregated, the supplies available through the Cal WaterFix, but his critique goes to the aggressive operational philosophy used to show an impact to storage.

CO-HEARING OFFICER DODUC: It's a fine point but, Mr. Bezerra, I will allow you to seek as long as you walk that fine line.

MR. BEZERRA: I'll attempt to find that line.

So I know I asked Mr. Milligan an open-ended question that was interrupted by counsel, so I'd like to just repeat the question.

Mr. Milligan, you testified in response to Mr. Hitchings that there's a lot of work to be done between the CVP and the SWP to allocate water with California WaterFix in place.

What work needs to be done between the two Projects?

WITNESS MILLIGAN: Well, there's quite a bit of work to be done. I think that's been identified and discussed in general.

But part of that will depend on, as we get into specifics as to the protections for the -- specific protections that are going to be needed, particularly as it relates to the Delta.

I think particularly of interest is, how do we share the amount of water that will be available for export in the Delta that's currently being shown in aggregate between the two Projects, and how will that be shared?

I think that's the primary aspect of this, not how -- what our operational philosophies will be.

MR. BEZERRA: Okay. If we could please pull up Exhibit BKS-53.

(Document displayed on screen.)

MR. BEZERRA: And, Mr. Milligan, this exhibit is excerpts of the July 2016 Biological Assessment for California WaterFix that I believe the Bureau of Reclamation produced. It is generally Staff Exhibit SWRCB-104. This is just a small excerpt -- These are excerpts from the description of the proposed action.

Are you familiar with the July 2016 Biological Assessment for California WaterFix?

WITNESS MILLIGAN: Not intimately, but I have reviewed sections of it.

MR. BEZERRA: Okay. Could we please scroll

down to Page -- the third page of this.

(Document displayed on screen.)

MR. BEZERRA: And the highlighted section discusses spring outflow criteria for California WaterFix; correct?

WITNESS MILLIGAN: (Examining document.)

MR. BEZERRA: And I have to apologize. I have copies of this that I could provide you if that would be more -- easier.

WITNESS MILLIGAN: Well, that could be easier.

All I could say is, it does seem to be discussing longfin smelt and spring outflow associated with habitat for longfin.

MR. BEZERRA: I'll give you a copy. That'll make everybody's life easier.

(Document distributed.)

WITNESS MILLIGAN: Thank you.

MR. BEZERRA: Would the Board and counsel appreciate copies as well?

(Document distributed.)

MR. BEZERRA: Okay. Mr. Milligan, let me point you to sentence that's in the highlighted section that begins, "To avoid."

And it reads (reading):

"To avoid a reduction in overall abundance for

longfin smelt, the PA" -- proposed action -- "includes spring outflow criteria, which are intended to be provided by appropriate beneficiaries through the acquisition of water from willing sellers."

WITNESS MILLIGAN: Yes, I do see that. I appreciate the hard copy.

MR. BEZERRA: I try.

Mr. Milligan, are you aware of any agreements between Reclamation and any willing sellers to contribute water to spring outflow criteria that may be required as part of the approvals of California WaterFix?

WITNESS MILLIGAN: No, I'm not.

MR. BEZERRA: Okay. Are you aware of any discussions to obtain that water from willing sellers?

WITNESS MILLIGAN: Currently, no.

MR. BEZERRA: Okay. Thank you.

Let me point you to the next section in the next sentence, which reads (reading):

"If sufficient water cannot be acquired for this purpose, the spring outflow criteria will be accomplished through operations of the CVP/SWP to the extent an obligation is imposed on either the SWP or CVP under federal or applicable state law."

To the best of your knowledge, have the CVP and

SWP determined how they will bear responsibility for these spring outflow criteria as part of California WaterFix?

WITNESS MILLIGAN: No. I think it would probably depend on the extent of an obligation imposed by Federal or State law.

MR. BEZERRA: And so this is a matter that the CVP and SWP will need to determine in the future in relation to California WaterFix?

WITNESS MILLIGAN: It would appear.

MR. BEZERRA: As part of that sentence, it says that these spring outflow criteria will be accomplished in the operations of the CVP/SWP.

As the CVP Operator, how might that be accomplished?

MS. AUFDEMBERGE: Objection: This is way beyond the scope.

CO-HEARING OFFICER DODUC: To the best of your ability, Mr. Milligan.

And if you don't know, then just say so.

WITNESS MILLIGAN: Well, how we would do that, I am not sure. But it would probably be a combination of increased storage release and/or reduced exports at a particular time.

My understanding of this action is to have

spring outflows, and to augment spring outflows is usually one of those two things.

MR. BEZERRA: Thank you.

And by "storage releases," you mean storage releases from any CVP Reservoir?

WITNESS MILLIGAN: Well, I would assume a CVP Reservoir that could provide Delta outflow, Net Delta Outflow.

MR. BEZERRA: And what CVP Reservoirs could provide Net Delta Outflow?

WITNESS MILLIGAN: Well, typically -- A typical operation, we're probably talking about released storage from Shasta or Folsom. But in theory, water imported from the Trinity Basin could do that.

It is possible that water released at New Melones could contribute to that. And it is conceivable even water released from Millerton during a time when we had the connectivity to the San Joaquin River could also in theory do that.

CO-HEARING OFFICER DODUC: In other words, highly speculative at this point.

WITNESS MILLIGAN: If someone were to press where it would come from, it would probably be at Shasta or Folsom, but it is possible to operate in a way could make that possible.

But, again, the other option is to reduce exports at a particular time.

MR. BEZERRA: And the two Projects would have to determine how this would be accomplished before California WaterFix could begin operation; correct?

MS. AUFDEMBERGE: I'm going to renew my objection:

This is beyond the scope of Mr. Milligan's testimony. This goes into Part 2 issues of mitigation for fish impacts.

I . . . That's my objection.

CO-HEARING OFFICER DODUC: I am interpreting Mr. Bezerra's questioning as it applies to operation in regards to what is before us, so in that aspect, your objection is overruled and Mr. Milligan will answer to the best of his ability.

Obviously, your objections earlier about speculating as to the potential outcome of these negotiations between the Projects are things Mr. Milligan cannot answer and will not be able to answer.

MR. BEZERRA: Understood.

So the question was: The Projects will need to determine how to comply with any spring outflow criteria in the future before California WaterFix begins operations; correct?

WITNESS MILLIGAN: I would assume that all the criteria that may be part of what comes out of the Biological Opinions, of which this may be a subcomponent of, we would have to understand how the Projects would operate in order to deal with that.

And that's a generic answer, and I don't know how to answer it in much more detail, because we don't know specifically to what extent it may -- the size of an action and/or if that would be something that may be more geared to one of the Projects or the other specifically.

MR. BEZERRA: Thank you.

So, beginning a new line of questioning.

If we could pull up Mr. Milligan's testimony, Exhibit --

CO-HEARING OFFICER DODUC: And that reminds me, Mr. Bezerra.

MR. BEZERRA: Yes?

CO-HEARING OFFICER DODUC: You did not give us an outline.

MR. BEZERRA: Oh, I apologize, yes.

So we've just dealt with the first part, which were to deal with some issues that were opened by Mr. Hitchings' cross-examination about the assumptions that went into Mr. Milligan's critique of MBK's modeling.

I now want to ask him about some of his

statements regarding how the CVP operates.

And then . . . I want to ask him about . . .

I think that -- that covers it.

CO-HEARING OFFICER DODUC: All right.

MR. BEZERRA: There are a couple different subtraits of that category.

So if we could pull this Exhibit DOI-36, please.

(Document displayed on screen.)

MR. BEZERRAF: Okay. Thank you.

And on that Page 1, if we could scroll down to the heading "Operational Philosophy."

(Scrolling down document.)

MR. BEZERRA: Mr. Milligan, do you see that first sentence under the heading (reading):

"The CVP was developed, in part, to improve water supply reliability and subsequently drought relieve."

WITNESS MILLIGAN: Yes.

MR. BEZERRA: Have you been employed by Reclamation the entire time since the CVP was developed?

WITNESS MILLIGAN: No, I have not.

MR. BEZERRA: And the CVP components were authorized by a series of Federal laws; correct?

WITNESS MILLIGAN: Correct.

MR. BEZERRA: Further down in that paragraph, there's a sentence that begins (reading):

"The CVP is (and always has been) operated to make full use of excess water during wet periods and use stored water to supplement releases and deliveries when adequate water is not otherwise available."

Do you see that sentence?

WITNESS MILLIGAN: Yes, I do.

MR. BEZERRA: You have not been employed by Reclamation the entire time the CVP has been operating; correct?

WITNESS MILLIGAN: No, I have not.

MR. BEZERRA: You began as the CVP's Operator in 2004, I believe?

WITNESS MILLIGAN: As the Operations Manager, yes.

MR. BEZERRA: Operations Manager.

And so you did not serve as the CVP's Operations Manager before the 1995 Bay-Delta Water Quality Control Plan took effect; correct?

WITNESS MILLIGAN: That's correct.

MR. BEZERRA: If we could go to Page 3 of his testimony.

(Document displayed on screen.)

MR. BEZERRA: And the last paragraph of Page 3, please.

(Document displayed on screen.)

MR. BEZERRA: Mr. Milligan, do you see the sentence in that paragraph (reading):

"Given the possibility of an upcoming drought in any year, Reclamation's philosophy has always been to minimize releases in the fall and prioritize upstream storage for the following year."

Do you see that --

WITNESS MILLIGAN: Yes.

MR. BEZERRA: -- sentence?

WITNESS MILLIGAN: Yes, I do.

MR. BEZERRA: Thank you.

And, again, you have not been the CVP Operations Manager the entire time the CVP has operated; correct?

WITNESS MILLIGAN: That is correct.

CO-HEARING OFFICER DODUC: Mr. Bezerra, I don't know how many additional sentences you're going to point out with this theme, but perhaps we can cut to the chase.

Mr. Milligan, since you have not been employed by CVP during the entirety of this Project, on what basis do you make these statements in your testimony?

WITNESS MILLIGAN: In essence, as a review of

some of the authorizing language, looking at the -- and reviewing older documents that we've through the period of time been developing, Project descriptions for particularly the 2008 Biological -- 2008-2009 Biological Opinions, looking at some of the old operating criteria and plans.

The idea of picking up excess flows in the Delta in the wintertime period and restoring that in the San Luis have been kind of an underlying theme, and to be able to then build your storage in your upstream reservoirs for later in the summer and thinking about subsequent operations beyond just that particular year.

Now, some of these statements may be somewhat dated to a degree as being post-San Luis unit, post-State Water Project.

Certainly, though, prior to the State Water Project and San Luis unit coming online, the CVP did make significant use of available flows in the spring period to meet irrigation demands and try to minimize its upstream releases.

So it's basically a review of past operating criteria, plans of the past, the authorizing documents, and then also talking with folks that have been working with the Project quite a bit longer than I have.

CO-HEARING OFFICER DODUC: If you have a point

that you'd like to get to in this line of questioning, Mr. Bezerra, rather than walk us through multiple sentences?

MR. BEZERRA: Yes.

CO-HEARING OFFICER DODUC: Please go there.

MR. BEZERRA: So, Mr. Milligan, you have understanding of how the CVP operated before the 1995 Bay-Delta Water Quality Control Plan took effect?

WITNESS MILLIGAN: I have some knowledge, yes.

MR. BEZERRA: And you have knowledge of how the CVP operated the Joint Point of Diversion Under Decision 1485?

WITNESS MILLIGAN: Yes.

MR. BEZERRA: And did the CVP use Joint Point of Diversion differently under D-1485 versus under the 1995 Bay-Delta Water Quality Control Plan?

CO-HEARING OFFICER DODUC: Hold on Mr. Milligan.

Mr. Mizell.

MR. MIZELL: Yeah. I'm going to object to this as being beyond the scope of Mr. Milligan's testimony.

What we have here is an attempt to go back in time and question him about operational practices in the past that are not part of this Project, not part of what we propose to do, and I just don't see how it's relevant.

CO-HEARING OFFICER DODUC: Mr. Mizell, Petitioners make the argument of looking at your past practices and your past operation and use the "Trust Us" argument in terms of future operation.

So I -- I will allow Mr. Bezerra some latitude in terms of exploring this -- this avenue.

But I appreciate that Mr. Milligan may not be able to answer specific questions with respect to past State Water Project operations.

MR. BEZERRA: Yes, I understood that.

MR. MIZELL: I'd like to note that D-1485 is not part of the proposed Project.

CO-HEARING OFFICER DODUC: Mr. Bezerra.

MR. BEZERRA: Yes. Thank you.

So, Mr. Milligan, do you understand that the CVP used Joint Point of Diversion differently under D-16 -- D-1485 than under the 1995 Bay-Delta Water Quality Control Plan?

WITNESS MILLIGAN: Yes.

MR. BEZERRA: Okay. Thank you.

Okay. Referring back to that sentence that we were talking about, given the possibility of an upcoming drought in any given year, you say that (reading):

". . . Reclamation's philosophy has . . . been to . . . prioritize upstream storage for the

following year."

What does that mean, to "prioritize upstream storage"?

WITNESS MILLIGAN: And I've . . . I apologize if the sentence isn't clear.

This is a question of prioritizing, let's say, decision that there is available capacity in the Delta to move water, let's say, into storage and San Luis Reservoir, the Federal share.

Many times, Reclamation would prioritize, keeping a good part of that -- chunk of that water in storage in its upstream reservoirs as opposed to moving the water, releasing it, many times probably paying a fairly high carriage water loss to move some portion of that and release then into storage south of Delta.

So we do see a premium in going into a subsequent year of keeping water in storage in our onstream reservoirs as opposed to moving water offstream except in the most kind of lopsided scenarios, which would be a scenario where, gee, we're fairly close to our topic conservation pools. We may have -- may be coming off of a wet year but, for whatever reason, may have some very low storage at San Luis.

That may be a circumstance where we would consider paying a premium, if you will, on carriage water

to be able to move across the Delta.

But as a general rule, we will want to make sure that we take -- first take care of business in terms of having a -- a good starting point to build our offstream storage coming into a new Water Year.

MR. BEZERRA: The operation you just described, is that required by any law or regulation?

WITNESS MILLIGAN: That I'm aware of.

MR. BEZERRA: So that is a discretionary decision by CVP Operators.

WITNESS MILLIGAN: Yes. The discretion that we believe gives us a high likelihood of meeting our regulatory and contractual obligations.

MR. BEZERRA: And that -- that discretionary decision could change at any time; correct?

WITNESS MILLIGAN: Well, I think within the construct of . . . Some of those things would take longer to change, let's say, if they're a matter of policy, but those things could change.

MR. BEZERRA: Thank you.

I'd like to refer to Exhibit BKS-50, please.

CO-HEARING OFFICER DODUC: Mr. Bezerra, how much longer do you anticipate needing?

MR. BEZERRA: I think 15 minutes tops?

CO-HEARING OFFICER DODUC: Are you okay with

going another 15?

THE REPORTER: (Nodding head.)

CO-HEARING OFFICER DODUC: Okay. We'll take our break then.

MR. BEZERRA: (Distributing documents.)

(Document displayed on screen.)

MR. BEZERRA: Mr. Milligan, Exhibit BKS-50 is excerpts from a December 7th, 2015, draft order that this Board issued, and I have a full copy of it if you'd like to see the full copy.

Are you -- Were you aware of this order, draft order, at the time this Board issued it?

WITNESS MILLIGAN: Is this a draft order or is this an order?

MR. BEZERRA: This is the draft.

WITNESS MILLIGAN: Oh.

MS. AUFDEMBERGE: I'm going to object: I can't envision currently how this is possibly related to his rebuttal testimony.

CO-HEARING OFFICER DODUC: Mr. Bezerra.

MR. BEZERRA: Yes. It's related to his rebuttal testimony because he has testified that the CVP prioritizes the protection of upstream storage in its operations as a discretionary philosophy.

And in this draft order, the State Board

proposed and ultimately required minimum upstream storage in drought conditions.

CO-HEARING OFFICER DODUC: So why are you not operating from a final order?

MR. BEZERRA: Because I need to discuss how the CVP responded to your draft order.

CO-HEARING OFFICER DODUC: All right.

Overruled, Miss Aufdemberge.

Continue, Mr. Bezerra.

MR. BEZERRA: So, Mr. Milligan, are you aware of this draft order?

WITNESS MILLIGAN: Well, I -- It would not surprise me there was a draft prior to the final order.

MR. BEZERRA: Okay. Thank you.

If you could please refer to the second page of that exhibit. In particular, there's a Paragraph 4.

WITNESS MILLIGAN: Yes.

MR. BEZERRA: And it's highlighted on the screen.

In this paragraph, this Board proposed a minimum October '16 storage level of 200,000 acre-feet at Folsom Reservoir.

Do you see that?

WITNESS MILLIGAN: Yes, I do.

MR. BEZERRA: Do you knowhow how Reclamation

responded to this draft order?

WITNESS MILLIGAN: Specifically no, but it wouldn't surprise me if I addressed the Board and said I don't believe this is a good idea.

MR. BEZERRA: Okay. Let me pull up Exhibit BKS-51.

(Document displayed on screen.)

MR. BEZERRA: (Distributing document.)

Do you see on the second page of Exhibit BKS-51 this letter was signed by David Murrillo, the Regional Director of the Mid-Pacific Region of Reclamation?

WITNESS MILLIGAN: Yes.

MR. BEZERRA: If we could go back to the first page, the first highlighted section. It says (reading):

"However, we object to the Board adoption of the above-referenced Proposed Order, as currently drafted, due to procedural and substantive concerns."

WITNESS MILLIGAN: I see that.

MR. BEZERRA: Do you recall making comments at this Board in support of this draft letter?

WITNESS MILLIGAN: I don't know if I specifically made comments as it relates to this letter, but I do believe I made comments that are along these lines, yes, as an example.

MR. BEZERRA: And by "along these lines," do you mean you appeared here to object to the Board's imposition of minimum carryover requirements in upstream reservoirs as part of the draft order?

WITNESS MILLIGAN: Yes.

MR. BEZERRA: Thank you very much.

That completes my cross-examination.

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

With that, we will take a 15-minute break.

We will resume at 11:20 and then we'll continue until 1 p.m.

(Recess taken at 11:05 a.m.)

(Proceedings resumed at 11:20 a.m.)

CO-HEARING OFFICER DODUC: Please take your seats. It is 11:20 and we're going to resume.

Before Ms. Nikkel begins her cross-examination, if my math is correct, and if everyone is extremely efficient and stick to the lower range of their time estimates, we might be able to finish your cross-examination by 1:00, Mr. Milligan, but it's possible that we also might not, in which case, I would like a time certainty of when you'll be returning for the rest of your cross-examination.

Will that be tomorrow morning?

WITNESS MILLIGAN: I leave it to my counsel. That is possible.

CO-HEARING OFFICER DODUC: I want a time certainty so that crossers may be prepared.

WITNESS MILLIGAN: We can do tomorrow morning.

CO-HEARING OFFICER DODUC: Tomorrow morning, starting at 9:30 --

WITNESS MILLIGAN: Yes.

CO-HEARING OFFICER DODUC: -- if we do not finish by 1 o'clock.

WITNESS MILLIGAN: Yes.

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

Ms. Nikkel.

MS. NIKKEL: Thank you.

Just to summarize my very brief cross-examination topics:

Just to start with a couple of followup questions regarding the testimony on shared capacity, and then some specific questions about the testimony and figures relating to North of Delta Ag Service Contract allocations.

CROSS-EXAMINATION BY

MS. NIKKEL: Good morning, Mr. Milligan.

WITNESS MILLIGAN: Good morning.

MS. NIKKEL: So -- So to start up and follow up on some of the testimony and questioning, we've heard about the yet-to-occur negotiations regarding the share of capacity by the -- that will be added by the Project.

Wouldn't that yet-to-be-agreed-upon share between State Water Project and Central Valley Project change how the upstream storages would be operated under the CVP?

WITNESS MILLIGAN: Although that's possible, at this particular juncture, not necessarily likely.

We probably -- the range of what I think will be -- is currently contemplated would be something that would stay within the operational framework that we currently see within what's been presented in the environmental documents and in the holistic or in aggregate operations that we've seen so far.

MS. NIKKEL: But it's possible that those changes could go outside of what's been presented so far; correct?

WITNESS MILLIGAN: Well, it is possible. I guess the question would become whether it's prudent. And we would certainly find ourselves in a position that a range of things that could occur may not be prudent because they might significantly change the upstream operations and be potentially putting us at risk to some

other obligations indirectly contractually or just in terms of fishery protections for cold water pools, meeting instream flow requirements of a particular type, so . . .

That's not where we're thinking. What we're thinking is, how do we negotiate what's currently the split of where we're at in the Delta predominantly in the excess flow conditions and not seeing -- and not anticipating a significant change in upstream operations.

MS. NIKKEL: But I think I heard you say it is possible; correct?

WITNESS MILLIGAN: A lot of things are possible --

MS. NIKKEL: Is that a yes?

WITNESS MILLIGAN: -- but not proved.

MS. NIKKEL: Then I'll move on.

So that was a yes?

WITNESS MILLIGAN: It is possible, yes.

MS. NIKKEL: Thank you.

Can we please pull up Mr. Milligan's rebuttal testimony, DOI-36?

(Document displayed on screen.)

MS. NIKKEL: And on Page 5, there at the top, starting with Section 1 under "Figures." We're going to focus on this figure as well as the description of it.

So, in the first sentence on the label Figure 1.1, your testimony states, that (reading):

"The steep drop in MBK" -- And I'm going to paraphrase slightly (reading):

"The MBK" modeling "at around the 60 percent exceedance mark and the very low delivery levels above 80 percent indicate an extreme distribution of allocations that CVO does not consider reasonable."

But it would be possible, again, to operate the Project in a manner that results in those steep drops in North-of-Delta ag service allocations in 60 percent of the years; correct?

WITNESS MILLIGAN: Well, the modeling would suggest that it is. I'd have to give some more thought in terms of the actual operations around that, but . . . an aggressive allocation philosophy is -- is what this is representing, and I think it does -- and I would concur that the outcome here is if you were aggressive in that manner and allocating as much as you can, particularly here, is going to have an effect later on in some dry sequence and that's kind of what this modeling indicates, so . . .

These exact numbers, are they possible? Hard to say in real life, but that trend possibly is representative of something that's, again, possible.

But is that a prudent operation? I'm not sure.

MS. NIKKEL: Are there any legal requirements that would prevent Reclamation from operating this way?

MS. AUFDEMBERGE: Object: Calls for a legal conclusion.

CO-HEARING OFFICER DODUC: To your knowledge as the management -- Manager of Operations, Mr. Milligan.

WITNESS MILLIGAN: I think -- Nothing comes to mind in a direct sense.

What does concern me is, particularly when you have, as often as this may suggest, low allocations, that there may be indirect elements here that I would really want to consider because it may put us at risk of not being able to meet some legal requirement down the road.

And this may be -- It's hard to isolate these things, "Oh, it's just affecting the allocations." It may be affecting other things as well.

So if we were actually going to try to implement this on a long-term basis, this type of strategy, I would say we'd want to be very, very thorough on what those implications can be, and more than just the review I've been able to do with this particular model.

MS. NIKKEL: And I think I heard you say that there are no, to your knowledge, legal requirements that would prevent Reclamation from operating this way; isn't

that correct?

WITNESS MILLIGAN: In a direct sense, no, I don't believe there are.

MS. NIKKEL: Thank you.

So another sentence I'd like to look at is the second sentence (reading):

"Reclamation will make more conservative allocations in all but the wettest years in an effort to reserve water supply for more reliable delivery through drought periods."

Is this statement an existing requirement in the operations of the Central Valley Project?

WITNESS MILLIGAN: This has been -- Again, I don't know what that means. But this has been the practice and is consistent with CVPIA, some of the language there, about what is the yield of the Project in some pretty significant drought sequence of late '20s, early '30s. And this would -- would change that philosophy certainly, and may have other implications as well, as I said.

So, again, I can't think of something legally that directly says, "Thou shalt do this," but there's a whole number of things that have evolved over the decades that fit -- fit within that kind of a philosophy.

MS. NIKKEL: So you're giving me a lot of

information and I'm asking a very direct question. I'm going to try one more time.

WITNESS MILLIGAN: It's usually how these work.

MS. NIKKEL: And I'm asking a very specific yes-or-no question and --

WITNESS MILLIGAN: I'm not aware of a direct legal requirement that dictates the allocations.

MS. NIKKEL: Thank you.

So now I'd like to look at the figure itself, Figure 1.1.

I think I heard you testify earlier that you had some assistance in preparing these figures.

Is the person who prepared this figure going to testify in this proceeding?

WITNESS MILLIGAN: That's my understanding.

MS. NIKKEL: And who is that?

WITNESS MILLIGAN: I think -- I believe this was prepared by either Nancy Parker with the Bureau of Reclamation, or Kristin White. Both, I believe, are on the panel later.

MS. NIKKEL: Okay. And can you -- Can you describe for us just generally what your understanding of what this table is showing -- or this figure is showing.

WITNESS MILLIGAN: The -- the 1.1 figure?

MS. NIKKEL: Um-hmm.

WITNESS MILLIGAN: It's, in essence -- And these, if you haven't -- haven't looked very often at these Exceedance Plots, it's basically just ranking the output from the CalSim simulation for a particular set of assumptions. In this particular case, it's ranking delivery and how often that delivery number is met.

So this would say, in the wetter end of -- Towards the zero in this particular case is -- are wetter years, and we see that the allocations are fairly high, or the amount of delivery in this case -- which kind of will track with allocations as well -- is fairly high for wetter conditions, and as you get to drier conditions, you see that that drops off. And depending on how you operate the CVP or some of your operational assumptions, you'll get a different trace as you go through with that, so . . .

And the modeling that's traditionally been done for the CVP, which is more akin to the blue lines, is something that's had many, many years of input from both folks that get delivery of water as well as Operators for both the CVP and the State Water Project.

The red lines would imply a change in that philosophy as to how those allocations would be done. It does appear that it would be something -- maybe an imprecise term is more aggressive in making allocations.

When water's there, let's allocate higher numbers, which would suggest that you can get some higher numbers, but there's also some times where you'd get lower numbers as you get to the drier.

MS. NIKKEL: Okay.

WITNESS MILLIGAN: That's my interpretation of what I'm seeing here.

MS. NIKKEL: Thank you. That's helpful.

Are you familiar with the concept of export estimates in the modeling?

WITNESS MILLIGAN: As a term for -- within CalSim modeling?

MS. NIKKEL: Yes.

WITNESS MILLIGAN: That -- As a precise term, no.

MS. NIKKEL: I'll direct those questions to the Modelers, then.

WITNESS MILLIGAN: I'd prefer it, yes.

MS. NIKKEL: Last set of questions.

If we could pull up SVWU-107. And we've seen this table already this morning. We're looking at Table 3 on Page 28 of that report.

(Document displayed on screen.)

MS. NIKKEL: All right. Thank you.

There we go. Thank you.

We're going to focus on the second set here, the second table under Table 3 that has the title "Average Annual Change in CVP Delivery By Water Year Type DWR/USBR BA Alternative 4A minus DWR/USBR BA NAA."

This is a table showing the differences in the modeling results as between the No-Action Alternative that was prepared by the Petitioners and the Proposed Project that was prepared by the Petitioners; is that right?

WITNESS MILLIGAN: That's what the table is purporting to be representing, yes.

MS. NIKKEL: On the left side of "North of Delta," there's a term "Ag Service."

Do you see that?

WITNESS MILLIGAN: Yes.

MS. NIKKEL: And it's your understanding those numbers reflect the delivery results in the model for Ag Service Contractors in the north of the Delta; right?

WITNESS MILLIGAN: That would be how I would interpret what's presented here.

MS. NIKKEL: And, so, isn't it right that even under Reclamation's own modeling, it shows that in some years North-of-Delta Ag Service Contractors will receive less water under the Project?

WITNESS MILLIGAN: These suggest there's

several water types that have slight changes, but on the whole, or averaged out, it looks like slightly -- slightly more.

MS. NIKKEL: But on a Water Year type in some types of Water Years, there will be reductions; right? Not just changes but actual reductions; is that right?

WITNESS MILLIGAN: Well, let's see. These are . . . The units here are thousands of acre-feet.

I'm not sure I'm picking up where the units are here.

MS. NIKKEL: It's right under the table. It says, "All Values are in 1,000-acre feet."

WITNESS MILLIGAN: Okay. So that's not a very -- Those are not very big numbers.

MS. NIKKEL: But it is less; correct?

WITNESS MILLIGAN: Well, the model is suggesting it could be less. And then I'll say the -- it appears to be -- the below normal seems to be the bigger negative. But my observation with CalSim results is these are never exactly the same, so --

MS. NIKKEL: Thank you.

WITNESS MILLIGAN: -- this is not a very big change.

MS. NIKKEL: I think I heard your answer.

Thank you. That's all I have.

CO-HEARING OFFICER DODUC: Now, Mr. Milligan, now that you've had to answer this same question twice about this table, does your last answer apply to all the columns in this table?

WITNESS MILLIGAN: That . . .

CO-HEARING OFFICER DODUC: That that's what the models suggest.

WITNESS MILLIGAN: That is what -- Not having examined model output to these numbers, I have not done that kind of fact checking, but this is what this table seems to suggest.

And accepting at face value the pluses and minuses here, that, you know, there's some numbers that are a little bit bigger than others, and there are some that are very small, and I would say those are not very significant.

This -- The CalSim output is not an exact science, so this would show -- My interpretation of a lot of these numbers are that they're pretty close to no change.

The South-of-Delta export numbers are probably ones that warrant a little more inspection.

CO-HEARING OFFICER DODUC: Thank you.

Thank you, Miss Nikkel.

And next up is Group Number 18.

MR. WASIEWSKI: Good morning, Mr. Milligan.

WITNESS MILLIGAN: Good morning.

MR. WASIEWSKI: The two issues that I want to go into today are: First, the operational philosophy of Reclamation; and then the second is actually going to be an issue brought up by Mr. Leahigh on joint operations.

And the reason I want to go into that is because Mr. Leahigh has testified as to joint operations but has only backed it up with data from the SWP. So I would like to ask Mr. Milligan's opinion regarding the CVP side of that. I'll limit it to that only.

CO-HEARING OFFICER DODUC: Okay. With respect to the operational philosophy, we've already established that there -- the operational philosophy, yes, does extend beyond Mr. Milligan's time with the Project but that he has formed his opinion based on his review of materials and based on his knowledge and expertise.

We've also established that the operational philosophies are not in any written manner in terms of a requirement that is specific to the operation of the Project.

And, yes, there is possibility of change in the future, though Mr. Milligan, of course, cannot predict what those changes might be, and he believes -- he believes that . . .

Well, never mind.

So I would strongly advise you to -- if you're going to explore the issue of operational philosophy, to not revisit those grounds.

MR. WASIEWSKI: I don't think we'll be revisiting that. We'll be within, I think, Mr. Milligan's timeframe at the Bureau of Reclamation exclusively, and --

CO-HEARING OFFICER DODUC: I don't --

MR. WASIEWSKI: -- I don't think anyone's touched on these other issues.

CO-HEARING OFFICER DODUC: Okay. And with respect to your second point, how is the second topic within the scope of Mr. Milligan's rebuttal?

MR. WASIEWSKI: It's -- I guess it's in the scope of the Petitioners' rebuttal. And if Mr. Leahigh was here right now, I would ask him these questions with the anticipation he would probably defer to Mr. Milligan on the CVP issue.

And since we only have Mr. Milligan here right now, I just want to get his thoughts on what Mr. Leahigh has said and then leave it at that.

If he doesn't know, I'm willing to accept that and just move on.

CO-HEARING OFFICER DODUC: I'll allow you to

proceed, but that does not seem very fruitful, so we will -- we will see.

MR. WASIEWSKI: Thank you.

MR. OCHENDUSZKO: And would you mind beginning once again with name and affiliation, please.

MR. WASIEWSKI: Sorry. Tim Wasiewski for the San Joaquin Tributaries Authority.

We'll start with Mr. Milligan's rebuttal testimony, so if you would pull up Exhibit DOI-36, please, and go to Page 2.

(Document displayed on screen.)

CROSS-EXAMINATION BY

MR. WASIEWSKI: Mr. Milligan, if you would direct your attention to the third full paragraph.

You write in there that (reading):

"Water years 2014 and 2015 represent a," quote, "set of extreme hydrologic conditions . . ."

Do you see that?

WITNESS MILLIGAN: Yes.

MR. WASIEWSKI: And then in reference to those years, you state that the (reading):

"Reclamation requested modification of some D-1641 requirements . . ."

Do you see that at the bottom of that?

WITNESS MILLIGAN: Yes.

MR. WASIEWSKI: But those are not the only years in which Reclamation requested modifications to D-1641; is that right?

WITNESS MILLIGAN: That's correct.

MR. WASIEWSKI: In fact, even before the most recent drought, Reclamation was having difficulty meeting the February-to-June pulse -- base flow requirements at Vernalis for -- under D-1641; correct?

MS. AUFDEMBERGE: Objection: Mr. Milligan's testimony relates to the operational philosophy of the CVP with respect to upstream reservoirs, not New Melones on the San Joaquin.

CO-HEARING OFFICER DODUC: I'm sorry, I didn't catch the last part.

MS. AUFDEMBERGE: It did not go in to operations in New Melones on the San Joaquin.

MR. WASIEWSKI: If I can respond.

I think Mr. Milligan just stated a little bit earlier that spring outflow might actually come from New Melones, so this, I think, is definitely relevant.

CO-HEARING OFFICER DODUC: To the extent --

Mr. Mizell?

MR. MIZELL: Yes. I'm going to object to using the answers to a previous cross-examination question as a basis to open up cross-examination on rebuttal testimony

to the sky's limit. It's a practice that's been employed today and I don't think it's appropriate.

CO-HEARING OFFICER DODUC: I appreciate that. I noted that as well, but I'm also wanting to avoid having the same question asked again if you were establish it for cross-examination by other parties.

Go ahead and ask your question. I'll give a little bit of leeway but Mr. Milligan, of course, is free to answer that he is not able to provide the information.

MR. WASIEWSKI: Sure.

Mr. Milligan, in years 2003, 2004, 2005, 2009, 2015, and 2016, Reclamation submitted Temporary Urgency Change Petitions to the State Water Board seeking a relaxation to the February-June baseline requirements under D-1641; isn't that correct?

WITNESS MILLIGAN: I can't testify right now to the years, but those -- there's a number of years those -- a few of those do pop out, that that is correct.

MR. WASIEWSKI: If we can pull up SJTA-201, please.

(Document displayed on screen.)

MR. WASIEWSKI: Mr. Milligan, this is a letter written by you to Tom Howard of the State Water Board. And the purpose of it was to explain to the Board how Reclamation planned to address difficulty in meeting the

San Joaquin River flow requirements in D-1641.

Do you recognize that?

WITNESS MILLIGAN: Yeah, it looks familiar.

MR. WASIEWSKI: If you can go to the third paragraph, please, on the first page.

(Document displayed on screen.)

MR. WASIEWSKI: Do you see in that paragraph where -- It's the final sentence (reading):

"In addition, even prior to the expiration of the San Joaquin River Agreement, Reclamation had difficulty meeting the February through June base flows contained in Table 3 of D-1641 and TUCPs were submitted in 2003, 2004, 2005, 2009, 2015 and 2016."

Do you see that?

WITNESS MILLIGAN: Yes, I do.

MR. WASIEWSKI: Does that refresh your recollection as to whether or not --

WITNESS MILLIGAN: It does.

MR. WASIEWSKI: Thank you.

And even after the San Joaquin River Agreement ended in approximately 2011, Reclamation had difficulty meeting not only the base flows but also the pulse flow requirement in D-1641; is that correct?

WITNESS MILLIGAN: That's correct.

MR. WASIEWSKI: And it's true that you

anticipate that these difficulties will continue and be part of the operational philosophy of Reclamation; is that correct?

WITNESS MILLIGAN: Well, the first half, I would say that, you know, until we make some changes to the Basin Plan, which are in the works, we will -- I would assume Reclamation is going to have difficulty in a number of Water Year types in meeting the base flow and the Table 3 pulse flow as well.

MR. WASIEWSKI: In fact --

WITNESS MILLIGAN: Now, that relates to a philosophy. I . . . I . . . I'm -- I'm hoping that we come to a new Basin Plan amendment with some flows that we feel are more achievable.

MR. WASIEWSKI: Well, it is Reclamation's plan at this point that it will operate to the requirements set forth in Appendix 2E of the National Marine Fisheries Biological Opinion from 2009 rather than the less onerous requirements set forth in D-1641 for Vernalis; is that correct?

CO-HEARING OFFICER DODUC: Is there an objection, Miss Aufdemberge?

MS. AUFDEMBERGE: I suppose, yes.

CO-HEARING OFFICER DODUC: Beyond the scope of rebuttal?

MS. AUFDEMBERGE: It's beyond the scope of rebuttal.

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

Your objection is sustained.

MR. WASIEWSKI: Okay. Now, I guess, that's the end of that line of testimony.

If we can pull up Mr. Leahigh's written testimony, which is DWR-78.

And I promise I will lay the proper foundation for this so that it's --

CO-HEARING OFFICER DODUC: Actually --

MR. WASIEWSKI: -- understood.

CO-HEARING OFFICER DODUC: -- you are questioning about the rebuttal testimony of a different witness.

MR. WASIEWSKI: The only thing that I'm concerned about is that when Mr. Leahigh gets up to testify, and if we ask a question regarding CVP operations which he has not provided data for --

CO-HEARING OFFICER DODUC: Therefore, if he has not provided for it, then it's not in his rebuttal, and it's not in Mr. Milligan's rebuttal.

MR. WASIEWSKI: That's --

CO-HEARING OFFICER DODUC: Therefore, it's out

of the scope of rebuttal.

MR. WASIEWSKI: I -- I understand that position, but he's stated that it's the Project's joint operations.

And if I could just ask Mr. Milligan if that's correct, then I would move on from that point.

CO-HEARING OFFICER DODUC: What specifically are you asking first? Ask me -- Okay. Ask your question.

MR. WASIEWSKI: Would it be better if I showed you the line of testimony?

CO-HEARING OFFICER DODUC: Sure.

MR. WASIEWSKI: Okay. Let's do that.

Let's pull up DWR-78, please.

CO-HEARING OFFICER DODUC: Be ready, Miss Aufdemberge.

(Document displayed on screen.)

CO-HEARING OFFICER DODUC: What page?

MR. WASIEWSKI: Sorry. Page 10, Lines 2 to 4.

(Document displayed on screen.)

CO-HEARING OFFICER DODUC: First of all, Mr. Milligan, did you review Mr. Leahigh's testimony?

WITNESS MILLIGAN: I have not.

Is this his rebuttal testimony?

MR. WASIEWSKI: Yes, this is his rebuttal.

WITNESS MILLIGAN: I have not reviewed this in detail.

MR. WASIEWSKI: Okay. I don't think you need to for this. If you have knowledge of what he said here, then we'll go based on that.

It says on Lines 2 to 4 (reading):

"Under a pre-biological opinion" -- meaning the 2008-2009 Fish and Wildlife and NBS Biological Opinions -- "the Projects" jointly "were allowed to use more surplus water to supply South-of-Delta demands . . ."

Do you see that?

CO-HEARING OFFICER DODUC: Okay. Now that I have seen the sentence, I am going to sustain the objection which Aufdemberge I'm sure is about to voice.

MS. AUFDEMBERGE: I am. For the record, I am.

CO-HEARING OFFICER DODUC: Very good.

MR. WASIEWSKI: Well --

CO-HEARING OFFICER DODUC: I will not allow you to cross-examine a witness on the rebuttal testimony of a different witness.

Unless you have something else to ask Mr. Milligan, your cross-examination, I believe, is complete.

MR. WASIEWSKI: The -- Okay. The only thing I

would have to ask is whether or not Reclamation will be willing to make Mr. Milligan available in the event that Mr. Leahigh does, in fact, defer these questions to a CVP expert.

CO-HEARING OFFICER DODUC: I can assure you Mr. Leahigh, I expect, will answer that question with an "I don't know" rather than deferring.

MR. WASIEWSKI: Okay. Thank you.

CO-HEARING OFFICER DODUC: Miss Meserve, you're up next, and you don't have Mr. Keeling to defer to.

MS. MESERVE: No questions. Thank you.

CO-HEARING OFFICER DODUC: What does that mean?

MR. KEELING: It means I'm wearing my tie today.

CO-HEARING OFFICER DODUC: I'm sorry. What does that mean, Miss Meserve?

MS. MESERVE: I have no questions. Thank you.

CO-HEARING OFFICER DODUC: You have no questions. All right.

Then I have Mr. Herrick is next.

Make me proud, Mr. Herrick.

MR. HERRICK: I've been disappointing women my entire life.

(Laughter.)

MR. HERRICK: Thank you, Board Members. John

Herrick for South Delta Water Agency. I have just a couple of very quick lines of questioning.

The first deals with Mr. Milligan's statements about the operations of the Project subject to CVPIA requirements for allocation priorities.

A couple of questions on the minimum health and safety operational constraints or obligations they believe they have.

And then I do have a couple of ultimate questions based upon Mr. Mulligan's -- Milligan's -- excuse me -- answer to the questions about future negotiations will determine operations rather than the ones that were in the modeling done.

I think --

CO-HEARING OFFICER DODUC: Now --

MR. HERRICK: I understand you -- I don't want to beat that dead horse, but there is a -- there are a couple of ultimate questions, I think, very brief and it will elicit useful information.

CO-HEARING OFFICER DODUC: Yes. It has been mentioned by Mr. Mizell, and I have also noticed, this practice of cross-examination based on previous cross-examination. And while I hesitate to endorse such behavior, to the extent that it adds value to the record and help us understand the issue better, I will allow it.

MR. HERRICK: Thank you.

And if I overstep that, I'm sure somebody will yell at me.

CROSS-EXAMINATION BY

MR. HERRICK: Mr. Milligan, thank you for being here.

In your testimony, you talk about the CVPIA -- in reference to CVPIA language on Page 2.

Do you see that in your testimony that?

WITNESS MILLIGAN: Yes, I do.

MR. HERRICK: And it talks about calculating yield after certain things have been provided; is that correct?

WITNESS MILLIGAN: That's the -- the passage from CVPIA, because the CV -- the act itself refuse -- refers back to yield of the Project a number of times, so it's -- the act itself was trying to define how it would define "yield" for the purpose of the act.

MR. HERRICK: And the yield is how much water's available, then, for the various uses or obligations of the Bureau; correct?

WITNESS MILLIGAN: Yes, in general.

MR. HERRICK: In the next paragraph in your testimony after that, you then -- and I'm just generalizing, so correct me if I'm overstating it.

But then you talk about balancing those various needs -- various obligations in order to operate the Project.

Is that generally correct?

WITNESS MILLIGAN: Generally, yes.

MR. HERRICK: Okay. Now, does that mean that -- And I'm looking at the very middle of that paragraph. It says (reading):

". . . Reclamation balances the obligations to Sacramento River Settlement Contractors, South of Delta settlement and San Joaquin River Exchange Contractors, various instream flow and Delta requirements and Level 2 Refuge deliveries."

Do you see that?

WITNESS MILLIGAN: Yes.

MR. HERRICK: Does that mean you're balancing deliveries with in-Delta obligations for water quality?

MS. AUFDEMBERGE: I'm going to object: It's . . . unclear whether -- what timeframe you're asking about.

MR. HERRICK: Well, let's just take a hypothetical year.

I'm just trying to see if the Bureau's decision on how much water goes to the certain listed contractors is balanced with in-Delta water quality obligations or

water quality obligations are met before such deliveries.

MS. AUFDEMBERGE: And if I heard you --

CO-HEARING OFFICER DODUC: Miss Aufdemberge, your objection would mean?

MR. MIZELL: Objection. That's within a year; correct? That's . . .

CO-HEARING OFFICER DODUC: Yes.

MR. HERRICK: Okay.

WITNESS MILLIGAN: So, Mr. Herrick, could you repeat your question after all that? I don't want to answer the wrong question.

MR. HERRICK: No problem.

I listed a number of obligations that your testimony says are balanced, referenced on Page 2. Those obligations were the Sacramento River Settlement Contractors, South of Delta Settlement Contractors, and San Joaquin River Exchange Contractors, various instream flow and Delta requirements and Level 2 Refuge deliveries.

The question is: Are you balancing the needs of in-Delta water quality requirements with deliveries to these various contractors? Or are you meeting in-Delta water quality obligations before you allocate water to those contractors?

WITNESS MILLIGAN: I would generally probably

characterize it as the -- as the -- the former. And these -- Some of these particular obligations that are listed here probably, depending on the situation as to where we may be -- experience a shortage, may change the balancing of that.

But I would probably apologize that the in-Delta water quality needs are not kind of in this list here, if you will, and that is certainly something that we would put a high priority on meeting all these obligations, including the in-Delta water quality as well.

MR. HERRICK: As your answer implies, you've testified, when there are times of shortages, then you -- you might alter your balance. Is that correct or incorrect?

WITNESS MILLIGAN: Well, there may be a circumstance where -- we've seen a few of these over the last couple years -- where even these particular obligations experienced some shortages. And they're not all in proportion.

So meeting -- The difficulty here is, depending on the sources of water and the Settlement Contractors may have a different dynamic than, let's say, the needs of the Exchange Contractors or some of the senior right holders on the San Joaquin River. And this brings into

play some of the operations that relate to the Friant system as well.

So it's a complicated circumstance, but, you know, we would certainly strive to meet -- before any of these are being dealt with as they relate to Delta operations, make every attempt to meet the Delta water quality requirements.

MR. HERRICK: Are there any sort of internal Bureau regulations or specified policies that tell you to what degree one use, or one obligation, is prioritized over another?

In other words, you say you'll likely try to meet the in-Delta ones. I'm trying to find out if that's a rule.

In other words, can you say it's a short year so we won't give -- we won't meet in-Delta because we'll balance that with extreme shortages to other people?

WITNESS MILLIGAN: This is a circumstance, particularly with this set, and when you mix in-Delta water quality requirements as well. In essence, they all tend to read like "You shall do this."

And the concern is, when we aren't there, or there's not enough to go around to meet this what we consider core level of obligations, is to try to figure out how to stretch the limitation the best that we can.

I think in that case, then, we're kind of balancing among them.

But that's -- that's a process that we were looking to see what can be done in a particular year.

MR. HERRICK: And in a big stream dry timeframe, are there any rules by which an outside party could see, by some certain date, the Bureau would no longer be able to meet in-Delta water quality requirements?

WITNESS MILLIGAN: Well, this has been an example where we've tried to get ahead of that game, recognizing that some of these dry conditions, we may see a set of circumstances where it has been extremely dry, storage levels in reservoirs are low, but still some uncertainty about the remaining spring in terms of hydrology and what some water quality needs may be, particularly salinity intrusion as an example.

And it may be prudent to start taking some actions several months ahead, and then some planning as long as six months ahead, to be able to put a plan in place that doesn't create a situation where we've lost total control of salinity in the Delta, for example.

And the Delta salinity barrier at False River was an example of that. And is there something we can do to avert that catastrophe of losing salinity completely,

and losing control of the limited amount of water that we have.

This is not a very good way of answering your question.

It's extremely dry hydrology that would create a circumstance where we had to start balancing needs within this kind of set of contractors and the Delta salinity regime is fairly severe, and the degree of that severity will probably lead us on a case-by-case basis on how we would get there.

So I don't know that there's any cookbook or any specific definitive way of doing that that we could point to ahead of time.

MR. HERRICK: So the Bureau's policy is not to meet Permit conditions before other obligations?

MS. AUFDEMBERGE: Objection: That's way beyond the scope.

CO-HEARING OFFICER DODUC: Let's withdraw that question, or rephrase it, Mr. Herrick.

MR. HERRICK: I'll withdraw.

Mr. Milligan, your testimony references the health and safety issue involved with the modeling that you respond to, and I just have a couple questions.

You include in your minimum export needs at the south of -- South Delta export facilities the City of

Tracy's supply; is that correct? You reference it. Sorry.

WITNESS MILLIGAN: Yeah. We make reference to it, yes.

MR. HERRICK: Is the City of Tracy's sole supply of water the CVP or does it have other supplies?

WITNESS MILLIGAN: I believe they do have some other supplies.

MR. HERRICK: Are there any municipalities that receive CVP water that rely solely on that CVP water for their uses?

MS. AUFDEMBERGE: Objection: That's beyond the scope.

CO-HEARING OFFICER DODUC: Mr. Herrick.

MR. HERRICK: Well, he's -- His rebuttal testimony explains why health and safety minimum amounts must be maintained, so I'm exploring with him the basis of those health and safety obligations.

CO-HEARING OFFICER DODUC: All right.

MR. HERRICK: There's only a couple -- There are only a couple questions remaining.

CO-HEARING OFFICER DODUC: All right. Overruled.

Mr. Milligan.

WITNESS MILLIGAN: There . . . Okay. This is

not my area of --

CO-HEARING OFFICER DODUC: And try to be as concise as possible.

WITNESS MILLIGAN: I will.

I think that certainly the Cities of Avenal, Coalinga, are two places that rely a great deal. I don't -- I don't know that it's their only source of water, but predominantly are relying on CVP water.

MR. HERRICK: You mention that there were a number -- a few times in 2014 and 2015 when you -- you, the CVP, pumped less than the 1500 cfs -- I'll say in quotes -- minimum health and safety amount.

Do you recall that?

WITNESS MILLIGAN: The combined exports between the Project and the CVP were below that.

MR. HERRICK: Yes.

WITNESS MILLIGAN: Yes. There were several times where the combined exports were below the 1100, which was 300 cfs by the State Water Project and 800 cfs for the CVP, and there were a few times that we were below that.

MR. HERRICK: Were there any health and -- Excuse me.

Were there any health and safety damages resulting from your joint pumping -- combined pumping of

less than 1500 cfs that you know of?

WITNESS MILLIGAN: Well, certainly some places were still very short of water. Fortunately, at this particular time, there was some other water that we were able to -- lack of a more precise word -- borrow from the State Water Project to be able to meet those needs and then repaid them at a later time.

MR. HERRICK: Without being -- sounding rude, I asked you if there were any damages to health and safety resulting from those lower pumping rates, combined pumping rates, and you answered, well, there were people experienced shortages but we -- they were able to be covered.

But the question is: The failure to pump 1500 cfs, did that result in someone not -- not meeting health and safety standards somewhere?

WITNESS MILLIGAN: I am not aware.

MR. HERRICK: Thank you.

WITNESS MILLIGAN: I don't know.

MR. HERRICK: Again, this is the last part, the followup on especially the questions by Mr. Bezerra.

You were asked questions about the -- how the Bureau might make up for shortages of exports to South-of-Delta contractors under WaterFix, and I think you were looking at the below-normal year -- excuse me --

the average annual was minus 13,000 acre-feet or something like that.

Do you recall that?

WITNESS MILLIGAN: Generally, yes.

MR. HERRICK: Yeah. The ultimate question I want to ask you is:

The method by which you address that shortage, if the Bureau tries to address that, is -- or would require some sort of operational action.

Would you agree with that? I mean, something would have to be done to do that. It won't magically appear somewhere.

WITNESS MILLIGAN: If I follow you, I would assume that operationally we would do something differently, probably in the Delta.

One pumping facility would pump rather than the other.

MR. HERRICK: And so my question to you, then, is:

Until we know how you're going to address that, how do we evaluate the impacts of the California WaterFix?

WITNESS MILLIGAN: Well, not being the person that developed the impact analysis to the -- let's say, the -- the environmental documents, meaning the EIS/EIR,

the work that's being done on the Biological Assessment, I think you need to look at it as a case-by-case.

The aggregate pumping of the two Projects probably covered a great deal of the effects, and that we're into some very fine-tuning potential effects that, oh, 50,000 acre-feet of pumping over a course of the year occurred at Jones rather than at -- through Clifton Court potentially.

I'm not going to say there's not an effect associated with that, but it may be much less than -- It may be a much smaller subset of the total effects of the -- what's being represented in these documents as we have the support.

MR. HERRICK: It could certainly be a small effect.

But isn't the purpose of this hearing to identify the effects so that people can then evaluate the import of those and whether or not they translate into someone's later conclusion of legal injury?

MS. AUFDEMBERGE: Objection: It's beyond the scope; calls for a legal conclusion.

MR. HERRICK: I thought it was an excellent question.

CO-HEARING OFFICER DODUC: I thought it was an excellent question, too.

I don't know that Mr. Milligan can answer it.

Mr. Milligan, do you wish to try?

WITNESS MILLIGAN: I wish I could answer it. It's an excellent question.

CO-HEARING OFFICER DODUC: So let's leave it at that.

MR. HERRICK: One last question, and it deals with the Table 3.

You were commenting that the changes to North-of-Delta deliveries appear to be slight and only 4,000 acre-feet in a below-normal year.

Do you require that -- require that -- remember that?

WITNESS MILLIGAN: That's the table we brought up in the exhibit, yes.

MR. HERRICK: But that's an average annual number; correct? It wasn't the maximum.

WITNESS MILLIGAN: That was a -- If I remember, the 4,000 acre-feet was an average of what was labeled "below normal years."

MR. HERRICK: So in some below normal years, it would be higher than that, and in some below normal years, it would be lower than that.

WITNESS MILLIGAN: My assumption is the weren't all the same, so yes.

MR. HERRICK: Right.

So do we know how often a higher number might appear so we can determine whether or not 4,000, 10,000, 6,000 actually harms somebody, or do we just have to assume that the average indicates there's no harm to anybody?

WITNESS MILLIGAN: This would probably be an area that the Modelers would be able to -- The data is there to do that and assess that. The roll-up table from MBK's exhibit kind of mushed those all together so you couldn't tell that from that table. But the data is there defined if that's an area of interest for someone.

MR. HERRICK: Thank you. That's all I have. Sorry for going over my estimated time.

CO-HEARING OFFICER DODUC: Thank you, Mr. Herrick. I'll take it out of Mr. Jackson's time.

MR. HERRICK: Thank you.

CO-HEARING OFFICER DODUC: Mr. Jackson, it's always difficult to follow Mr. Herrick but you are up next.

MR. JACKSON: He says I'm -- He says I'm older than he is so I deserve more deference.

CO-HEARING OFFICER DODUC: Right. I did observe that he offered you his glasses earlier --

MR. JACKSON: He did.

CO-HEARING OFFICER DODUC: -- which I thought it was kind.

MR. JACKSON: He did. He's a kind man.

Could we put up --

CO-HEARING OFFICER DODUC: Mr. Jackson, also, the points that you will be covering?

MR. HERRICK: Well, actually, I was going to cover the three points: The operational philosophy and the use of stored water, the fall water, and the health and safety pumping.

I think the last two have been covered by people in front of me, so while we have beaten the operational philosophy up fairly well, I have some specific questions that have not yet been asked.

CO-HEARING OFFICER DODUC: Okay.

MR. JACKSON: And so I would like DOI-36 at Page 3, which was up there before.

(Document displayed on screen.)

MR. JACKSON: Excuse me. Maybe it's back on Page 2.

CO-HEARING OFFICER DODUC: If it helps, I think the monitor in front of you --

MR. JACKSON: There you go.

CO-HEARING OFFICER DODUC: -- has it as well.

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CROSS-EXAMINATION BY

MR. JACKSON: In this section of your testimony, Mr. Milligan, you've -- you've used the term "operational philosophy."

What do you mean by that term? How do you define that?

WITNESS MILLIGAN: Well, as it relates to this particular testimony and specifics back to some of the review of the modeling that was presented, for lack of a word, the MBK modeling, was that, in this case, what is the philosophical approach operation that we would be taking if we had a circumstance we had limit -- we didn't have a lot of limitations as to the movement of water from the north of the Delta to the south of the Delta, and how would we value -- and I'm using a CalSim term here. How would -- What relative value would we put in an acre-foot of water that may reside in Shasta versus taking up to and trying to, with some losses, to get that into San Luis Reservoir?

And what I was trying to emphasize here is that we see a great deal of value of an acre-foot of water in Shasta or in Folsom because it gives us a lot of flexibility depending on what the subsequent Water Year plays out because there are more things we can use that water for, whether it's meeting a demand in that

particular basin or an in-stream flow in the river or in that particular year ahead, or to meet a Delta water quality standard or outflow objective. Once we move it into storage south of Delta, then it's pretty limited as to where it's going to go.

So we would not take -- We would not take likely -- lightly the idea of, gee, we're past capacity and there's some calendar dates left here, let's pump -- release water and pump water to south of Delta just because we have additional capacity or a change in the criteria that might be involved.

So philosophically, we -- So when -- Probably the long way of saying.

We would still give a great deal of deference to the need to carry -- have some water available to provide us the maximum flexibility for an uncertainty ahead in terms of Water Year.

MR. JACKSON: So is it fair to shorten the characterization to the words that the water is more valuable for more uses the higher up the system you keep?

WITNESS MILLIGAN: Generally speaking, yes. There's a point at which, as you're getting close to your conservation pool, that you might say, gee, I've got a very saturated basin. I might spill this, and I might lose control of that, because I need to consider flood

operations, so . . .

There's a gradation in that but, generally speaking, what you said is true.

MR. JACKSON: Okay. Is that, then, the source of your statement that the operational philosophy is further supported by the definition of CVP yield that you put in your testimony?

WITNESS MILLIGAN: I think that, again, this is in the context of our review of some of the MBK modeling, which does tend to be a bit more aggressive in how water is allocated both north and south of the Delta. It was one of our earlier charts.

Mathematically speaking, that may on average produce higher deliveries but lower deliveries in the drier sequences and presenting, probably, inherently some more risk.

And what we're trying to point out here was that that may be actually a counter-philosophy to what might be proposed -- or what had been used as a -- as a citation within CVPIA, but by many folks' terms, what does reliability mean? And your ability to maintain at least some deliveries in drought sequences is usually -- For some folks, that is the definition of liability, not an average annual delivery over time.

And our concern was the outputs of the -- those

modeling results tended to deliver more water in the wetter sequences than not.

MR. JACKSON: So what I -- The remaining part of my questions will be in regard to the -- whether or not there are different categories in terms of your operating philosophy based upon whether or not there are statutes behind them or regulations behind them.

And so my question is: What is the meaning of -- in terms of your operation -- of your limitations under Section 3406(b)(2) that you mentioned here?

Does -- Does your contractual obligations begin before these things are done that are listed in 34(b)(2) (sic) or are those balanced with your view of your contractual obligations?

WITNESS MILLIGAN: I probably am not the best person to talk about where these lie within the obligations of the contracts.

MR. JACKSON: Well, you're the Operator, so . . .

I mean, how do you see -- Well, for instance, you've listed a number of things that are required that include your obligations under your licenses and permits with the State Water Resources Control Board.

Do you need to meet those before you -- completely before you even consider your contractual

obligations?

MS. AUFDEMBERGE: I'd like to object: Much of this requires -- calls for a legal conclusion.

CO-HEARING OFFICER DODUC: I would like to hear his answer as an Operator, his understanding of what his obligations are.

MS. AUFDEMBERGE: On an annual -- In one year; correct?

CO-HEARING OFFICER DODUC: In any year.

MS. AUFDEMBERGE: Well, there's a year over a year and one year.

CO-HEARING OFFICER DODUC: In any year, what is his understanding of his obligations?

WITNESS MILLIGAN: Well, there are different -- there's different forms of contracts.

But as an Operator, our first order of business is, are we operating through the -- through the year to meet our permit terms and conditions and our Biological Opinions.

But -- And then at the same -- But at the same time, in most years, this is not a kind of either/or. Can we meet the obligations of -- they relate to settlement contracts, things that we have an understanding have their root in senior water rights to us.

Once we figure out how we're going to operate around those, then we can start looking at things, maybe water available for -- that are probably terms -- or you could use the term is more discretionary, meaning that there's a discretion to move those things up and down.

MR. JACKSON: All right. And what --

WITNESS MILLIGAN: What gets very difficult is in a year where you're trying to put together the operations to meet the Permit terms and conditions and obligations of senior water right holders and there's not enough water to go around.

MR. JACKSON: In regard to your license and permit conditions and the State Water Resources Control Board's authority, aren't they in charge of determining who's senior in any given circumstance rather than the Bureau?

WITNESS MILLIGAN: Well, yeah, but -- And to a large part, as an Operator, a lot of that is in most circumstances settled already, that we understand what those mean. Some of meeting those obligations have their roots in some Board orders.

MR. JACKSON: Yes.

The -- When you talk about "other agreements pertaining to the Central Valley Project under applicable State or Federal law existing at the time of enactment of

this title have been met," does that include the salinity requirement that was a -- a reason for the Central Valley Project going into effect originally?

MS. AUFDEMBERGE: Objection: Calls for a legal conclusion.

MR. JACKSON: As an Operator, do you operate to meet the salinity requirements in the Delta as a purpose of your Project?

CO-HEARING OFFICER DODUC: Mr. Mizell.

MR. MIZELL: I'm objecting to Mr. Jackson's line of questioning as asking Ron Milligan to interpret statute and derive the meaning and operational philosophy of his superiors that he's already testified in cross-examination by Mr. Hitchings that he's given certain constraints and he operates to those constraints.

The rationale behind constraints is what Mr. Jackson is trying to get into, and I believe that's already been asked and answered.

CO-HEARING OFFICER DODUC: Mr. Jackson.

MR. JACKSON: I'm reading off the man's rebuttal testimony, and so I can't possible be out of the scope of his rebuttal testimony.

The --

CO-HEARING OFFICER DODUC: You're not -- Mr. Jackson, I'm trying to ascertain what additional

information Mr. Milligan might be able to provide in response to your question that you -- that you're trying to seek.

MR. JACKSON: Well, the -- the -- the language I was just moving to is: What are the applicable State or Federal laws that he's talking about? And do they include things specifically like the Delta Protection Act?

CO-HEARING OFFICER DODUC: Mr. Milligan.

WITNESS MILLIGAN: Mr. Jackson, could you point to which particular area you're speaking of when you're -- Is it the text that was within the citation of 3406(b)(2) from the CVPIA or was it --

MR. JACKSON: 3406(b)(2), in your testimony, looks to be Page 2.

WITNESS MILLIGAN: Correct.

And I think that that text is related back to how, for the purposes of the Act, they're defining "yield" and to some degree "reliability."

But there's a whole host of State and Federal requirements that -- that we're trying to meet at any particular time.

MR. JACKSON: And -- And I guess I'll try to simplify the question.

Since you have this stuff -- this definition of

"yield" in the CVPIA, do you meet -- do you see your operational philosophy as operating to balance things after these are met, or are these just other things that you balance with your contracts?

WITNESS MILLIGAN: I think I --

MS. AUFDEMBERGE: I have to object to that. The -- I don't understand what "these" are. These are --

MR. JACKSON: They are, according to this, project yield.

My question is: Is the project yield determined after fishery, water quality, flow and operational requirements, terms and conditions and license permits and other agreements relating to the Central Valley Project under applicable State or Federal law?

MS. AUFDEMBERGE: I'm just going to have to object:

This is -- He's asking about interpretation of the statute, and Mr. Milligan has already testified that's not the purpose of his reciting CVPIA, that section.

CO-HEARING OFFICER DODUC: Mr. Milligan, let's see if we can finish this up.

Your inclusion of CVP yield in your testimony was intended for what purpose?

WITNESS MILLIGAN: The purpose was to show that delivery of water predominantly for Water Service Contractors was viewed through a lens of what could you do during a prolonged drought sequence, not what is the yield of the Project over all Water Year types.

So the intent here of talking about this is that, even back to CVPIA earlier documents, the intent of the Project was to look at it through the lens of what kind of water can you provide through an extended drought period?

And that was the reason that we included this, because this would -- If you were to look at yield only from the 1928 to 1934 drought period, you would actually see, from what the MBK modeling was suggesting, a significant decrease in yield, using this definition, to that approach.

It's not that they couldn't change in the future. That was the intent here was, we were losing what appeared to be availability of water for Water Service Contractors in -- in drought sequences.

The rest -- As an Operator, we don't typically every year try to define what's the yield of the Project through the drought sequence.

CO-HEARING OFFICER DODUC: Right.

WITNESS MILLIGAN: That's really not germane to

the day-to-day operations of the Project.

CO-HEARING OFFICER DODUC: Mr. Jackson, I believe you exhausted this particular area to the point where I think we've maximized the value of his line of questioning.

MR. JACKSON: I understand that that may be the ruling. For the purposes of the record, I would like to indicate that I don't believe I've exhausted it.

And the next question would be: When he talks -- When the CVPIA Project yield is analyzed, what State and Federal laws are a part of that determination in any given year?

MS. AUFDEMBERGE: That's a legal conclusion. That requires a legal conclusion.

CO-HEARING OFFICER DODUC: Yes, it requires legal understanding, but Mr. Milligan is an Operator, a Senior Level Operator, who does have some information.

So, to the extent that you have included this in your testimony, Mr. Milligan, can you answer Mr. Jackson's question with respect to the scope of this paragraph?

WITNESS MILLIGAN: If one were to today do an analysis of what is the yield of the CVP through this drought period, specific to this language -- and this is not something that's routinely done; I want to emphasize

that -- that it would probably be a whole host of existing permit terms and conditions, Biological Opinions, Water Quality Control Plan requirements, in-stream flows, Trinity rock flows potentially would fall into that.

We'd probably have to sit and brainstorm a whole number of things. A lot of those are already inherently wired into CalSim so I would probably start there. All of those types of things certainly would be --

CO-HEARING OFFICER DODUC: So let me stop you there, Mr. Milligan and ask Mr. Jackson:

I would hope it's not your intent in asking this question to go through a listing of all those requirements.

So what -- What is the point that you're trying to get across here? Help me understand.

MR. JACKSON: Sure.

I'm trying to understand -- and I thought that's what this says -- to determine whether or not the operational philosophy which seems to be the answer to everything at this point, since nothing in terms of operation has been specifically submitted for this Project, nothing definitive, includes the laws that they're required to follow as -- as deductions from yield

that they're operating with under their philosophy.

CO-HEARING OFFICER DODUC: Mr. Milligan.

WITNESS MILLIGAN: Again, a calculation of yield is not something that -- that we would -- that's typically done, particularly in this case.

If one were to do it for the -- and they had a purpose for CVPIA, this is the sum total of the guidance we get. So we would make an attempt to determine that.

From the philosophy of how we operate the Project, what we're saying is that we would try to maintain in that philosophy operating in a manner that would maintain some level of deliveries through extended drought periods.

CO-HEARING OFFICER DODUC: While in complying with applicable State and Federal law.

WITNESS MILLIGAN: Yes, exactly. It's not -- Which I think is the purpose of that rebuttal, was to say that we seem to have lost that line of thinking and what the MBK presentation of impossible operations would look like, which is, well, we're just going to try to get as much water on average as we can, which has a lot of delivery of water in the, and above the, average timeframe.

And that, when you start comparing it to with and without the Project gives you some different answers,

that was really the whole point here, is that we still see value in drought sequences and making deliveries to Water Service Contractors. And those will be done after we meet other obligations, which are related to senior water right holders and permit terms and conditions.

CO-HEARING OFFICER DODUC: And Permit terms and conditions.

WITNESS MILLIGAN: Correct.

CO-HEARING OFFICER DODUC: Thank you.

MR. JACKSON: And I don't want to confuse it, so I'm . . .

Mr. Milligan, in regard to the drought sequences of the 1928 to 1934 drought, your operational philosophy at this point in time is to keep that in mind. Is that fair to say?

WITNESS MILLIGAN: Well, yes. I think what we've got today is probably that drought sequence, the '88 through '92 drought period. I think the period that we just are coming out of is influencing a bit of our thinking, is that, what do we do to maintain some control of the system?

And I'll take even 1977 Delta water quality as well, is, what -- what can we do to maintain control of our system so we don't lose that salinity in the Delta at some point?

MR. JACKSON: So isn't it time to do that and put it into the permits in terms of trying to be able to get through the next drought --

MS. AUFDEMBERGE: Objection --

MR. JACKSON: -- with a plan?

MR. MIZELL: -- calls for a legal conclusion.

MR. JACKSON: This is an Operator conclusion. I mean --

MR. MIZELL: It's a legal conclusion about whether the Board had --

MR. JACKSON: We could it with a legal conclusion --

CO-HEARING OFFICER DODUC: Stop. Stop. Stop.

Mr. Milligan, are you able to answer the question?

WITNESS MILLIGAN: I can't answer the question that this is the time or the place or the process to do that.

But as an Operator, we are constantly thinking about that and amongst some other things. We're thinking next year is a flood, a wet year, like in 1982 to '83 type of transition. We're also thinking about those things.

So there's a lot of planning positional logic that goes into our operations, and I don't know. They're

all good things, but where do we do that? I can't say.

MR. JACKSON: And one last question.

This Project is designed to take excess water from below the reservoirs.

Would you define what you mean by "excess water from below the reservoirs."

WITNESS MILLIGAN: Well, let's say excess water in the Delta, and let's say as it relates to this particular new Point of Diversion, let's say, high flows past Hood that are in excess of what's needed to maintain salinity and other biological outflow requirements.

So as we've seen on, let's say, daily time-step, there's probably a number of days and a particular hydrologic sequence that the flows that are past that reach of the Sacramento River or in excess of those needs, and that diversion there can be done in a safe manner.

So those are the -- And those flows are, let's say, product in the winter and spring that are not the product of reservoir storage withdrawal, but are either passing through flows that would not otherwise be stored, or have actually fallen on the valley floor and they're running into the Delta.

That's -- That's my thinking of the definition.

MR. JACKSON: And it's your position that

there's no one who has a senior water right to the Bureau for those waters?

WITNESS MILLIGAN: We would only be --

MS. AUFDEMBERGE: Objection: That . . .

CO-HEARING OFFICER DODUC: Just let him answer, Miss Aufdemberge.

WITNESS MILLIGAN: To the degree that we would be exercising our current rights, as we understand them. We're -- We're not suggesting in this proceeding that we're expanding our -- the volume of water that we would take or the -- the period, the season of diverting the water. It's just adding another location.

MR. JACKSON: And if you were incorrect about that and were actually doing that, then you're not trying to change priority of water rights by joining this Project.

WITNESS MILLIGAN: That's -- That -- That is correct. That's not my understanding.

MR. JACKSON: Thank you.

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

Miss Des Jardins, you are our last cross-examiner.

MS. DES JARDINS: Okay.

CO-HEARING OFFICER DODUC: Miss Des Jardins has

requested 45 minutes. I will urge her to be more efficient.

However, Mr. Milligan, what is your flexibility to go a little bit beyond 1:00?

WITNESS MILLIGAN: I would be flexible to stay until we finish this line of questioning.

CO-HEARING OFFICER DODUC: All right.

MS. DES JARDINS: Thank you. Dierdre Des Jardins with California Water Research.

CO-HEARING OFFICER DODUC: And the points that you will be covering, Miss Des Jardins?

MS. DES JARDINS: I wanted to specifically ask about the allocation decisions and the pumping that was done in the fall of 2013 and what happened with storage in 2014.

And there's sort of some inconsistencies, and I --

CO-HEARING OFFICER DODUC: I'm sorry.

MS. DES JARDINS: And I also wanted to look at what the total minimum health and safety demands of the CVP were and how -- how he was making provisions to end a repeat of the '28 to '34 drought, meeting those demands.

CO-HEARING OFFICER DODUC: And on your first point with respect to inconsistency, are you referring to inconsistency to the philosophy in his rebuttal

testimony? What kind of inconsistencies?

MS. DES JARDINS: It's factually inconsistent.

CO-HEARING OFFICER DODUC: In the allocation decisions that were previously made?

MS. DES JARDINS: I'd like to be able to ask the question. I think that'll make it clear, and then you can rule on any other one.

CO-HEARING OFFICER DODUC: We shall see.

Proceed.

MS. DES JARDINS: Okay.

CO-HEARING OFFICER DODUC: Miss Aufdemberge.

CROSS-EXAMINATION BY

MS. DES JARDINS: So, Mr. Milligan, I'd like to pull up Exhibit DOI-36, please.

(Document displayed on screen.)

MS. DES JARDINS: And I'd like to go to the bottom of Page 2: "Using fall exports."

And it states (reading):

"We typically assume that if they can meet" --

It's on the bottom of Page 2.

(Document displayed on screen.)

MS. DES JARDINS: Scroll to the next page.

(Scrolling down document.)

MS. DES JARDINS: (Reading):

". . . The peak demand in July and August then

we will be able to meet the demands" during "the contract year. As a result, available Delta pumping in September through November does not typically influence the allocation estimates made the previous spring."

So, in 2013, you've had one of the dryest periods on record. And as you went into fall, the records show that you had maximal pumping of 4250 in August, 3250 in September, and 2500 in October and the first part of November.

I can pull up a slide if you'd like to look at that.

And so my question to you is: That wasn't minimal health and safety pumping and, in fact, by January, you'd drawn down Shasta to 1.6 million acre-feet.

So when you were -- you had made the allocation the previous spring, when you were doing that pumping and you were seeing that it was a very dry fall and, in fact, your testimony says that it was the dryest 12-month period on record, did you consider reducing the allocations?

WITNESS MILLIGAN: So, with all of that discussion, if the question is, did we consider reducing allocation, the answer is no, because the water

predominantly used for that allocation had already been used; that the pumping that was done in that fall wasn't really being directly delivered to support the allocation.

I think consistent with what is written here, is that that was actually a period of time where storage was increasing in San Luis, not to support necessarily directly the allocation. And that it's also probably my recollection that this was a period in time where we saw depletions kind of break in Sac Valley, and we saw actually secretions occurring, and that there was water available to pump in the Delta.

So we'd have to look at simultaneously what were the releases in the reservoirs, and were they at -- releases that were consistent with in-stream flow requirements?

MS. DES JARDINS: Could we pull up DDJ-179, please.

(Document displayed on screen.)

MS. DES JARDINS: This shows -- I did pull up what was happening in Shasta. I know that you were increasing storage in San Luis but this shows what was happening with Shasta that fall.

WITNESS MILLIGAN: And I can't -- I'm sorry. I can't quite read. Is this storage going on?

MS. DES JARDINS: Yeah. This is the reservoir storage. I pulled it off of CDEC.

WITNESS MILLIGAN: Yes.

MS. DES JARDINS: And you can see, at the end of August, you were about almost 2.4 million acre-feet, September you were 2.1, October you were 1.5, and I -- you see it being drawn down through the entire fall.

WITNESS MILLIGAN: And we -- we had -- So the real question is, what were the releases at that time? We have to release some minimum flows for fishery on the upper part of the Sacramento River.

MS. DES JARDINS: Isn't that primarily in the spring, though?

WITNESS MILLIGAN: No. We have at least a minimum -- and actually per -- through 3406(b)(2) of the CVPIA, we were actually trying to provide some in-stream flow habitat for spawning fall-run Chinook as well.

MS. DES JARDINS: Okay. Can we bring up DDJ-180, please.

(Document displayed on screen.)

MS. DES JARDINS: So this is the actual pumping during that period, and it shows -- Isn't 4250 fairly close to the maximum at that Tracy Pumping Plant?

WITNESS MILLIGAN: Probably -- With most configurations, it probably was five units, so, in a

lower diversion period, it was probably about what I -- I believe the capacity of is EC probably what's happening here.

MS. DES JARDINS: And then it shows we were down to 3450 and then down to around 2500. And then it was only until late December that you finally start ramping down to 1,000, which is close to your minimum.

CO-HEARING OFFICER DODUC: And the question is?

MS. DES JARDINS: And so wasn't -- Weren't you releasing water from storage? Doesn't this imply that you were having to release water from storage for these fall exports? Because I don't believe there was very much runoff during that fall.

WITNESS MILLIGAN: The answer is, no, I don't believe so. I think I characterize it as we were making releases -- reservoir releases for in-stream purposes upstream and pumping what was available to the Project at -- in the Delta at the time.

So we're taking what we had from our releases on both the American and the Sacramento and, per COA sharing formula with the State of California, these were pumping rates that were supported by those releases.

But it's not my recollection that we were augmenting those releases at this particular time to -- to basically increase pumping rates. If that were the

case, you would have probably seen a lower -- lower storages at Shasta, for example, and higher pumping rates here.

MS. DES JARDINS: What is the minimum release at Shasta in the fall at Keswick?

WITNESS MILLIGAN: Well, the minimum is 3250 has been our rule of thought. But, as I said, there is -- are augmentations to that, you know, in coordination with U.S. Fish and Wildlife Service, State Fish and Wildlife, and other fisheries that augment that flow to provide additional spawning habitat and flow flexibility -- or flow stability through that Reach for spawning in the fall.

MS. DES JARDINS: You have (b)(2) water that you use sometimes, but do you remember if you used that or did augment the -- the minimum flows?

WITNESS MILLIGAN: I -- I don't have that with me at the moment.

MS. DES JARDINS: Okay. What is the minimum flow at Folsom in the fall?

WITNESS MILLIGAN: That depends --

CO-HEARING OFFICER DODUC: Hold on.

MS. DES JARDINS: Yeah.

CO-HEARING OFFICER DODUC: Hold on.

MS. DES JARDINS: Getting off --

CO-HEARING OFFICER DODUC: Miss Des Jardins, I allowed you to explore this topic, even though Miss Aufdemberge did not object, but I need you now to go back to the rebuttal testimony that Mr. Milligan presented.

And if there are any inconsistency that you observe with respect to what he testified to in his rebuttal, then that's where you should focus.

MS. DES JARDINS: Okay. Let's -- Let's go back to Page 2 of DOI-36.

(Document displayed on screen.)

MS. DES JARDINS: And -- Yeah. Let's scroll back up.

(Scrolling up document.)

MS. DES JARDINS: Scroll back up.

(Scrolling up document.)

MS. DES JARDINS: Okay. There we are.

(Reading):

". . . Calendar year 2013 had the driest 12-month period on record. A primary factor in these years was the severely limited snowpack to provide a water source throughout the irrigation season. In these years, Reclamation chose not to drain the upstream CVP reservoirs to meet system demands due to heightened potential risk of the

drought continuing."

So this seems to be inconsistent. What you're saying is that you were required to make, it looks like, about 800,000 acre-feet of releases for fishery flows?

WITNESS MILLIGAN: Well, again, we haven't looked at what the releases were. I haven't presented that.

But we had minimum flows that were required, and those were coordinated to meet those flows, and minimum flows on the Sacramento River as well.

I don't know what was controlling Keswick releases at the time. But we were just pumping, for the most part, the water available, once it hit the Delta, that was driving what those pumping rates were, not vice versa.

It wasn't a pumping number to support an allocation because demands had dropped off and that's why San Luis Reservoir was accumulating storage. It was a matter of this water needed to be released upstream and that, once it reached the Delta, we were within our rights to pump it.

MS. DES JARDINS: I . . . I did want to ask you about:

Do you know what the -- what the demand is in drought years for the Settlement Contractors?

CO-HEARING OFFICER DODUC: Miss Aufdemberge.

MS. AUFDEMBERGE: Object: That's beyond the scope.

MS. DES JARDINS: He does state -- And let's go back to this. Let's go up -- Scroll up to CVPIA.

(Reading):

"For the purpose of this section, the term 'Central Valley Project yield' means the delivery capability of the Central Valley Project during the 1928-1934 drought" --

CO-HEARING OFFICER DODUC: Yes. We've seen this particular passage already thanks to -- Well, we've seen this.

MS. DES JARDINS: So you don't provide any information here about what the actual CVP demands are and how you would meet them during a repeat of the '28 to '34 drought?

CO-HEARING OFFICER DODUC: And Mr. Milligan has already answered in response to a previous question as to the intent of including this passage.

Do you --

MS. DES JARDINS: What was the answer?

CO-HEARING OFFICER DODUC: Do you have further questions?

MS. DES JARDINS: What was the answer that he

gave previously? Because I -- I did want to ask a followup question about that.

CO-HEARING OFFICER DODUC: What is your followup question?

MS. DES JARDINS: Why . . .

The 2014 drought was not more severe than the '28 to '34 drought, so why weren't you able to meet -- You know, this says that --

MS. AUFDEMBERGE: Objection.

MS. DES JARDINS: This implies there's reliability.

MS. AUFDEMBERGE: Assumes facts not in evidence.

MS. DES JARDINS: Yeah.

CO-HEARING OFFICER DODUC: Miss Des Jardins, complete your question for me.

MS. DES JARDINS: Oh.

Why weren't you able to meet the CVP demands, including the water quality requirements? Because it did say there that (reading):

". . . Means the delivery capability . . . after fishery, water quality, and other flow and operational requirements" are "met."

And I'm trying to see because there's -- there's a concern there that it wasn't -- There were --

There were conflicts at that point in 2014. It was a dry year.

And the question was, why wasn't there enough water to meet the health and safety standards that you needed to meet without curtailing these other obligations?

CO-HEARING OFFICER DODUC: Because it was a drought?

MS. DES JARDINS: This indicates there's a reliability issue.

Do you -- When making your allocation decisions, do you consider the need to provide minimum health and safety flows in subsequent years?

MS. AUFDEMBERGE: I'm going to object: The questioning is premised on the '28 to '34 drought being worse than the '13 through '16 --

CO-HEARING OFFICER DODUC: No, let's -- Okay.

MS. AUFDEMBERGE: And I'm not sure --

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

Let's take Miss des Jardins' last question and apply it to the operational philosophy to which Mr. Milligan has been testifying.

WITNESS MILLIGAN: So how would we phrase that question?

CO-HEARING OFFICER DODUC: Miss Des Jardins, just state your last question again in terms of considering health and safety --

MS. DES JARDINS: This implies -- The Central Valley Project yield implies . . .

Is the CVP able to meet minimum health and safety requirements through a repeat of the '28 to '34 drought?

CO-HEARING OFFICER DODUC: I don't know that it requires that.

Mr. Milligan.

WITNESS MILLIGAN: That is not how I read this section of the Act. It just says this -- If you were to compute the yield of the Project, we'll define that as this particular sequence -- drought sequence after you've met these other requirements. And if that ends up being zero, the yield of the Project would be zero potentially if you apply this.

That's a little different question than the previous question we had, so I'm not sure -- That is not how I would read this particular question. This is not applying a guarantee or a philosophy to get through and meet certain obligations during this drought sequence.

CO-HEARING OFFICER DODUC: Thank you.

MS. DES JARDINS: Okay. So this says --

Doesn't it imply that, under your current operational philosophy, that you will have water in carryover storage to meet the minimum health and safety requirements?

WITNESS MILLIGAN: That's not what this section is saying. I don't think that we've talked about it in that context, either.

MS. DES JARDINS: Are you aware that there used to be a minimum carryover storage requirement for Shasta of 1.9 million acre-feet?

CO-HEARING OFFICER DODUC: Miss Aufdemberge.

MS. AUFDEMBERGE: Objection.

CO-HEARING OFFICER DODUC: Sustained.

MS. DES JARDINS: I believe he discusses the history of the Central Valley Project and -- and operations, and he says the historic operations are different and they did, in fact -- There was a good stream at one time and it did, in fact, change. So that is why I was posing the question.

CO-HEARING OFFICER DODUC: I don't follow the question.

MS. DES JARDINS: There used to be -- There used to be a minimum carryover storage requirement of 1.9 million acre-feet, and I wanted to ask how that --

CO-HEARING OFFICER DODUC: And where is this in his rebuttal testimony?

MS. DES JARDINS: He -- He just says that the -- the CVP operations haven't changed.

CO-HEARING OFFICER DODUC: And where is this in his rebuttal testimony?

(Pause in proceedings.)

CO-HEARING OFFICER DODUC: Miss Des Jardins.

MS. DES JARDINS: Yeah. I'm sorry. I don't have the exact passage.

CO-HEARING OFFICER DODUC: Do you have other questions for Mr. Milligan?

(Pause in proceedings.)

MS. DES JARDINS: Do you -- Mr. Milligan, do you believe that -- In the drought years in 2014, were natural flows sufficient to provide for health and safety needs without curtailing . . . curtailing -- health and safety pumping without curtailing outflows for salinity requirements?

MS. AUFDEMBERGE: Objection: Beyond the scope.

CO-HEARING OFFICER DODUC: Miss Des Jardins.

MS. DES JARDINS: It does say -- This is a question of whether -- whether there was sufficient -- This -- The core issue is whether there is sufficient natural flow or whether you have to release stored water, and this goes to the core of the operational philosophy.

And I can go back to . . .

CO-HEARING OFFICER DODUC: Go back to his --

MS. DES JARDINS: Yeah.

CO-HEARING OFFICER DODUC: -- testimony --

MS. DES JARDINS: Yeah. The testimony.

Let's go back to -- Could you go down -- Scroll down to Page 2.

(Scrolling down document.)

MS. DES JARDINS: Up.

(Scrolling up document.)

MS. DES JARDINS: Up.

(Scrolling up document.)

MS. DES JARDINS: Up.

(Document displayed on screen.)

MS. DES JARDINS: It says (reading):

"Reclamation chose not to drain . . . upstream CVP Reservoirs to meet system demands due to heightened potential risk of the drought continuing . . . requested modification of some D-1641 requirements, not to directly improve CVP water supplies, but to conserve upstream storage to the benefit of a number of uses."

And the question there is: This is directly related to that because the question is whether natural flows were sufficient to provide the CVP water supplies for health and safety.

WITNESS MILLIGAN: This is a difficult question because one has to assume meeting all the other requirements. And in that context, I don't believe it was.

Reclamation did meet the health and safety needs for a number of contractors, but it was somewhat at the expense of some senior contractors getting some of their water.

As it relates to the health and safety pumping, there was not enough water in the Delta at the time to maintain pumping at levels that would have sustained us over a longer period in -- in the summer months and that was a combination both of dry hydrology and extremely high tides and salinity intrusion at the same time, which was the product of -- It was also fairly unique in 2014 and 2015.

So there had to be adjustments made in the system, and they were done both in terms of Delta outflow for some habitat considerations, again a barrier end of salinity was a deviation, and a number of contractors both taking less water than they may have had a right to that were senior to CVP, as well as going through some extraordinary steps to maintain supplies.

So I think the answer to your question is, there really was not enough water in the system in that

particular year to meet these minimum pumping requirements. But I think it would have been -- And the point of the passage here was to say that an aggressive approach to CVP operations in other years would have made that even worse, in my opinion.

But when we do get the 2014-2015, the phenomenal lack of snowpack is a big driver, and that was far worse than anything we saw in the '38-to -- '28-to-34 drought period.

MS. DES JARDINS: I did want to go back to DDJ-178.

(Document displayed on screen.)

MS. DES JARDINS: I'm sorry. DDJ-179.

(Document displayed on screen.)

MS. DES JARDINS: Mr. Milligan, this goes back to the question of -- This shows, after the TUCP was implemented, storage in Shasta built up to almost 2.4 million acre-feet while you were doing this -- needing to constrain outflow in the Delta.

Isn't that building up CVP water supplies?

WITNESS MILLIGAN: Well, certainly building up storage in Shasta, and primary concern here was trying to build a cold water pool for the subsequent summer.

These movements of storage, there's, you know, completely a balancing of what inflows and outflows are.

So, obviously, we're building upflow -- storage here, but we were asking the Board not to -- for deviation so we wouldn't take some of this storage, because this is not a very high storage that we're topping out at, so there's not a lot of cold water pool there.

If we had to take a portion of that to meet a spring X-2 requirement, for example, we would been in even worse shape.

MS. DES JARDINS: Okay. I believe that concludes my questions. Thank you.

CO-HEARING OFFICER DODUC: Thank you, Miss Des Jardins.

And that should conclude the cross-examination.

I'm not seeing anyone jumping up.

Miss Aufdemberge, do you wish to redirect?

MS. AUFDEMBERGE: No redirect.

CO-HEARING OFFICER DODUC: I don't believe there were any verbal objections voiced to Mr. Mizell's testimony and exhibits.

MS. HEINRICH: I don't think that there were.

CO-HEARING OFFICER DODUC: Mr. Ochenduszko, were there any questions asked that were deferred to somebody else that we need to track?

There were a couple of questions by Mr. Hitchings and Mr. Bezerra, I believe, but I thought

that Mr. Milligan at least attempted to answer them.

MR. OCHENDUSKO: That's correct.

And, as well, Ms. Nikkel brought up some model questions but she didn't actually ask those. She self-deferred.

CO-HEARING OFFICER DODUC: Okay. In that case, then, I thank you, Mr. Milligan, and we will now take our lunch break.

WITNESS MILLIGAN: Thank you.

(Witness excused.)

CO-HEARING OFFICER DODUC: And when we return, we will hear from the three witnesses whose names I now do not remember, and we'll continue Part -- Panel 2 Petitioners' testimony.

We will resume at 2:05.

(Luncheon recess was taken at 1:04 p.m.)

Thursday, April 27, 2017 2:09 p.m.

PROCEEDINGS

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CO-HEARING OFFICER DODUC: Good afternoon. It is 2:09. We are back in session. Apologize for being late; desperately needed to reboot my morning.

With that, we are here and I believe, Mr. Mizell and Mr. Berliner, you have witnesses here for the second portion of your Panel 2.

How much time do you anticipate needing for your direct?

MR. MIZELL: 35 minutes.

CO-HEARING OFFICER DODUC: 35 minutes. Okay.

Just for planning purposes, who here plan on conducting cross-examination?

Please come up and give me a rough time estimate, identify yourself and your Group Number to help me make my notes.

MR. HERRICK: John Herrick, South Delta parties.

Maybe 20 minutes.

CO-HEARING OFFICER DODUC: I'm sorry?

MR. HERRICK: Maybe 20 minutes.

CO-HEARING OFFICER DODUC: Okay.

MS. MESERVE: Good afternoon. Osha Meserve for

land, et al.

Probably about 30 minutes, though it may go to 45.

And I do have a proposal to switch the ordering a little bit. I've conferred with some other Protestants. And would you like me to mention that now or --

CO-HEARING OFFICER DODUC: Please.

MS. MESERVE: What we'd like to do, with your indulgence, was to have 24, San Joaquin County, go in the next order where I would go in 19, and then --

CO-HEARING OFFICER DODUC: I'm sorry. So that -- Would you be following 24 or before?

MS. MESERVE: I would be, but the one other accommodation is that City of Stockton would like to go after me and they're 22. So the way that portion of the lineup would go would be 24, 21, 19, 22.

I do not believe there are parties here in between those numbers, but if they are . . .

CO-HEARING OFFICER DODUC: Okay. 24, 21, 19, 22.

And you are 19 and you have estimated 30 to 45 minutes.

MS. MESERVE: Yes.

CO-HEARING OFFICER DODUC: All right.

MS. MESERVE: Thank you.

MS. TABER: Good afternoon, Kelly Taber for the City of Stockton, Group 22.

We may need up to an hour, depending on how the questions are answered.

CO-HEARING OFFICER DODUC: Okay.

MS. TABER: I would hope to be more efficient, though.

MR. KEELING: Tom Keeling for the San Joaquin County Protestants.

I estimate between 45 minutes and an hour.

CO-HEARING OFFICER DODUC: And I'm sorry. What -- What group number are you? You're 21?

MR. KEELING: 24.

CO-HEARING OFFICER DODUC: 24. Ah.

MR. KEELING: You will notice that once again I am the goat.

CO-HEARING OFFICER DODUC: Yes, you are.

Okay. So that's 24, 21, 19 and 22.

MS. DES JARDINS: Dierdre Des Jardins, California Water Research.

And I estimate half an hour.

CO-HEARING OFFICER DODUC: All right. With that, I will turn to Mr. Mizell and Mr. Berliner.

MR. JACKSON: Excuse me.

CO-HEARING OFFICER DODUC: I'm sorry?
MR. JACKSON: Given that -- those time limits, is there any possibility we'll get to another panel today?
CO-HEARING OFFICER DODUC: I don't believe so, not unless they --
MR. JACKSON: Those of us who have questions --
CO-HEARING OFFICER DODUC: -- are grossly overestimating their times.
MR. JACKSON: Okay. Mr. Mizell, do you have another panel today?
MR. MIZELL: If we were required to call another witness today, we could do so, but I am not proposing to do that unless the --
MR. JACKSON: I'm trying to help him, so maybe that I can go home and he can't.
CO-HEARING OFFICER DODUC: Well, Mr. Jackson, if you want to go home, I want to go home.
MR. JACKSON: Well, I think Ms. Marcus could actually to this by herself once.
CO-HEARING OFFICER MARCUS: Not as well as she can in any --
CO-HEARING OFFICER DODUC: Well, what we're --
CO-HEARING OFFICER MARCUS: -- way, shape or form.

MR. JACKSON: I mean --

CO-HEARING OFFICER MARCUS: While I appreciated it once.

CO-HEARING OFFICER DODUC: I like you, Mr. Jackson.

MR. JACKSON: You could hit 99. You don't have to hit a hundred.

CO-HEARING OFFICER DODUC: Thank you, Mr. Jackson, but I think, in the interest of nothing else than my sanity, we will not go to the next panel today.

Mr. Mizell, do any of your witnesses need to take the oath?

MR. MIZELL: Yes, they do. Dr. Preece and Mr. Owen both need the oath.

CO-HEARING OFFICER DODUC: Please stand and raise your right hand.

MICHAEL BRYAN, DOUGLAS M. OWEN and ELLEN PREECE called as witnesses for the Petitioners, having been first duly sworn, were examined and testified as follows:

DIRECT EXAMINATION BY

MR. MIZELL: Dr. Bryan, is DWR Exhibit 81 a true and correct copy of your testimony?

WITNESS BRYAN: Yes.

MR. MIZELL: Dr. Preece, is DWR-83 a true and correct copy of your testimony?

WITNESS PREECE: Yes.

MR. MIZELL: And is DWR-16 a true and correct copy of your Statement of Qualifications?

WITNESS PREECE: Yes.

MR. MIZELL: Mr. Owen, is DWR-82 a true and correct copy of your testimony?

WITNESS OWEN: Yes.

MR. MIZELL: And is DWR-15 a true and correct copy of your Statement of Qualifications?

WITNESS OWEN: Yes.

MR. MIZELL: Thank you.

I'm going to turn the microphone to Dr. Bryan and Mr. Owen, and they will summarize their written testimony for you.

WITNESS BRYAN: Could you put up the testimony that Mr. Mizell provided at the break.

Good afternoon, Hearing Officer Doduc, members of the Board, Board staff. My name is Dr. Michael Bryan and I will be leading the water quality presentation this afternoon.

My presentation will present to the Board my 10 opinions that I've developed by conducting technical analyses in support of preparing testimony in three basic areas, those being the California WaterFix effects on harmful algal blooms and water quality at the City of

Sacramento's Water Treatment Plant intakes on both Lower American and Lower Sacramento Rivers.

My full analysis and rebuttal of claims made by the City of Sacramento is provided in my written testimony submitted as Exhibit DWR-651.

Second area would be California WaterFix effects on harmful algal blooms in the Delta. And again my full analysis and rebuttal of claims made by San Joaquin County and other parties pertaining to this topic is provided in my written technical report submitted as Exhibit DWR-653.

And, finally, the California WaterFix effects on harmful algal blooms and water quality at the City of Stockton's drinking water intake on the San Joaquin River.

And, once again, my full analysis and address of water quality concerns raised by the City of Stockton is included in my technical report submitted as Exhibit DWR-652.

MR. HUNT: Pardon. Before we continue, can you please identify each slide and where it comes from as we go throughout the process?

WITNESS BRYAN: Yes.

MR. HUNT: Thank you.

MR. MIZELL: If I might just insert here,

Dr. Bryan.

The PowerPoints you are seeing this afternoon are a condensed version of what was submitted. There haven't been any substantive change -- There have been no content changes. What we have done is eliminated slides that were not necessary in order to make a summary presentation, and we've inserted Mr. Owen's slides in the center where they flowed most naturally.

So it is modified from what was submitted as an exhibit but you can see that in the corners are the full citations to each and every slide and the contents are unchanged.

WITNESS BRYAN: So as I go through the presentation. I'll just refer to the slide number that's in the upper right-hand corners of the slide.

So my first four opinions were developed based on my analysis of the California WaterFix effects at the City of Sacramento's water treatment plant intakes again on the Lower Sacramento and Lower American Rivers.

The city claimed that the California WaterFix would result in river flows and temperatures that would increase harmful algal blooms in the Lower Sacramento and Lower American River, cause probable level increases in disinfection byproduct formation potential at the water treatment plants, cause increases in river dissolved

metals and organic carbon that also would adversely affect water treatment plant operations and disinfection byproduct levels at those treatment plants.

The city's experts provided no analysis specific to the California WaterFix as it's currently proposed to support these claims.

For my analyses, I used flow, velocity and temperature modeling output originally presented in DWR's case in chief, as well as temperature modeling presented in the Biological Assessment for the California WaterFix.

Slide 4.

Because much of my rebuttal testimony relates to how the California WaterFix would potentially affect microcystis blooms in the rivers upstream from the Delta and in the Delta, I wanted to first identify for you the preliminary -- the primary environmental factors that affect microcystis bloom frequency and magnitude in these water bodies. And these are shown, again, on Slide 4 here.

The primary eight biotic factors are:

Water temperature. Studies have shown that temperatures need to be 19 degree Celsius or higher in these water bodies to get microcystic blooms, 66.2 degrees Fahrenheit. That restricts the bloom season to the summer and early fall months of the year.

Microcystis needs low flows and channel velocities resulting in low turbulence and mixing and long residence times, water pollen gradiance and clarity that produces photosynthetically active radiation of 50 micromoles per second or greater, and sufficient nutrients, both nitrogen and phosphorus, as well as biofactors in competition with other algae and grazing by zooplankton.

All of these factors work together to control microcystis bloom in any particular place in the Delta or upstream of the Delta.

My testimony will focus primarily on water temperature and channel flow velocity because other parties have claimed that the California WaterFix would change these parameters in a manner that would cause greater microcystis blooms in the water upstream of the Delta and in the Delta.

My first opinion pertains to Lower Sacramento River harmful algal blooms.

Based on my analyses, it's my opinion that neither the frequency nor magnitude of cyanobacterial blooms would change in the Lower Sacramento River due to the California WaterFix effects on flows and temperatures.

Slide 7.

To determine how model changes in river flows and associated velocity and turbulence due to the California WaterFix, relative to that which would incur under the No-Action Alternative Scenario could affect microcystis blooms, I turn to the scientific literature.

My review of the world's literature on this topic revealed that flow velocities in the range of .1 to 1.3 feet per second disrupt microcystis blooms.

Velocities of .2 to 1 foot per second have been shown to disrupt microcystis blooms to the point where the dominant algal community is shifted from cyanobacteria to green algae and diatoms.

Velocity above one foot per second has been documented in the literature to quickly disrupt an established microcystis bloom.

In short, the scientific literature indicates that channel velocities above about .2 feet per second become increasingly less favorable for cyanobacteria, including microcystis, due to the turbulence in mixing what they cause in the water column.

With regards to turbulence and mixing, microcystis is at a competitive disadvantage over other algae -- a competent advantage, rather, over other algae when the water column has low turbulence and it's a stable, calm water environment.

But microcystis is at a disadvantage when flow velocities are higher and there's turbulence and mixing in the water column.

Slide 9.

Because channel velocity dictates the relative degree of channel turbulence and mixing, I, therefore, analyzed model velocity data for the Lower Sacramento River at River Mile 58. It's about 2 miles downstream from the City of Sacramento's Sacramento River Water Treatment Plant.

Using Exceedance Probability Plots for the California WaterFix scenarios, Alternative 4A, operational scenario H3, 4A, H4, Boundary 1, Boundary 2 and the No-Action Alternative as shown in the legend on the bottom of the slide.

This example plot for the Lower Sacramento River in August shows the probability with which daily maximum velocities would exceed specified velocities shown on the vertical axis.

There's a couple of things I'd like you to note in the slide, on Slide 9.

First, daily maximum velocities for the California WaterFix scenarios remain above about .9 feet per second at all times which, according to the literature that we just reviewed a minute ago, is a

velocity that's too high to allow micro -- cyanobacteria to create green algae and diatoms within the river.

Second, during the 40 percent of the time on the river where velocities are the lowest, which you can see on the right side of the figure, the California WaterFix would more frequently result in higher velocities than would occur under the No-Action Alternative, which is indicated by the black line. The California WaterFix scenarios are indicated in the color -- colored lines in these graphics.

Turning to Slide 10.

When looking at velocities on an even finer 15-minute time-step for the month of August, you see in this slide, on Slide 10, August -- I should mention August is a key month for microcystis blooms in the Central Valley.

There's a couple of things I'd like you to note from this figure.

First, we see that the frequency with which any given velocity is exceeded is very similar among all five scenarios modeled.

Second, for the 40 percent of the time when velocities are lowest, again which you can see on the right side -- lower right side of the graphic, the California WaterFix would more frequently result in

higher velocities than would the No-Action Alternative.

Slide 11.

As the figure in this slide shows, the frequency with which any given temperature would be exceeded in the Lower Sacramento River upstream of the city's Sacramento River Water Treatment Plant in the month of August would be about the same for the proposed action and the No-Action Alternative.

So the California WaterFix as shown by the PA, the red line -- PA standing for proposal action, because this modeling came from the Biological Assessment for the California WaterFix.

In that modeling, the WaterFix was depicted as Alternative 4 H3+.

Figures for other months through the May-through-October period, that period of the year when water temperatures in the river are warm enough for microcystis blooms to occur looks similar to this figure here in Slide 11, indicating that the California WaterFix would have very small effects on Lower Sacramento River water temperature relative to that which occur under the No-Action Alternative.

The minor temperature effects of the California WaterFix would not change the frequency or magnitude of blooms in the river relative to that which would occur on

the thermal regime that would exist on the No-Action Alternative.

This finding from detailed analyses does not support the city's claim pertaining to temperature of harmful algal blooms in the Lower Sacramento River.

My analyses supported the same opinion for the Lower American River.

Slide 12.

Based on similar analyses, my second opinion for the Lower American River harmful algal blooms is similar to the opinion that I just went through with you for the Lower Sacramento River.

I'm having difficulty with the clicker here.

There we go. Maybe I was pointing it the wrong way.

My third opinion pertains to disinfection byproducts of the City of Sacramento's water treatment plants.

Based on my analyses, it's my opinion that the California WaterFix would not cause increases in temperature and organic carbon in the Lower Sacramento and Lower American Rivers of frequency and magnitude that would substantially increase the disinfection byproduct formation potential in the city's water treatment plants.

Slide 16.

The city's water treatment plants are regulated to comply with disinfection byproduct drinking water MCLs -- maximum contaminant levels -- in the treated drinking water supply on an annual average basis.

To determine how the California WaterFix would affect total trihalomethane formation potential, for example, I first determined the highest annual average temperature increase modeled for the Lower Sacramento and Lower American Rivers, which was .1 degrees Fahrenheit for the Lower Sacramento River and .5 degrees Fahrenheit for the Lower American River.

Again, this is on an annual average basis.

I then reviewed the scientific literature to identify general models that have been developed to show how the temperature how -- when temperature increases in raw water supply, what effect that temperature change has on the total trihalomethane formation potential at a water treatment plant.

Using five such models, all of which show the good predictability, the highest percent increase in total for trihalomethanes determined for the Sacramento River's .1 degree Fahrenheit annual average temperature increase was .4 percent shown on the left side of this slide.

It was 1.6 percent for the half a degree

maximum annual temperature increase modeled for the Lower American River shown on the right side of the slide.

This translates into about a one-microgram-per-liter increase in total trihalomethane production for which the drinking water MCL is 80, total 80 micrograms per liter.

For additional perspective, the city's annual average of total trihalomethane concentration reported in it's 2012 through 2015 Water Quality Consumer Confidence Reports range from 57 micrograms per liter to 74 micrograms per liter.

At this point of the presentation, I'd like to turn things over to Mr. Owen, who has also provided testimony on this topic, on the trihalomethanes, and I'll let him add to this discussion.

WITNESS OWEN: Thank you, Dr. Bryan.

My qualifications are in Exhibit DWR-15 related to this topic.

And on the Slide --

MR. BAKER: So --

WITNESS OWEN: -- DW --

MR. BAKER: -- before we move on, the previous slides were from DWR-8 errata, and then these slides will be from DWR-9; is that correct?

WITNESS OWEN: (Nodding head.)

MR. BAKER: Thank you.

WITNESS OWEN: And it's listed in the upper right-hand corner as DWR-9.

I have only two slides, one with my conclusions and the second with some backup.

My fundamental conclusions are three:

A temperature difference of 1-degree Fahrenheit is very small in terms of affecting THM, and I also include HAA5, because both of these are chlorinated algaenated compounds that are regulated under the DBP rule, so I included HAA5 as well.

This temperature change alone of that magnitude would not result in a DBP compliance issue for the City of Sacramento's water treatment plants.

To reach an extent of change in temperature at which it would be observable is probably more on the order of 5 degrees centigrade, which is close to 10 degrees Fahrenheit. And many of -- much of the work that's been done in developing predictive equations that Dr. Bryan was talking about, and on which I relied, usually used this kind of increment, 5 degrees centigrade.

I also noted in Bonny Starr's testimony, which was City of Sacramento-8, that she indicated that increases in water temperature affected water treatment

processes themselves.

And it wasn't clear in that testimony to me whether she thought that were a good or a bad thing, but actually it's a positive thing. Conventional processes as well as disinfection become more efficient as temperature increases, although at a1-degree Fahrenheit increment, it would not be discernible.

So in the upper right-hand corner, this also says DWR-9.

So the analytical approach that I used is similar to what Dr. Bryan did. I applied an industry-accepted model. It is one of the mod -- one of the predictive equation groups that Dr. Bryan has used, but I used it because it is the one that was used by the USEPA in developing the THM and HAA5 requirements as part of the Stage I and Stage II DBP role, and I am familiar with that work that was engaged in that process.

So my percent -- I also used a 1-degree Fahrenheit difference, and that's a little bit higher than the annual average that Dr. Bryan used. I wanted to be conservative in this fashion so I looked over all the temperature increases in the modeling work that Dr. Bryan had done at any probability of exceedance for any month and 1-degree Fahrenheit was the maximum, so I chose that.

And so I increased both at a lower end and an

upper end the temperature by one degree. And you can see the increase in percentages for total trihalomethanes in the Sum of Five Haloacetic Acids.

Note that actually the percentages of decrease as the temperature increases. It's not a linear function that's associated with this. And all of these percentages would not in any way result in a compliance issue for the City of Sacramento water treatment plants for these algaenated compounds under the DBP rule.

And so, Dr. Bryan, I'll turn this back to you.

WITNESS BRYAN: Thank you, Mr. Owen.

So, continuing with DWR-8 errata, Slide 17.

The city claimed that the California WaterFix would increase dissolved organic carbon in Lower Sacramento River and Lower American Rivers due to two factors: Increased cyanobacteria and reduced reservoir storage.

As I already discussed, cyanobacteria would not change notably in either of the rivers between the California WaterFix and the No-Action Alternative and, thus, would not contribute to higher dissolved organic carbon in the rivers.

With regards to storage, the city claimed that releases from reservoirs at lower storage levels would load additional organic carbon in the rivers below the

reservoir.

They further claim that lower reservoir levels in the fall would expose more shoreline within the reservoir, which would load more organic carbons in the rivers once we had a first flush event in the fall. My analyses did not support either of the city's claims with regards to reservoir storage.

Regarding potential exposed shoreline and using Folsom Reservoir as an example in my analysis, the potential additional exposed shoreline in the fall for the -- of the year for the California WaterFix relative to the No-Action Alternative would constitute less than 1,100th of 1 percent of the acreage of the watershed. Such a negligible change in the watershed would not be expected to change organic carbon levels in the rivers downstream in the reservoir.

I'll get this clicker figured out about the time I'm done with my presentation here. Still trying this.

CO-HEARING OFFICER MARCUS: It's the clicker; it's not you.

CO-HEARING OFFICER DODUC: Could we help him?

WITNESS BRYAN: There we go.

Slide 19.

To address the city's claim that lower storage

results and higher organic carbon in the rivers downstream in the reservoir, I compiled monthly Shasta storage data in river dissolved organic carbon in -- in the river downstream of the reservoir at Balls Ferry.

As shown in the figure on Slide 19, the dissolved organic carbon in the river does not go up as storage goes down, as was claimed by the city. In fact, these data show no relationship between Shasta storage and organic carbon in the lower Sacramento River downstream of the reservoir.

Slide 20.

I performed the same analyses for Folsom Reservoir storage in Lower American River organic carbon. And, again, you can see from this figure organic carbon in the Lower American River does not go up as storage goes down.

Slide 21.

I'm keeping a close eye on these slides here.

Slide 21.

My fourth opinion pertains to reservoir storage and dissolved metals in the rivers.

Based on my analyses, it's my opinion that discharge from reservoirs having somewhat lower summer and fall storage for the California WaterFix relative to that of the No-Action Alternative would not cause

increased dissolved metals in the rivers and, thus, would not cause additional treatment requirements at the water treatment plants.

Slide 23.

Modeling for the California WaterFix shows no substantial reductions in end-of-September storage for either Shasta or Folsom Reservoirs.

Slide 24.

To further assess this issue, I compiled monthly Shasta and Folsom storage data from CDEC and metals data in the rivers below these reservoirs from DWR's Water Quality Data Library.

And as shown on Slide 24, this figure relates to dissolved iron concentrations at the Lower Sacramento River at Balls Ferry to end-of-September storage in the reservoir, Shasta Reservoir.

The weak positive relationship of lower dissolved metal concentration in the river when reservoir storage levels are lower, shown here again in Slide 24, is the opposite relationship of that claimed by the city.

I also demonstrated this for manganese, which is shown and discussed in my technical report.

Slide 26.

I'll now move on to the second major component of my presentation this afternoon where I present five

opinions pertaining to the effects of the California WaterFix on Delta harmful algal blooms.

This testimony is being provided as rebuttal of claims made by San Joaquin County and other parties as specified -- specifically identified and cited in my written technical report, which again was submitted as DWR Exhibit DWR-653.

Slide 27.

My fifth opinion pertains to Delta flows and harmful algal brooms. Based on my analyses, it's my opinion that although microcystis blooms are expected to occur at certain Delta locations in the future just as they have occurred historically, channel velocities at various Delta locations would not be altered to a degree that would make hydrodynamic conditions substantially more conducive to microcystis blooms under the California WaterFix scenario relative to the hydrodynamics that would occur in these channels under the No-Action Alternative.

Slide 29.

I assessed 10 Delta locations, many of which have experienced microcystis blooms in the past, for my flow velocity analysis, and those are shown on this -- this figure on Slide 29.

Slide 30.

In the interest of time, I'll present just one of the 10 locations to demonstrate the basis of my fifth opinion. The location is Old River at Rock Slough which is a Delta location that has experienced microcystis blooms in the past.

I have two points to make from this Probability Exceedance Plot for daily maximum flows shown on Slide 30.

First, the frequency with which any given daily maximum channel velocity would occur would be merely the same for all five scenarios.

This is particularly true for the 50 percent of the time when flows are at their lowest, which you can see on the right side of the graphic.

Second, daily maximum velocities are always sufficiently high at or about .8 feet per second to produce turbulence and well-mixed conditions within the channel that are more favorable to green algae and diatoms and less favorable for cyanobacteria, including microcystis.

The daily maximum Exceedance Plots for the other marine locations analyzed are similar to this one, shown here for Old River.

Slide 31.

In analyzing model 15-minute absolute velocity

data -- When I say "absolute," I mean these are velocities regardless of which direction you're going. We're working with absolute velocities.

We see that when velocities are below about .8 feet per second, the frequency with which a given velocity would be exceeded for the California WaterFix would be equal to or greater than that for the No-Action Alternative.

And you can see that in kind of the right lower part of the slide where the colored lines are all at or above the black line for the No-Action Alternative. Hence, the California WaterFix is not causing low-flow velocities more often than under the No-Action Alternative scenario.

Velocities between about .8 and 1.2 feet per second do occur somewhat less frequently for the California WaterFix relative to the No-Action. And you can see that in the left upper portion of the graphic.

Nevertheless, the velocities that do occur for the California WaterFix in this range are sufficiently high to place cyanobacteria at a hydrodynamic disadvantage in its competition with other algae because of the turbulence and velocity that such high floats would produce.

Consequently, somewhat reduced velocities for

the California WaterFix scenario in this higher velocity range of .8 to 1.2 feet per second would not be expected to encourage greater cyanobacteria blooms at this location relative to that which would occur under the No-Action Alternative.

Slide 36.

My sixth opinion pertains to the effects of the California WaterFix on Delta channel flow velocities as they affect Delta residence time and harmful algal blooms.

Based on my analyses, it's my opinion that increased residence time alone does not equate with increased microcystis bloom frequency or magnitude.

Based on current science, it's uncertain how cyanoHABs would react to California WaterFix-driven changes in residence time as modeled.

Slide 37.

This is continuing on the residence time topic.

Channel velocities really are the driver of a number of key factors affecting microcystis, including residence time, channel turbulence and mixing, which is the real big one because it affects the competition of the microcystis with other algae, and in-channel turbidity, in-channel-generated turbidity, which then affects the attenuation of light down through the water

column and, of course, all algae are competing for light.

Because these and other factors interact in a complex fashion to affect cyanoHABs, increased or long residence time alone by itself, as a factor by itself, do not always result in a bloom occurrence or an increased bloom frequency. And we see that from various research that's been done in the Delta.

Slide 40.

My seventh opinion pertains to the effects the California WaterFix are on Delta temperatures and harmful algal blooms.

Based on my analyses, it's my opinion that the frequency and magnitude of cyanobacteria blooms in the Delta would not increase substantially due to the minor increases -- or changes in temperatures due to the California WaterFix relative to the temperatures that would occur in the same locations under the No-Action Alternative.

Slide 42.

I -- For this temperature assessment, I analyzed nine different locations, which included both streams and rivers, the Sacramento River and the San Joaquin location on each of those rivers, as well as a number of central south and eastern Delta locations known to have experienced microcystis blooms in the past.

Slide 44.

The Probability Exceedance Plot on Slide 44 shows that the frequency with which any given temperature would occur in the San Joaquin River at Prisoner's Point in the month of August would be about the same for the California WaterFix in the No-Action Alternative.

This minor difference in August temperature regime between the two scenarios would not alter microcystis bloom frequency or magnitude at this river location for the California WaterFix relative to that which would occur under the temperature regime for the No-Action Alternative.

This was also the case for the other eight locations that I assessed, so I'm only showing you this plot for Prisoner's Point. But the other Exceedance Plots for the other eight locations look very similar to this.

Slide 46.

My eighth opinion pertains to the effects of the California WaterFix on Delta turbidity and harmful algal blooms.

Based on my analyses, it's my opinion that minor change in turbidity that may occur for the California WaterFix would not have a substantial effect on the frequency or magnitude of harmful algal blooms in

the Delta.

Continuing on this turbidity topic, Slide 48.

The Final EIR/EIS analyzed that -- analysis of turbidity concluded that the California WaterFix would have less than significant adverse effects on Delta turbidity.

We can also, you know, glean additional insight on this issue by looking at recent research, and in particular, Lehman et al. (2017) which was a study of microcystis blooms in the Delta for the drought year of 2014 compared to what occurred in wet years of 2004 and 2005 and dry years of 2007 and 2008.

The Lehman et al. study found that Delta turbidity and light levels in the euphotic zone -- that zone of water column that algae is productive -- did not differ significantly between the drought year 2014 and other years, despite the San~Joaquin River flows being a factor of three lower in 2014 relative to what they were in the wet years of 2004 and 2005.

Because flow difference is a factor of three-across years did not significantly alter Delta turbidity or light availability for microcystis, I would not expect the smaller magnitude flow differences between the California WaterFix and the No-Action Alternatives to significantly affect Delta turbidity or light

availability for microcystis.

Slide 49.

My ninth opinion pertains to the effects of the California WaterFix on Delta nutrients and harmful algal blooms.

Based on my analyses, it's my opinion that relatively small increases in nutrients due to the California WaterFix would not be expected to increase the frequency, magnitude or duration of cyanobacteria blooms -- cyanoHABs, as we call them -- in the Delta relative to that which would occur from the No-Action Alternative.

Slide 51, continuing on this topic of nutrients.

The issue raised by the other parties is -- pertaining to nutrients is that the California WaterFix scenarios would increase the proportion of San Joaquin River water and decrease the proportion of Sacramento River water in the Central Delta.

Because San Joaquin River water is higher in nitrogen and phosphorus than the Sacramento River, that change in flow factions leads to an increase in nutrients in those Central Delta locations, nitrogen and phosphorus.

So to assess the effects of these slight

increases in nitrogen and phosphorus, I turned to the scientific literature which indicates that total nitrogen and orthophosphate, or soluble reactive phosphorus -- SRP as it's shown in the slide -- which is the form of phosphorus most readily used by phytoplankton, are available in nonlimiting amounts in our Delta.

In a review article of everything that was known about microcystis at the time that they wrote it in 2015, Berg and Sutula found that nutrient concentrations in N-to-P ratios did not -- did not change sufficiently among years to explain the interannual variation in microcystis blooms, frequency of occurrence for the biomass of those blooms.

They further state in their paper, and I quote here (reading):

"Therefore, the initiation of microcystis blooms and other cyanoHABs are probably not associated with changes in nutrient concentrations or their ratios in the Delta."

Findings from these researchers and others indicate that small changes in nitrogen and phosphorus that would occur for the California WaterFix would not be expected to affect microcystis blooms in the Delta.

I was on a roll there but -- No. There we go. Thanks for the help.

Slide 52.

This brings me to my third and final topic area.

My tenth opinion pertains to the effects of the California WaterFix on water quality at the City of Stockton's water treatment plant intake on the San Joaquin River.

Based on my analyses, it's my opinion that the California WaterFix would not alter the water quality at the City of Stockton's Water Treatment Plant intake in a manner that would cause adverse impacts to the municipal and industrial supply of beneficial uses at that river location.

This opinion that I reached from forming site-specific analyses is consistent with the impact determinations made in the Recirculated and Final EIR.

Slide 53.

The water quality concerns raised by the City of Stockton are those listed here in Slide 53.

It's my opinion that the impact assessment for these constituents presented in the Recirculated Draft and Final EIR/EIS adequately and accurately addressed whether or not the California WaterFix would cause significant adverse effects or impacts to the municipal and industrial supply and beneficial uses of the Delta,

including the Reach of the San~Joaquin River where the City of Stockton groups for NI (phonetic) uses.

Nevertheless, additional analyses were performed, specifically at the city's intake location, to best address their concerns that they raised in these proceedings.

I've already presented my opinions on the effects of the California WaterFix on the latter two issues listed on Slide 53, those being water temperature and cyanobacteria. My opinions presented on these topics also apply to the city's intake location on the San Joaquin River.

Regarding other toxins, the EIR/EIS assessed a total of 182 different constituents or constituent classes, many of which were toxins, and found that the California WaterFix would result in less than significant non-adverse impacts for all toxic compounds in the Delta, including the San Joaquin River.

Regarding pesticides, my technical report, Exhibit DWR-652, provides a detailed assessment for the potential for the California WaterFix to affect pesticide levels for those pesticides at the drinking water -- city's drinking water intake, those pesticides that are regulated with drinking water MCLs.

This assessment did not identify any pesticides

that the California WaterFix would increase to levels of concern for the diversion and treatment of municipal and industrial water supplies at the city's intake location.

The final five constituents listed in Slide 53, those being bromide, chloride, EC, organic carbon and nitrate plus nitrite, were assessed quantitatively using the DSM-2 modeling output for the four California WaterFix scenarios: Again, 4A H3, 4A H4, Boundary 1, Boundary 2 and the No-Action Alternative.

Slide 55.

As an example of these latter constituents and analyses that I performed on them, Slide 55 shows box-and-whisker and probability of exceedance plots for monthly bromide concentrations in the San~Joaquin River at the City of Stockton's intake location.

The period of record analyzed using the DSM-2 model is the same period we would have had in the past, which is 1976 to 1991.

I also in the technical report analyzed each of the Water Year types individually. This particular graphic shows all years together for the period of record.

There are no adopted water quality objectives or criteria for bromide, and the primary source of bromide is the city's water treatment plan intake

location of seawater intrusion or bromide concentrations as background levels in the San Joaquin River itself.

I conclude from the site-specific analyses that bromide concentrations that would occur at the site for the California WaterFix need not substantially degrade water quality with respect to bromide relative to that which would occur at this site under the No-Action Alternative and, thus, would not adversely impact San Joaquin River's municipal and industrial supply beneficial uses.

This is the same impact conclusion reached for bromide in the Final EIR/EIS.

I made the same technical findings from my site-specific analyses for chloride, EC, nitrate plus nitrite, and organic carbon.

With that, I will end and answer any questions that the Board staff may have.

CO-HEARING OFFICER DODUC: Thank you, Mr. Mizell. That concludes your direct?

MR. MIZELL: It does.

CO-HEARING OFFICER DODUC: All right. Then we will begin with cross-examination.

And I think the first group up will be -- Well, it would have been Miss Meserve for Group 19, but per her request, it is Mr. Keeling, Group Number 24, who will go

first.

And Mr. Keeling, I would like to give the court reporter a break around 3:30, so please find a convenient time because you had requested an hour.

MR. KEELING: Yes.

CO-HEARING OFFICER DODUC: So if there's a natural break around 3:30, we will take our break then.

MR. KEELING: Good afternoon, Hearing Officers, counsel, and the witnesses. I'm Tom Keeling on behalf of the San Joaquin County Protestants.

My questions are all for Dr. Bryan. They have to do with the -- particularly the Delta but going into a little bit more of his testimony about key factors such as turbidity, velocity that affect the formation of HABs.

CROSS-EXAMINATION BY

MR. KEELING: As a preliminary matter, Dr. Bryan, has the DSM-2 model ever been used in a peer-reviewed scientific journal to predict the effects of flow velocities and HABs formation?

WITNESS BRYAN: I don't know.

MR. KEELING: Has the DSM-2 model ever been used to assess the potential for formation of HABs in a peer-reviewed scientific journal?

WITNESS BRYAN: I guess that sounds like the same question to me. Was there a different aspect to

that question?

MR. KEELING: I'm reading -- I'm phrasing it another way. Is the answer still you don't know?

WITNESS BRYAN: Could you repeat the question?

MR. KEELING: Has the DSM-2 model ever been used to assess the potential for formation of HABs in any peer-reviewed scientific journal at all?

WITNESS BRYAN: It may have been, but I -- I don't -- I'm not aware.

MR. KEELING: Am I -- Do I recall correctly that you examined Knights Landing for temperature?

WITNESS BRYAN: Yes.

MR. KEELING: And you looked at Knights Landing for flow as well; is that right?

WITNESS BRYAN: No, not for flow.

MR. KEELING: Why didn't you examine other locations for temperature, such as Elk Slough or Snodgrass Slough?

WITNESS BRYAN: I didn't have temperature modeling data available at those locations.

MR. KEELING: Did you conduct any kind of investigation to see if we would have temperature data available for locations that might be more conducive to HABs formation than Knights Landing?

WITNESS BRYAN: The reason that I analyzed

temperature at Knights Landing was as part of my rebuttal of City of Sacramento's claims that California WaterFix would increase microcystis blooms in the Sacramento River upstream of their Sacramento River Water Treatment Plant.

So the logical location to look at temperature and velocities was near their -- their intake. So that's why I used that -- the location of Knights Landing upstream of their intake location.

MR. KEELING: Did the City of San Joaquin's testimony -- Did the City of Sacramento's testimony include a discussion of Knights Landing?

WITNESS BRYAN: I don't believe that it did.

MR. KEELING: Or temperature at Knights Landing?

WITNESS BRYAN: I don't recall that they discussed that, no.

MR. BERLINER: I'm sorry. I apologize for interrupting.

But Mr. Keeling asked a question, did the City of San Joaquin --

MR. KEELING: City of Sacramento. I'm sorry.

MR. BERLINER: I suspected that. But maybe you could -- Could you ask the question again, because the record reads City of San Joaquin.

MR. KEELING: Let the record reflect that I

meant the City of Sacramento.

MR. BERLINER: Thank you.

And just for the witness, if you could confirm his answer would remain the same.

MR. KEELING: And the answer would remain the same even if I meant the City of Sacramento rather than the City of San Joaquin?

WITNESS BRYAN: Yes.

CO-HEARING OFFICER DODUC: And, Mr. Berliner, the microphone needs to be down closer to you. Thank you.

MR. KEELING: Do you know of any locations in the Delta that would be typically subject to lower river velocities than the main stem of the Sacramento River during the same model period?

WITNESS BRYAN: Yeah, there are a lot of different locations in the Delta that would have lower velocities than the main stem of the Sacramento.

MR. KEELING: Those might include Elk Slough?

WITNESS BRYAN: Sloughs do tend to have lower velocities than the main stem, yes.

MR. KEELING: That would include Cache Slough and Snodgrass Slough?

MR. MIZELL: Objection: Asked and answered.

CO-HEARING OFFICER DODUC: Are you moving on,

Mr. Keeling?

MR. KEELING: Yes.

CO-HEARING OFFICER DODUC: Thank you.

MR. KEELING: Am I correct in understanding that you examined the river velocity using DSM-2?

WITNESS BRYAN: That's correct.

MR. KEELING: Are the figures shown on Pages 8 and 9 of DWR --

Mr. Baker, DWR-8, not this errata. All of my discussions will be on DWR-8.

Pages 8 and 9.

(Document displayed on screen.)

MR. KEELING: Do you have Pages 8 and 9 in front of you, sir?

WITNESS BRYAN: I think they're coming up on the screen.

MR. KEELING: My question very simply is: Why don't these figures identify how they were generated?

WITNESS BRYAN: Why don't they -- Could you repeat the question?

MR. KEELING: Oh, I understood from your previous response that these figures were based on DSM-2.

WITNESS BRYAN: That's correct.

MR. KEELING: And I'm wondering why that wasn't shown on the figures themselves.

WITNESS BRYAN: No particular reason.

MR. KEELING: Who prepared the model output figures that -- for Pages 8 and 9?

WITNESS BRYAN: The modeling is -- was conducted for DWR's case in chief, so DWR Modelers would have produced them.

Then the output files were given to me and my staff and my staff and I worked up these figures.

MR. KEELING: Did you personally prepare these figures?

WITNESS BRYAN: I did not. My staff produced these figures.

MR. KEELING: Do you know who on your staff produced these figures?

WITNESS BRYAN: Yes.

MR. KEELING: Who?

WITNESS BRYAN: Kyle Bloom.

MR. KEELING: Kyle . . .

WITNESS BRYAN: Bloom.

MR. KEELING: You examined water velocity at River Mile 58; did you not?

WITNESS BRYAN: I examined flow velocity at River Mile 58 in the Lower Sacramento River, that's correct.

MR. KEELING: How was the water velocity at

River Mile 58 determined?

WITNESS BRYAN: Using the DSM-2 model.

MR. KEELING: DSM-2 uses average velocity; is that correct?

WITNESS BRYAN: The DSM-2 model runs on a 15-minute time-step, so you can get whatever averages out of that that you want.

MR. KEELING: Well, I was really speaking specially, not chron -- not temporally.

Let me put it this way: Isn't it true that estimated velocities dropped non-linearly from the center of the channel towards the river margin where the blooms form?

WITNESS BRYAN: Yes, the channel margins would have lower velocity than the side of the channel, that's correct.

MR. KEELING: So when I -- Going back to my question about average velocity.

Now you understand what I mean when I say if there's a spatial rather than a temporal reference?

WITNESS BRYAN: (Nodding head.)

MR. KEELING: So what's the answer?

WITNESS BRYAN: What's the question?

MR. KEELING: Does DSM-2 use average velocity?

WITNESS BRYAN: If your question is specific to

how DSM-2 models average velocity spatially, I would want to defer that question to the Modelers. I didn't conduct the modeling so I can't specifically tell you how it spatially averages velocity across the channel.

MR. KEELING: Well, does the method by which velocity at River Mile 58 was determined also give us the water velocity on the channel margin of the river?

MR. MIZELL: Objection: Asked and answered. He's indicated that that's a detail that the Modelers did.

CO-HEARING OFFICER DODUC: Actually, that is a different question.

MR. KEELING: It is a different question.

WITNESS BRYAN: It's my understanding that the DSM-2 model looks at the entire channel. Exactly how it averages velocity across that channel, you'd have to ask the Modelers to define that for you.

So my understanding is, it -- it would look at all parts of the channel but, again, exactly how it averages the velocity across the channel, they could speak to much better than I.

CO-HEARING OFFICER DODUC: But is it your understanding that whatever that average is would then apply to other parts of the channel, the entire channel?

WITNESS BRYAN: Well, my understanding is that

DSM-2 doesn't give you different velocities for different sections of the channel, if that's the question. It gives you one velocity for the entire channel.

MR. KEELING: So your answer would be no.

WITNESS BRYAN: To what question.

MR. KEELING: The question I just asked, which is: Doesn't the method by which velocity at River Mile 58 was determined also give us the water velocity of the canal margin of the river?

WITNESS BRYAN: And my answer was: It would -- My best understanding is that it would integrate velocities in the channel margin as a part of how it calculates a single velocity for the channel.

It does not give separate velocities for different, distinct portions of the channel.

MR. KEELING: Madam Hearing Officer, I asked a yes-or-no question.

CO-HEARING OFFICER DODUC: Mr. Keeling, he answered the question. I understood his answer.

MR. KEELING: Thank you.

CO-HEARING OFFICER DODUC: I expect that you do as well.

MR. KEELING: Thank you.

Well, my next question, then, is: What is the velocity at the edge of the channel at River Mile -- at

River Mile 58?

MR. MIZELL: Objection: Vague. At what point in time? Under what conditions?

MR. KEELING: Well, under what conditions did you examine velocity at River Mile 58? Those would be the conditions under which I'm asking this question.

WITNESS BRYAN: So, my analysis used the best available modeling that's available to me, modeling that was specifically done for the California WaterFix to analyze how this Project would affect flows, velocities, temperatures, all the things that we've been talking about in this hearing.

So I -- The rebuttal testimony that I was preparing to rebut claims that the California WaterFix would cause substantial increases in microcystis blooms in the Sacramento River upstream of the City of Sacramento's Water Treatment Plant. Those claims had no modeling whatsoever. They had nothing to back them up, nothing to back up those statements.

So I used best-available information produced specifically for this hearing process from the standard models that we've talked about for months in this proceeding, and that's the best-available information I had in order to evaluate velocities in the channel, and so that's what I used.

MR. KEELING: I'm going to move to strike the entire monologue, which was unresponsive and it didn't constitute evidence.

CO-HEARING OFFICER DODUC: Mr. Keeling, you asked a question. He answered it to the best of his ability.

I followed his answer, and so I will ask you to move on because I think you've made your point on this.

MR. KEELING: Did you use the particle tracking module, sometimes referred to as the PTM?

WITNESS BRYAN: No, I did not.

MR. KEELING: Are you aware of what the PTM is?

WITNESS BRYAN: Yes.

MR. KEELING: And you didn't use it at all in this analysis.

WITNESS BRYAN: I did not.

MR. KEELING: You understand that the PTM treats tracked particles as being neutrally buoyant; is that correct?

WITNESS BRYAN: That's my understanding.

MR. KEELING: And you understand that cyanobacteria are not neutrally buoyant; don't you?

WITNESS BRYAN: Cyanobacteria can control buoyancy up and down the water column.

MR. KEELING: They're not neutral?

WITNESS BRYAN: Sometimes they're neutral. Depends on what they put into their gas vesicles.

MR. KEELING: Why did you not use the PTM in this case?

WITNESS BRYAN: I did not use the particle tracking model because . . .

What the Particle Tracking Model is looking at, at least in how it's been used for discussions of residence time, and microcystis ecology is very complex and one of the things I've already indicated in my presentation is worth reiterating here, is that velocity controls channel turbulence and mixing. And channel turbulence and mixing controls where the microcystis can outcompete other algae and when and perform a big bloom at a location or whether the other algae outcompete microcystis, and it just didn't ever really form a large problematic bloom.

So there's a lot of factors that microcystis needs to come together to form a bloom, one of which can aid microcystis in a sense of accumulating -- It's a slow growing algae. And so one of the reasons it gets outcompeted by other algae is because of the faster growing.

So when a microcystis is performing a bloom over time, particularly in a riverine system like the

Sacramento River, it really can't really win that gain of competition with other algae before it gets flushed downstream. The residence times are simply too short in a riverine environment.

In addition, the riverine environment was turbulent in mixing and has high turbidity. And so when the cells get churned from the top to the bottom of the channel, microcystis needs a lot of light as well. It doesn't grow as well in low light conditions as diatoms and other forms of algae, and so those are the forms that are competing.

The way microcystis tries to win that competition, whether it's in a river or a channel of the Delta, it needs that calm water, that lack of churning and mixing, because when the water is calm and stable, it can control its buoyancy and it moves itself up to the surface where it can reproduce at the surface in high light environments. It can handle higher lighted environments than many other algae.

It performs -- It gets up to the surface. It grows. It produces colonies. These colonies flow up and they form a mat at the surface, is what they're trying to do, which then shades out the other algae and that's how they win that competition.

That's all disrupted when you have turbulence

and mixing.

So if in a particular location cyanobacteria are growing and they're starting to form a bloom, the longer residence time you have, the more those cells of microcystis can accumulate and come up to the surface, and you get more and more biomass over time versus getting flushed out of the area, which is what would happen in a short tidal residence time.

So what the Particle Tracking Model does is, it -- essentially in a DSM-2 modeling, it puts in particles at a location and it tracks them to see how long it takes, how many days it takes, for them to get flushed out of a Reach or channel or an area within the Delta.

The reason I didn't use the Particle Tracking Model in my analysis, is, I think it's -- it can be misleading in terms of the results that you're getting from it when you're trying to analyze whether microcystis will form a bloom or not.

Because imagine two different scenarios. They both have a residence time of, let's just say, 10 days.

One scenario is a water body that is very lake-like, like a slough, habitat or something. And the particles in the model would move into that area and move out in, like, a 10-day period. But the entire 10 days

would be a very calm, stable water column environment and microcystis could compete very well in that environment.

In our Delta, we have a large tidal flux, and we have channels that flow both directions every day. So you can still have a Particle Tracking Model come up with a 10-day residence time.

But each and every one of those days, that channel is moving back and forth. It's sloshing on the tidal cycle back and forth, back and forth. And so you're getting turbulence and mixing that's going to cause microcystis to be at a hydrodynamic disadvantage in its competition with other algae.

So, residence time as measured by a Particle Tracking Model is not refined enough in my opinion to make, you know, judgments about how microcystis would react or not react based on a one- or two- or three-day change in residence time model, Particle Tracking Model. That's why I didn't use it.

MR. KEELING: What model did you use to estimate temperature for your testimony?

WITNESS BRYAN: It was the model that was performed for the Biological Assessment, and I believe that's Reclamation's temperature model.

MR. KEELING: Is that a predictive model? By "predictive," I mean a model that would actually estimate

the actual temperatures in the river at a given location during operations?

WITNESS BRYAN: Well, we had long discussions of that in this hearing.

All models are attempting to, you know, provide information in the right ballpark. But the way in which we use the models, including the temperature models, are in a comparative fashion.

So I was less focused on the absolute temperatures in my analysis and more interested in how the relative frequency and magnitude with which temperatures would change in the relative magnitude by which the California WaterFix would change temperatures, not so much to try to predict absolute temperatures.

MR. KEELING: Let's look at the graphic display of the model run on Page 10 of DWR-8, Mr. Baker.

Do you have that in front of you?

(Document displayed on screen.)

MR. KEELING: Why is the source of this figure on Page 10 of DWR-8 not identified?

WITNESS BRYAN: No particular reason.

MR. KEELING: Who prepared the chart at Page 10?

WITNESS BRYAN: The actual figure?

MR. KEELING: Yes.

WITNESS BRYAN: My staff.
MR. KEELING: Do you know who on your staff?
WITNESS BRYAN: Kyle Bloom.
MR. KEELING: Why didn't you show the temperature for 4A, H3 and H4 and the two boundary conditions as well?
WITNESS BRYAN: Because those were not available for this location.
This modeling comes from the Biological Assessment, and it did not look at those other scenarios. They just looked at the proposed action versus the No-Action Alternative.
MR. KEELING: So how could one compare the outcomes of those scenarios with respect to temperature?
WITNESS BRYAN: Again, I didn't have access to modeling for those scenarios at a location in relatively close proximity upstream of the City of Sacramento's uptake, so I used what model was available to me.
MR. KEELING: Is that "I don't know?"
WITNESS BRYAN: No, it's not an "I don't know."
MR. KEELING: Are you telling me there is no way to make that comparison?
MR. MIZELL: Objection: Badgering the witness.
CO-HEARING OFFICER DODUC: Mr. Keeling.
MR. KEELING: My question is: How would you

make the comparison.

CO-HEARING OFFICER DODUC: How would you make the comparison, Dr. Bryan?

WITNESS BRYAN: How would you make what comparison?

MR. KEELING: The comparison for temperatures for 4A, H3, H4 and the two boundary conditions.

WITNESS BRYAN: You'd have to do a model run with the Reclamation's temperature model for all those conditions and then get output at that location.

MR. KEELING: But that was never done.

WITNESS BRYAN: Not to my knowledge.

MR. KEELING: This figure at Page 10 of DWR-8 describes model temperatures at Knights Landing; is that correct?

WITNESS BRYAN: Yeah. Model temperatures at Knights Landing in the Lower Sacramento River, that's correct.

MR. KEELING: The figure seems to me to show the probability of exceedance at Knights Landing was summarized here for all the Water Years combined; is that correct?

WITNESS BRYAN: Yes, that's correct.

MR. KEELING: Going back to the temperature model being used.

Has that temperature model ever been used in a peer-reviewed scientific article to assess a potential for HABs formation?

WITNESS BRYAN: I don't know.

MR. KEELING: How is the average of 91 years of model runs related to the formation of algal blooms?

WITNESS BRYAN: That's not an average that's shown in these graphs.

MR. KEELING: Do these graphs show peak temperatures?

WITNESS BRYAN: These -- Yes, this graphic does show that, the highest temperature that would have been output for any given month in the model.

MR. KEELING: This would be a good place to break, going back to your earlier point.

CO-HEARING OFFICER DODUC: Let me clarify:

The highest -- The highest temperature that month, not the highest average temperature in that month? Not the average temperature of that month?

WITNESS BRYAN: (Nodding head.)

This Probability Exceedance Plot would include all monthly output data for the 1922 through 2003 period of record.

So the probability exceedance lines that you see for each figure would take in all of those monthly

averages for each month of each of the years.

CO-HEARING OFFICER DODUC: Monthly average.

WITNESS BRYAN: Well, this -- Let me correct: This is just August, to remind ourselves. We're just looking at August. So it's going to have 82 Augusts in that dataset. You get one value for August for each year out of -- out of the model.

CO-HEARING OFFICER DODUC: But is that an average value for that August?

WITNESS BRYAN: Yes.

CO-HEARING OFFICER DODUC: Thank you.

MR. KEELING: Thank you.

CO-HEARING OFFICER DODUC: We will take a 15-minute break and we will return at 3:35.

(Recess taken at 3:20 p.m.)

(Proceedings resumed at 3:35 p.m.)

CO-HEARING OFFICER DODUC: It is 3:35, so please take your seat. We will resume.

And, Mr. Keeling, I've been advised by counsel to be very clear in case there are any confusion on the record that we will respect your motion to strike a portion of Mr. -- of Dr. Bryan's testimony -- actually an answer to your question which you characterized as -- What was it?

MS. HEINRICH: Monologue.

CO-HEARING OFFICER DODUC: A monologue.

In response to that motion, my ruling is that is overruled.

MR. KEELING: Thank you.

CO-HEARING OFFICER DODUC: With that -- Just so you know, I've asked Miss Heinrich to keep track of the vocal objections that are raised during the course of -- of this hearing on admissibility, and I've asked Mr. Ochenduszko to keep track of any questions that are -- particularly for the Petitioners' witnesses that are being deferred to a later witness so that we make sure that they are appropriately addressed.

MR. KEELING: That was my understanding. And for that reason, I've not thought it necessary to follow up with a letter or writing to the Hearing Officers about the two motions to strike I made on Tuesday.

CO-HEARING OFFICE DODUC: Thank you.

We appreciate the efficiency and the saving of trees in terms of filing more paperwork with us.

MR. KEELING: (Nodding head.)

CO-HEARING OFFICER DODUC: All right. With that, Mr. Keeling, we are back to you and your cross-examination.

MR. KEELING: Going back to Exhibit DWR-8, Dr. Bryan, Page 27.

Mr. Baker, can you put us on Page 27?

(Document displayed on screen.)

MR. KEELING: There we go. Thank you.

Do I understand correctly that these nine Delta locations referred to are representative of the entire Delta in your testimony?

WITNESS BRYAN: What I attempted to do is select a reasonable number of locations that both geographically covered the cross-section geographic area of the Delta, some of the main stem channels, the San Joaquin River and the Sacramento River, as well as those interior Delta channels that have experienced microcystis blooms in the past.

So, yes, collectively, I was attempting to make the nine Delta locations reasonably representative for the analysis.

MR. KEELING: Are there any of these locations that are not either large river channels or sloughs directly or hydrologically connected to the existing export intakes?

WITNESS BRYAN: Could you repeat that question?

MR. KEELING: Let me put it differently:

Are any of these locations dead-end sloughs?

WITNESS BRYAN: I do not believe so.

MR. KEELING: So none of these in your

assessment are dead-end sloughs.

Did you look at any dead-end sloughs?

WITNESS BRYAN: No.

MR. KEELING: Do you know how many dead-end sloughs there are in the Delta?

WITNESS BRYAN: Many.

MR. KEELING: Sorry. Your answer?

WITNESS BRYAN: I would say many.

MR. KEELING: Thank you.

I'd like to bring you to Page 28.

Mr. Baker.

(Document displayed on screen.)

MR. KEELING: And I -- Please forgive me, Dr. Bryan. I may have missed a moment of your direct testimony about this exhibit, and if I'm going over it again, I apologize.

What -- What is shown in the figure on Page 28?

WITNESS BRYAN: It's a figure of the Delta that shows the locations -- nine different locations that I assessed flow velocity -- locations at which I assessed flow velocity.

MR. KEELING: And is there a reason why the source of this figure is not listed anywhere on the exhibit?

WITNESS BRYAN: No particular reason, no.

MR. KEELING: Who prepared Page 28?

WITNESS BRYAN: My staff.

MR. KEELING: Who in particular?

WITNESS BRYAN: Dave Thomas.

MR. KEELING: Thank you.

Who decided on these specific locations?

WITNESS BRYAN: It was really a combination of factors:

One, I -- I met with Modelers and said that I wanted to look at, again, the geographic coverage of the Delta up to 10 different locations for my analysis to evaluate flow velocity, and I wanted to choose locations that I knew from past research, like Lehman studies, that have microcystis blooms occurring in those locations historically. And so we overlaid those areas that had microcystis issues in the past with those locations for which flow velocity were available for the models, and that's how I came up with these locations.

MR. KEELING: Why did you not also examine any of what you characterize as the many dead-end sloughs in the Delta?

WITNESS BRYAN: Primarily because I don't think that the DSM-2 model necessarily can model velocities in dead-end sloughs very well.

And, secondly, I don't know -- Well, I guess I

can leave it at that. I'm not so sure that, when we're trying to look at how the California WaterFix would affect velocities in channels in the Delta, how it can affect microcystis blooms.

If you get into a dead-end slough, no matter how you operate the system, that dead-end slough's going to have low velocities. By definition, it's a dead-end slough, so you're not going to see much of a difference in that slough between the No-Action Alternative and the California WaterFix scenarios.

MR. KEELING: Do you have any reports or studies to back up that conclusion?

WITNESS BRYAN: No. Just -- Just my years of experience in working on aquatic systems.

MR. KEELING: Did you do any testing or modeling yourself to reach that conclusion?

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

MR. KEELING: You just -- You just told me that you didn't think that the WaterFix, if it's approved, would make a difference with respect to velocities in dead-end sloughs, and I'm asking if you did any modeling or testing yourself on that.

WITNESS BRYAN: No.

MR. MIZELL: Objection: Asked and answered.

CO-HEARING OFFICER DODUC: Now it's been asked and answered.

MR. KEELING: Taking a look at the velocity modeling on Pages 29 through 34 of Exhibit DWR-8.

This is a series of velocity figures?

Perhaps you can go through them, Mr. Baker, so that the witness can see what we're talking about.

(Document displayed on screen.)

MR. KEELING: Thank you.

I have just two questions:

Is the velocity modeling that is shown on these Pages 29 through 34 of DWR-8 to be used on a Project operational basis?

MR. MIZELL: Objection: Vague.

MR. KEELING: Okay. Would these velocities presented on these pages be the same velocities that you would expect to see during Project operations?

WITNESS BRYAN: The modeling that I used was conducted to define what we would see in terms of flows and velocities under the different scenarios that are indicated in the slide, so that's what I had to work with.

There's always -- Obviously, a Project like this has operational flexibility. Things can vary somewhat from planning models.

But as far as the analysis that I was able to conduct at this point in time, this, in my opinion, is the best indication of the velocities that would occur at this location for each of those scenarios.

MR. KEELING: So these are not predictive?

WITNESS BRYAN: Well, again, models are always trying to be as reasonably accurate as they can be.

We've had extensive discussions in this hearing about predictive models and comparative models. My analysis, it's not . . . It's not important that these models be pinpoint accurate. They're in the -- Because, after all, the development that DSM-2 has gone through over the years, and its various calibrations and so forth, we have the confidence to use the DSM-2 model for these types of proceedings. So we think it gives us reasonable estimates of flows and velocities and things of that nature.

My -- I use the data out of DSM-2 in a comparative mode. What my interest is here, as shown on the right lower side of this graphic in particular, where microcystis can gain a foothold and form the large blooms that are problematic is when flows are low.

So a Probability Exceedance Plot like this shows you that, when flows are low, the frequency with which they're low is the same across the Alternative

Assessment. That's what I was looking to determine.

MR. KEELING: The next few questions may betray my ignorance because I'm just a guy on the street and you're a scientist, so don't think me foolish.

If I understand your testimony correct -- correctly, long residence times are associated with lower channel velocities; is that correct?

WITNESS BRYAN: Yes.

MR. KEELING: Is it fair to say that longer residence times associated with lower channel velocities are likelier to lead to HABs formation than shorter residence times associated with higher channel velocities?

MR. MIZELL: Objection: Incomplete hypothetical; vague.

MR. KEELING: It is a hypothetical, but I think it's a clear hypothetical.

Did you understand the question?

CO-HEARING OFFICER DODUC: Hold on. I'm having technical difficulty with my microphone.

CO-HEARING OFFICER MARCUS: It just turned itself off.

CO-HEARING OFFICER DODUC: I turned it off.

When in doubt, just hit it; right?

MR. KEELING: I'll repeat the question.

CO-HEARING OFFICER DODUC: Mr. Keeling, yes, please do repeat the question.

MR. KEELING: Yes.

Is it fair to say that longer residence times associated with lower channel velocities are likelier generally to lead to HABs formations than shorter residence times associated with higher channel velocities?

CO-HEARING OFFICER DODUC: Overruled, Mr. Mizell. I understand the question, I believe. Mr. Bryan does as well.

WITNESS BRYAN: Yeah, I understand the question.

But as a hypothetical, one of the things that I attempted to explain earlier is that, you know, we as human beings love to try to figure out what makes things tick, what causes microcystis to do what it does.

And flow velocity's very important; residence time can be important. But it's only two factors in the mix.

And so your hypothetical scenario really doesn't give me enough of the other information to be able to answer the question, really.

So, in general, lower flows and longer residence time are more conducive to microcystis in

general. But what you have to be careful of, is, when you look across a complex arena like our Delta and the various channels, if you say, "I slow down velocity and increase residence time at this location; therefore, I will get more microcystis blooms," it's never that simple.

So I would caution against that interpretation.

MR. KEELING: I wasn't suggesting a single causation. I was assuming a controlling for other causal factors.

And if controlled for other factors, I understand your answer to be yes.

WITNESS BRYAN: In general, as you slow the water down, less turbulence, a water column becomes more stable, that's more conducive to microcystis, yes.

MR. KEELING: So controlling for those other factors you just alluded to, low channel turbulence and mixing is likelier to lead to HAB formation than not; correct?

WITNESS BRYAN: Say that again?

MR. KEELING: Controlling for those other factors you alluded to, lower channel turbulence and mixing is likelier to encourage the formation of HABs.

WITNESS BRYAN: Again, it depends what channel you're talking about, and it depends how much you're

slowing velocities down.

If the channel's highly turbid, it's already at a high velocity, you can slow it down by 20, 30, 50 percent and have no effect on harmful algal blooms.

So there are a lot of other factors. We can talk in generalities, and I think the answer I provided speaks to the big-picture generality that, in general, as you slow down channel velocity, reduce turbulence, increase water calm disability, that plays to the hydrodynamic advantage of microcystis.

But, again, I warn against oversimplifications of saying if we slow down velocity, we're automatically going to get more microcystis. That just doesn't always -- isn't always the case.

MR. KEELING: I understand that HABs formations involves a synthesis -- dynamic synthesis of many factors, Dr. Bryan, but I also understand your testimony breaks it out into individual discussions, like temperature, flow, turbidity. And so it makes it difficult to talk about this without talking --

WITNESS BRYAN: Oh, absolutely.

MR. KEELING: -- as you did about these individual compounds.

Do you agree with that?

WITNESS BRYAN: I agree.

MR. KEELING: Would you agree that controlling for these other components to which you've alluded, low channel turbulence -- Well, strike that.

Isn't it true that lower in-channel turbidity is likely to lead to HABs formation than higher channel turbidity, controlling for those other factors?

WITNESS BRYAN: Again, it depends what "lower" and "higher" means.

We -- Yeah, I'll just leave it at that.

It depends what turbidity levels you're starting from and going to.

MR. KEELING: Doesn't the EIR/EIS explain that the California WaterFix, if approved, will result in longer residence times in the Delta?

WITNESS BRYAN: To the degree that it does, it was probably referring to the Particle Tracking Model that we were discussing earlier.

So, to the extent that the EIR talks about information from the Particle Tracking Model from DSM-2, that does indicate that there will be longer residence times.

MR. KEELING: Did you review the Final EIR/EIS?

WITNESS BRYAN: Yes.

MR. KEELING: And another --

WITNESS PREECE: I have something to add that

will help answer your questions about residence time.

In the Stockton deep water ship canal, which is known for having short residence times, in 2012, there was a big -- or longer residence times. Excuse me.

There -- In 2012, there was a very large cyanobacteria bloom.

In 2009, when conditions were very similar, so always very long residence times, there was no bloom.

And so that's an example of where all the other factors appeared to be similar and residence time being very slow did not create a bloom.

MR. KEELING: Thank you, Ms. Preece.

Isn't it true that the deep water channel to which you refer is an engineer channel and not part of the Sacramento River?

WITNESS BRYAN: Yeah, it's not part of the Sacramento River. It's part of the San Joaquin River.

MR. KEELING: Is it part of a river or is it an engineer channel?

WITNESS BRYAN: It's part of the river. It's just been deepened.

MR. KEELING: Dr. Bryan, we've been talking about HABs, harmful algal blooms.

How many cyanobacteria constitute a bloom?

WITNESS BRYAN: What do you mean by "how many

cyanobacteria"?

MR. KEELING: I mean, what quantity a -- If a -- If you meet a unit -- single unit of cyanobacteria in the water, it's not an algal bloom.

What's the quantity we're talking about before you get to a bloom status?

WITNESS BRYAN: I guess I've never heard it discussed that way.

But if you're talking about microcystis, microcystis has very small cells. And so you can have millions of cells in the water column and not have a bloom that we would look at and say, "Oh, jeez, there's a problematic bloom." But you can still have, you know, a lot -- millions and millions of algae cells in the water column.

So, when we talk about blooms or problematic blooms, it's just the accumulation of these -- these small cells to a very, very high level where they become visible, where they begin to form those mats on the surface and so on and so forth.

MR. KEELING: And I believe you testified that water column clarity is a key driver for the formation of algal blooms?

WITNESS BRYAN: Yes. It can be, yes.

MR. KEELING: Is high water clarity considered

a prerequisite for microcystis bloom formation?

WITNESS BRYAN: No, I wouldn't say it is.

MR. KEELING: If I told you that was a quote directly from Lehman 2013, would that surprise you?

WITNESS BRYAN: No, it wouldn't surprise me. But microcystis has a life history strategy, as I alluded to earlier, where it -- it -- in order to compete with other algae and get the light that's available, it can control its location in the water column so it can migrate up to the surface.

So even in areas that have high turbidity and operate clearly, if microcystis has all these other factors in its favor that we're talking about, including hydrodynamics in a stable water column, it can get up to the surface.

So you don't have to necessarily have a clear water column for microcystis to form a bloom and now compete.

It may -- Yeah, I'll -- I'll leave it at that.

MR. KEELING: But you did agree that water column clarity is a key driver for the formation of algal blooms.

WITNESS BRYAN: It can be. It's not always a prerequisite.

MR. KEELING: Isn't it true that the proposed

WaterFix Project, if approved and constructed, would remove much of the sediment carried by the Sacramento River, resulting in greater clarity below the points at which that sediment is removed?

WITNESS BRYAN: I -- I do not agree with that statement.

MR. KEELING: At this time, I'd like to distribute two short excerpts from the Final EIR/EIS, and Mr. Baker has them on a flash drive thanks to Miss Meserve's foresight.

UNIDENTIFIED SPEAKER: Do you have it available for the Hearing Officers?

MR. BAKER: I don't have any other copies.

MR. KEELING: And while she's doing that, I don't know the procedure. I'm happy to assign this a number next in order and have my assistant upload it tomorrow for -- if that's the procedure you want.

CO-HEARING OFFICER DODUC: Yes, please. And also added to your index of exhibits.

MR. OCHENDUSKO: Yes, please --

MR. KEELING: All right.

MR. OCHENDUSKO: -- the exhibit identification, please.

MR. KEELING: All right. I have to write that down because I'll never remember.

CO-HEARING OFFICER DODUC: Thank you for being so helpful, Mr. Keeling.

And for wearing the best tie.

MR. KEELING: Thank you.

MR. MIZELL: Excuse me, Hearing Officer Doduc.

If you would like, I believe Dr. Preece had found a number for the number of cells in a HAB bloom if that something that interests you. Otherwise --

CO-HEARING OFFICER DODUC: Actually, that does interest me.

WITNESS PREECE: Okay. So, typically, a plantonic -- which that's the type of microcystis that we are talking about here -- blooms are defined as 7-by-104 cells per liter and develop over a period of several weeks, starting from a plantonic population of at least a thousand cells per liter.

CO-HEARING OFFICER DODUC: And who decided that?

WITNESS PREECE: This is based off of two sources: Baxa and others, 2010, who writes on the Delta, and then Davis and others, 2009.

CO-HEARING OFFICER DODUC: Thank you.

MR. KEELING: I can just imagine the individual who had to count as they were adding up.

Dr. Bryan, you've been handed two excerpts from

the Bay-Delta Conservation Plan/California WaterFix Final EIR/EIS, which I believe is Exhibit SWRCB-103.

And I will -- We will have exhibits with these excerpts later, but I think they're all from that.

The first is UT7 for Alternative 4, Pages 20-131 through 20-133.

(Document displayed on screen.)

MR. KEELING: Do you have that in front of you?

WITNESS BRYAN: I do.

MR. KEELING: The second is UT7 for Alternative 4A, Pages 20-193 through 20-194.

Do you have that in front of you?

WITNESS BRYAN: Yes, I do.

MR. KEELING: Please direct your attention to the section entitled "Solid Waste" on Page 20-132 of the first excerpt.

WITNESS BRYAN: (Examining document.)

MR. KEELING: Mr. Baker, if you could make it a little larger for folks in the back without losing part of those areas?

(Enlarging document on screen.)

MR. KEELING: There we go. Thank you.

CO-HEARING OFFICER DODUC: And Mr. Herrick is muting his phone right now.

MR. KEELING: I am -- Have you had a chance to

review that?

Or go ahead. Let me know when you're finished.

WITNESS BRYAN: Which section would you like me to read?

MR. KEELING: The section entitled "Solid Waste" consists of three paragraphs.

WITNESS BRYAN: (Examining document.)

MR. BAKER: Mr. Keeling, would you like to identify this Exhibit SJC and the next number?

MR. KEELING: If I knew the next number, I would. Maybe you could tell me, Mr. Baker.

MR. OCHENDUSKO: Well, we'll let your -- We'll let your secretary identify that and put it in with the EII later today.

MR. KEELING: Very good.

WITNESS BRYAN: Okay.

MR. KEELING: Okay. Thank you.

You understand that this section deals in large part with removal of sedimentation from the river.

You understand that?

WITNESS BRYAN: Yes.

MR. KEELING: And looking at the conclusion in the -- actually, the second paragraph where it says (reading):

"During periods of high sediment load in the

Sacramento River, the daily mass of solids would be expected to increase up to 253,000 dry pounds per day. The annual volume of solids is anticipated to be approximately 291,600 cubic feet (dry solids)."

Do you see that?

WITNESS BRYAN: Yes.

MR. KEELING: What would be the effect on water clarity below the proposed North Delta intakes by removing approximately 291,600 cubic feet dry solids annually?

WITNESS BRYAN: In the Water Quality chapter of -- of the EIR/EIS, we had to assess how the California WaterFix would affect turbidity.

So if you have a flowing river and you have these diversion intakes and it's flowing at 10 NTUs -- those are the Nephelometric Turbidity Units -- and water column is flowing at 10 NTUs, and you divert some of that water, the water that passes the diversion is still flowing at 10 NTUs, because you've taken a bunch of water out, you've taken sediment with that water.

But the turbidity of the water that continues to flow in the channel immediately downstream from those intakes is 10 NTUs.

Now, it's a lower volume of water, and so that lower volume of water would generate less in-channel

turbulence and scour of channel margins, et cetera. And so it can have some effect on down -- downstream turbidity.

But we did not feel that it would have such a substantial effect, because you're still going to have relatively high volumes of flow passing the diversions in the channel downstream. It's still going to have a large settlement load; it's still going to have sediment; it's still going to have resuspension of that sediment in a tidal cycle.

So in the Water Quality chapter in the EIR/EIS, we found that the California WaterFix would have a less-than-significant adverse effect on turbidity.

MR. KEELING: Is that why you didn't discuss the removal of sediment -- suspended sedimentation in your -- in your testimony about HABs?

WITNESS BRYAN: Yes. I don't believe that the California WaterFix is going to affect turbidity in the Delta to a point that would have any effect on harmful algal blooms.

MR. KEELING: And just to complete this, the -- the excerpt that we just looked at concerned Alternative 4.

If you take a look at the second excerpt, which addresses impact UT7 for Alternative 4A.

Do you have that in front of you.

(Document displayed on screen.)

MR. KEELING: And take a look at Page 20-193 at the bottom where it reads -- Thank you, Mr. Baker.

(Reading):

"Potential effects associated with operation and maintenance of water conveyance facilities would be similar to those described under Alternative 4. Therefore, 4A would not result in physical effects associated with the provision of new . . . physically altered -- new or physically altered government facilities."

And then continue on to Page 20-194 to the third paragraph, Mr. Baker, which states (reading):

"Similar to Alternative 4, the operation of maintenance activities associated with the proposed water conveyance facilities would not be expected to generate solid waste such that there would be an increase in demand for solid waste management providers in the plan area and surrounding communities. Therefore, there would be no or minimal effect on solid waste management facilities."

Do you understand that the overarching consequence to be that, with respect to sediment removal,

there's no material difference between Alternative 4 and 4A?

WITNESS BRYAN: I'm not familiar with this section of the EIR/EIS. I didn't have anything to do with preparing it so I'm not really prepared to answer questions about this.

MR. KEELING: Do you disagree with those statements?

WITNESS BRYAN: I don't have any opinion about the statements. I didn't work on this section of the EIR.

MR. KEELING: In preparing your testimony, were you aware of the estimated amount of sediment that would be removed under Alternative 4A?

WITNESS BRYAN: I was aware that sediment would be removed based on the diversions at the North Delta Diversions, yes.

MR. KEELING: That is all I have. Thank you.

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

MR. KEELING: Thank you, Miss Preece; thank you, Dr. Bryan.

CO-HEARING OFFICER DODUC: Mr. Herrick, you're up next.

MR. HERRICK: Thank you, Madam chairs, Board

Members, staff.

Mr. Keeling asked questions on all my topics so I will be very brief, hit just a couple of follow-on things I might ask.

CROSS-EXAMINATION BY

MR. HERRICK: Dr. Brown -- Bryan. Excuse me while I figure out where the heck I am.

WITNESS BRYAN: (Laughing.)

MR. HERRICK: You touched on in some of your answers this issue of the predictive as opposed to the comparative issue with the models, and you stated that you guys had -- you'd talk about that in preparation for this; correct?

In one of your presentations, you -- you were showing us how you thought the modeled changes in velocities did not significantly result in velocities above the .2.

Do you recall that?

WITNESS BRYAN: Is there a slide that you'd like to pull up?

MR. HERRICK: Yeah. I'm sorry.

If we can . . .

Anyway, let me just say without looking at that:

Are you asking the Board to rely on the numbers

you've provided for changes in velocity or just the differences between the two scenarios?

WITNESS BRYAN: I'm not sure I follow your question.

MR. HERRICK: Well, if -- if you show that velocity changes at a particular location are -- result in numbers that are above .2, are you asking the Board to make their decision based upon the actual numbers in the future will be above .2?

WITNESS BRYAN: Well, if you look at the various locations that I analyzed -- And maybe we could pull up the PowerPoint presentation, the DWR-8 errata, the combined version that we went through today. I just want to kind of get us on the same page.

Why don't you pull up Slide 31.

(Document displayed on screen.)

WITNESS BRYAN: Is this helpful to the -- your question?

MR. HERRICK: Yes. Yes, thank you.

So, in your direct testimony, I believe you were referring to the fact that the changes in velocity didn't typically result in any significant times when those numbers resulted -- resulting numbers were above .2.

In other words, .2 is the threshold you were

talking about is when impacts on microcystis growth occurred.

WITNESS BRYAN: No, I wouldn't necessarily characterize it that way.

The information that I spoke to in my testimony, the slide that you're referring to is an earlier slide where I said that velocities above .2 feet per second become increasingly more challenging hydrodynamically for microcystis because the velocities, as they increase above .2 feet per second, you get more of the mixing and turbulence in the channel.

So that's the point that I was making with the .2.

MR. HERRICK: Yes. I was -- I wasn't trying to disagree with that. I was trying to restate it, which I did poorly, but . . .

What I'm trying to get at is, should we use your Slide 31 as a representation of how often it will be above .2 or just the differences between different scenarios?

Because that gets to the predictive versus comparative issue, and I thought when you were referencing the .2, you were making that predictive conclusion.

WITNESS BRYAN: Like I said before, it's an

interesting discussion we've had in this hearing about predictive and comparative. It's an important point, but when we use models, we want and expect them to be reasonably at least in the ballpark of accurate to what we're talking about.

So if you look at this slide, the reason that the flow of velocities go to zero is because you've got tidal movement in this channel. It reverses directions. So, for minutes at the slack tide, you're going to be at zero and it's going to flow in the other direction. So that's why you have a very low percent of time that you have a zero flow here.

And the rest of the Probability Exceedance Plot is the model's best estimate and the frequency with which you get other velocity in that channel.

So, the bulk of my analysis, I feel that DSM-2 does a reasonable job of indicating -- We know we have slack tides out there. We know when a channel reverses, it goes to zero for a short amount of time.

So if we have a figure like this that had nothing below .2 feet per second, we would be suspect of the model because we know we have slag tides.

So when we look at this, it is a reasonable representation of the kinds of velocities that you get on a 15-minute time-step absolutely regardless of direction

in Old River at Rock Slough.

Once we have that --

CO-HEARING OFFICER DODUC: So you are using it as a predictive tool?

WITNESS BRYAN: No. I was just getting to that point.

CO-HEARING OFFICER DODUC: Get to it quicker, please.

MR. HERRICK: Yes, please.

WITNESS BRYAN: Once -- Once we have a model that we think is worthy of looking at its output, meaning if the model was so -- had no ability to even predict a value in the right ballpark, we wouldn't use the model.

So these models can provide a reasonable representation of the probability of exceeding any given velocity that you see on this plot.

But where the real analysis comes in is, I don't care how -- quite how -- you know, how much the model, whether it's precisely accurate, whether the frequency with which .4 feet per second is exactly, you know, 70 percent or -- I don't -- I don't really care about that precision so I'm not using it in a predictive fashion that way. I'm using it in a comparative fashion.

So what it's telling me is that under the No-Action Alternative, I'm going to see everything from

zero velocity at the slack tide all the way up to 1.2 feet per second.

And I can see on the Probability Exceedance Plot how frequently I'm at or above any of those velocities. Then I use the comparative mode approach because I want to see if the California WaterFix is causing those low-flow conditions where microcystis would have an advantage to occur more frequently or less frequently than under the No-Action Alternative.

So the bulk of the analysis is certainly in the comparative mode.

MR. HERRICK: I'll leave it at that.

CO-HEARING OFFICER DODUC: That was a fine question, Mr. Herrick.

MR. HERRICK: It started out as a fine one.

Dr. Bryan, on Page 29 of DWR-8, which is the original PowerPoint, you list a -- you identified those locations for which your analysis on velocities were made; correct?

WITNESS BRYAN: Yes.

MR. HERRICK: Now, does this analysis include the temporary barrier program being in operation during the -- whatever months it's normally operating?

WITNESS BRYAN: You'd have to ask the Modelers that question.

MR. HERRICK: Okay. Are you familiar with the -- the barrier program, in that it traps incoming tides to a great degree to hold levels as best as possible, and then does not let water flow back downstream when the tide goes out?

WITNESS BRYAN: Again, I'm not -- I'm not familiar with that, so you'd have to ask the Modeling.

MR. HERRICK: I'm not trying to test you, but given the program where there are barriers that trap flows, did that go into your consideration as to changes in velocities that might occur if you have -- I'm just representing possibly -- sloshing back and forth behind barriers and no net flow out of them one way or the other?

WITNESS BRYAN: What I guess I can say is, the degree to which barriers are in place or not in place would be reflected in the model scenarios that I compared.

So -- But you'd have to ask the Modelers what was in and what was out of each of those scenarios.

MR. HERRICK: Okay. And lastly, this'll be a generalization, so please object if you don't like it.

But you went through the various factors, velocity, temperature, dissolved organic compounds, residence time.

And my reading of your -- your testimony, your conclusions, is that each one of those you analyzed and said, I don't think it significantly affects the frequency or magnitude of algal blooms.

But I wonder if you've done an analysis that combines all those things. In other words, if we look at the worst case under each one of those scenarios, would level of impact would it have on HABs?

WITNESS BRYAN: Yeah. I think, you know, overall, in an analysis like mine, because it was rebuttal testimony and the folks that -- that I was rebutting were making claims that temperature would cause increase in cyanobacterial flow, cause reduced flow, cause increase, we analyzed those individually, as we often do. We did water quality analyses. We looked at individual constituents at a time.

But based on the analyses that I've done, I don't feel that temperature, when looked at in isolation, that temperatures would change sufficiently in the Delta to affect microcystis.

I don't feel that the hydrodynamic profile on velocities and the hydrodynamics that you get in the channels, the turbulence and mixing, would change substantially between the scenarios -- the WaterFix scenarios and No-Action Alternative, to make a cause on

microcystis.

So, while I went through that individually, I would also say that, when you combine that, when you combine the effects of the California WaterFix, temperature and velocity, I would still not expect to see that to be -- to cause a substantial difference in microcystis dynamics in the Delta.

I just don't think it's substantial enough even when added together to cause notable differences in the dynamics of microcystis in the Delta.

MR. HERRICK: I appreciate your conclusion.

I guess my question was more: The various Protestants and parties are trying to analyze the effects. And if you give us a string of, as you put it, not significantly change the magnitude or frequency, and then you add four or five of those, you don't think there's significance together, on what basis can other people, then, determine whether or not your conclusion might be correct? Or should we just rely on your expertise?

And there's -- there's no quantification of all these in what you labeled as not-significants together.

MR. MIZELL: I'm going to object for the moment here: The question is rather unfair.

Our rebuttal evidence is based upon the cases

in chief of the other parties.

If Mr. Herrick is asking why we didn't include in our rebuttal a scenario that was never brought up in the cases in chief of other parties, it would have been objected to as improper rebuttal.

So based on this line of questioning, we could certainly produce during surrebuttal, but it's an unfair question to ask why the witness has not prepared something, because it's beyond the other cases in chief.

CO-HEARING OFFICER DODUC: Mr. Herrick, he has a point.

MR. HERRICK: Perhaps, but the issue --

CO-HEARING OFFICER DODUC: He does.

MR. HERRICK: The issue is, who has the burden of proof?

So when the issue arises, and then the Petitioners say, "Well, we're just rebutting. We're not going to show you what we think the effects are," then there's an argument they haven't met their burden of proof.

So the witness doesn't have to answer that. I was just trying bring that issue to the forefront because it is other people trying to make significant decisions based on nobody having done a combined analysis.

CO-HEARING OFFICER DODUC: Thank you,

Mr. Herrick.

MR. HERRICK: Thank you.

CO-HEARING OFFICER DODUC: And I look forward to reading that in your closing brief.

MR. HERRICK: Thank you. That's all.

CO-HEARING OFFICER DODUC: Okay. That would next -- I believe our final cross-examiner today will be Miss Meserve. And then tomorrow we'll have Miss Taber and Miss Des Jardins, which means that we will get to your remaining Panel 2 tomorrow, Mr. Mizell.

And since I see Miss Nikkel also still here, let me go ahead and address the -- the notice that North Delta Water Agency served on the Department to request that Dr. Nader-Tehrani appear as a witness for North Delta, and to request that he bring specified documents or other evidence to the hearing.

We will be issuing a written ruling forthcoming that will have further detail on this, but for now, I want you to be aware that -- Oh, let me also acknowledge that DWR submitted a Motion for Protective Order seeking to vacate North Delta's notice. And, like I said, we'll be issuing a written ruling on this.

But for tomorrow's purposes, Dr. Nader-Tehrani will not be required to appear separately on behalf of North Delta, provided that he appears as a rebuttal

witness for DWR as proposed and is subject to cross-examination on the modeling identified in North Delta's notice.

In addition, Dr. Nader-Tehrani will not be required to bring to the hearing any documents or other evidence that DWR has already provided to North Delta or made publicly available.

Mr. Nader-Tehrani should bring to the hearing any documents or other evidence described in North Delta's notice that have not been provided already.

And while I don't think it was specifically clear, let me add, Ms. Nikkel, that while Mr. -- while Dr. Nader-Tehrani will not be required to appear separately as your witness, you will be allowed in the conduct of your cross-examination to explore some of the topics you identified.

MS. NIKKEL: Thank you. That's very helpful to know in advance. Appreciate the notice.

A couple of questions for clarification, one maybe for Mr. Mizell:

And the first one is, our Notice was not specific to Dr. Nader-Tehrani. If Dr. Nader-Tehrani is the appropriate witness to direct these questions to, we're happy to do that while he's appearing in his panel, but we just want to confirm that he's the right person to

ask.

CO-HEARING OFFICER DODUC: He will be the person who will be appearing and you may ask him your questions.

MS. NIKKEL: And if he says no, we'll have to, I think, raise the issue again perhaps.

CO-HEARING OFFICER DODUC: We'll address that if we come to that.

MS. NIKKEL: And then my second question for clarification is whether documents made publicly available, that means made publicly available anywhere and not necessarily submitted into the record; correct?

CO-HEARING OFFICER DODUC: As long as you have access to it.

MS. NIKKEL: Okay. Thank you.

CO-HEARING OFFICER DODUC: Okay. Any questions, Mr. Mizell?

MR. MIZELL: Not about the ruling, no.

As for tomorrow and the appearance of witnesses, I'm going to offer a proposal that we have Miss Sergent appear tomorrow.

I know that a number of folks and I have talked about this over the break, and I don't believe has raised any objection so far.

But she has a rather discrete portion of

testimony and it might be nice to have that presented on its own at this point so that the Modelers and the Operators can appear beginning on the 4th, and that's as a whole.

CO-HEARING OFFICER DODUC: So you are changing again on me, because I believe your initial projection was that Miss Sergent, Mr. Leahigh, Dr. Nader-Tehrani, Mr. Munévar and three other witnesses will be appearing together as a panel, and now you are suggesting that Miss Sergent appear tomorrow by herself.

MR. MIZELL: That is correct.

You've run this rebuttal hearing very efficiently and I am attempting to make sure that my witnesses can be available when you want them.

Miss Sergent has a discrete piece of testimony and, therefore, she can appear on her own without too much disruption to the rest, whereas the Operators and the Modelers really are overlapping.

And as you indicated before, we want to avoid the he said/she said sort of back and forth between asking questions of one and being referred to the other.

CO-HEARING OFFICER DODUC: Assuming -- and I'm not hearing any objection -- Ah, maybe.

Are you as annoyed as I am that there are these last-minute changes, Miss Spaletta?

MS. SPALETTA: It doesn't annoy me. I actually like Mr. Mizell's proposal to have fixed dates, to be frank, so that this would not be an issue. I didn't like necessarily the dates he proposed, but I did like the idea of fixed dates for that reason.

I actually have a mandatory court appearance tomorrow, and so I was going to ask to go out of order to cross-examine that panel at the end, whenever the next day of hearing would be.

CO-HEARING OFFICER DODUC: But now it's not a panel.

MS. SPALETTA: But now it's not a panel, and so it puts me at a bit of a disadvantage because I will not be here to examine Miss Sergent.

CO-HEARING OFFICER DODUC: And did you wish to cross-examine Miss Sergeant?

MS. SPALETTA: I did. It may be that, by the time it gets to me, the questions are done, in which case I will, you know, try to watch the video if it's available over the weekend and I could notify someone that I don't need to examine her anymore. I'm happy to do that.

But that does cause a problem for me if she goes by herself tomorrow.

CO-HEARING OFFICER DODUC: Because Mr. Mizell

is springing forth this last change on us, and because you were kind enough to be here today to allow us some pre-warning of your unavailability, I will make sure that, in the event Miss Sergent needs to come back on . . . Thursday?

When are we meeting next? Thursday?

MR. OCHENDUSKO: Yes.

CO-HEARING OFFICER DODUC: Thursday. In the event that she needs to come back for you to conduct your cross-examination, she will be required to do so.

MS. SPALETTA: I appreciate that, and I will try my very best to make sure that I let Mr. Mizell know if I don't need to examine her, so as to not make it necessary.

CO-HEARING OFFICER DODUC: Let us know, as well.

MS. SPALETTA: I will. Thank you.

CO-HEARING OFFICER DODUC: Thank you.

MS. HEINRICH: One other housekeeping item, if I may.

I'm not sure that -- Well, we don't know how long cross-examination of Miss Sergent will take, and it looks like we probably will finish with Land's cross-examination of this panel today, which only, according to my notes, leave us with about an hour and a

half worth of cross-examination of this panel plus any redirect or recross. So I'm not sure that we can fill the day tomorrow solely with Miss Sergent's cross-examination.

CO-HEARING OFFICER DODUC: Thank you, Miss Heinrich, for pointing that out.

MR. MIZELL: If it's the Board's pleasure, I can also produce additional witnesses, but I would indicate that once we bring forth the Operators or the Modelers in separate panels, then Mr. Ochenduszko never well might have a busier job.

CO-HEARING OFFICER DODUC: I seem to recall when we reconvened last -- When did we last . . . On Tuesday. Was it Tuesday?

MS. HEINRICH: Yes.

CO-HEARING OFFICER DODUC: All the days come together.

I believe it was Mr. Bezerra that raised this issue in pointing out that Mr. -- that Dr. Nader-Tehrani appeared on the unavailability list that you provided, Mr. Mizell. And I recall you saying at that time, in response to Mr. Bezerra's question, that you would make your witness available when they are called.

MR. MIZELL: That is true. That is why this is -- this is a proposal, not a -- not an edict. I'm

asking that we make this accommodation.

It was -- It was Mr. Munévar who does not have availability this week, but I can attempt to get him back in state and make him appear tomorrow.

CO-HEARING OFFICER DODUC: If we need to get to that panel, or the remainder of Panel 2, then please make sure that your available witnesses are here. And as we have allowed you flexibility, and other parties flexibility, in the past to have witnesses appear out of sequence as long as they are still within the time of your presentation of rebuttal, we will allow you that flexibility.

But I expect that, if we finish with Miss Sergent tomorrow, that you will have your witnesses available to continue with your presentation of rebuttal.

MR. MIZELL: Very good. Thank you.

MR. HERRICK: John Herrick, South Delta.

I just want to clarify whether it's going to be one part of that panel that follows Miss Sergent or all of them are going to be here just for the preparation for any potential cross if we get to it?

If -- If -- If Miss Sergent is done sometime tomorrow, are we putting on one or more of the panel or is the whole panel going to try to present?

Because we supported his idea --

CO-HEARING OFFICER DODUC: His remaining panel -- The remainder of his Panel 2 consists of one, two, three, four, five, six people.

Is that correct, Mr. Mizell?

MR. MIZELL: That is correct.

MS. MORRIS: Stefanie Morris, State Water Contractors.

Could -- Would it be possible to get an estimate of who plans, and the timing of cross-examining Miss Sergent, since Mr. Munévar, as Mr. Mizell says, is out of the state, and so he's --

CO-HEARING OFFICER DODUC: This is the Petitioners' --

MS. MORRIS: I'd like to --

CO-HEARING OFFICER DODUC: This is the Petitioners' Petition to the State Water Board.

It is the Petitioners' responsibility to have their witnesses available in state knowing the dates in advance in order to ensure all parties fair and equal access in the participation of this hearing, so I am not at all sympathetic.

MS. MORRIS: But -- But I'm not trying to ask for your sympathy. I'm just trying to understand for everybody in the hearing room, for purposes of cross-examination and coordinating the schedules, if it

looks like that panel will go on tomorrow or if Miss Sergent is going to have a long cross-examination.

I'm not asking for sympathy. I'm just trying to understand and make it fair --

CO-HEARING OFFICER DODUC: Keep in mind --

MS. MORRIS: -- to all the participants who have to prepare for cross-examination.

CO-HEARING OFFICER DODUC: Keep in mind, however, that not all parties are present here today. Not all parties are required to be present here today. They may show up tomorrow now that they know Miss Sergent will be up for her rebuttal testimony and cross-examination.

So, yes, I could ask for an estimate of time -- and thank you again, Mr. Mizell, for dumping this on us at the last minute -- but it will -- may not truly reflect the level of cross-examination Miss Sergent might be subject to.

MS. MORRIS: Thank you.

CO-HEARING OFFICER DODUC: On that note, who present here today plans on cross-examination of Miss Sergent, and for how long?

MS. NIKKEL: Meredith Nikkel on behalf of North Delta Water Agency.

We have probably 30 minutes of

cross-examination for Miss Sergent.

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

MR. HERRICK: John Herrick, South Delta parties.

Mr. Dean Riess will be conducting, and I believe maybe up to a half hour.

MR. COOPER: Dustin Cooper on behalf of Group 7.

I would anticipate about 30 minutes.

MS. TABER: Kelly Taber on behalf of City of Stockton.

Just a couple of questions, very short. A few minutes.

MS. SPALETTA: Jennifer Spaletta, and it will be not tomorrow but it will be about 30 minutes.

CO-HEARING OFFICER DODUC: Okay.

MS. DES JARDINS: Dierdre Des Jardins.

And if I have to estimate today, it would be about half an hour, but I was going to look at her testimony more tonight. Thank you.

MR. WASIEWSKI: Tim Wasiewski for the San Joaquin Tributaries Authority.

Maybe 15 minutes.

CO-HEARING OFFICER DODUC: So we obviously will

be through with Miss Sergent, with the exception of calling her back on Monday for Miss Spaletta if necessary, if necessary. Not Monday. I'm sorry. Thursday.

We should be done with Miss Sergent by no later than mid-afternoon.

Are we done? Are there other surprises, Mr. Mizell?

MR. MIZELL: No, ma'am.

CO-HEARING OFFICER DODUC: All right.

Miss Meserve, thank you for your patience, for what I intended to be a short announcement.

MS. MESERVE: You never know around here. All right.

Good afternoon, Dr. Bryan, Owen, Preece.

Let's see. So the areas I was going to cover was a little bit about the preparation of the testimony, went into that; injury versus effects in terms of what we're here for in the hearing; the preparation of the Final EIR versus the Draft EIR in terms of residence time and -- and the limits of modeling.

And I think Mr. Mizell won't mind if I go long, I think, but I should try to keep it to half hour. Okay.

CROSS-EXAMINATION BY

MS. MESERVE: So most of my questions are for

Mr. Bryan.

So first is: You were the lead preparer of the Water Quality chapter of the EIR for this Project; is that correct?

WITNESS BRYAN: Yes, I served as the principal in charge and a number of my staff worked with me on that chapter.

MS. MESERVE: And you're very familiar with the EIR process, I assume?

WITNESS BRYAN: Yes.

MS. MESERVE: Can you just state your general understanding of why we prepare EIRs. What's the purpose?

WITNESS BRYAN: Well, first and foremost, maybe to comply with CEQA.

But EIRs, EISs are prepared to analyze the effects of Projects on the environment so that decision-makers can make decisions with full knowledge of the environmental effects that may occur upon those Projects being implemented.

MS. MESERVE: And what about with respect to mitigation? What's the -- What's the requirement?

MR. MIZELL: Objection: This goes beyond the scope of his rebuttal testimony.

MS. MESERVE: The reason I'm asking about this

is because this is a hearing about whether there's injury to legal users of water.

His testimony actually doesn't speak to that. It speaks to something that sounds a little bit more like an effect in significance, and I'm just trying to understand his testimony in the context of this proceeding.

MR. BERLINER: Again, this is rebuttal testimony to points that were raised by others and nobody raised this point.

CO-HEARING OFFICER DODUC: That is correct, Miss Meserve. Can you reframe the question?

MS. MESERVE: I shall try.

MR. BERLINER: Frankly, it sounds like legal argument.

CO-HEARING OFFICER DODUC: Try it, Miss Meserve, and I'll --

MS. MESERVE: Well, I believe that the testimony which is -- that this was prepared to rebut actually spoke in terms of injury to legal uses and users of water in the Delta.

And this rebuttal from the Petitioners doesn't really speak to that. So I'm trying to understand what the expert is -- what he thought he was demonstrating.

So I think if you let me -- give me a tiny bit

of rope, it won't take long, and I think it is obvious.

CO-HEARING OFFICER DODUC: All right.

MS. MESERVE: Thanks.

So do you -- Dr. Bryan; correct?

WITNESS BRYAN: (Nodding head.)

MS. MESERVE: Yes.

Do you know generally what the purpose of Part 1 of the proceeding is in which you are an expert witness; correct? What is the purpose?

MR. BERLINER: Objection: Relevance.

MS. MESERVE: He is here to opine on the ultimate question we are here for; right?

MR. BERLINER: No. He's here --

CO-HEARING OFFICER DODUC: Hold on --

MR. BERLINER: He is here to rebut testimony.

CO-HEARING OFFICER DODUC: -- Mr. Berliner.

What is your question, Miss Meserve?

MS. MESERVE: What is his understanding of what the purpose of Part 1 of this proceeding is.

CO-HEARING OFFICER DODUC: No. Let's -- Let's be more focused on that question, please.

MS. MESERVE: Let me work on that.

Is it your understanding that Petitioners have the burden to show there is no injury in this proceeding?

MR. BERLINER: Objection: Relevance.

CO-HEARING OFFICER DODUC: Sustained.

Miss Meserve, focus on his rebuttal.

MS. MESERVE: Okay.

Did you consider the issue of injury in preparing your testimony?

MR. BERLINER: Objection: Relevance.

MS. MESERVE: When you use the term "effect" in your testimony, what do you mean?

WITNESS BRYAN: When I use the term "effect."

When we're analyzing the effects of Projects, so in this case the California WaterFix being implemented, I'm making comparisons between the California WaterFix and the No-Action Alternative, there can be any number of environmental effects.

An effect can be a change in temperature. An effect can be a change in flow or flow velocity. These are all environmental effects of the action being implemented.

Then, what I -- what we do in impact assessments, to use that term, is, we first do an assessment to understand the frequency and magnitude of the effect. And then we, in turn, look at whether that frequency and magnitude of the effect would cause an adverse impact.

We've been talking a lot about microcystis, so

does the change in frequency and magnitude of velocities, or does the change in frequency and magnitude of temperature rise to the level that they would change microcystis dynamics in the Delta such that it would maybe cause more frequent blooms and be an adverse effect.

So that's the nature of the assessment.

MS. MESERVE: And so were you looking at whether there was any effect at all, or whether it was a substantial, or what kind of effect?

WITNESS BRYAN: Well, again, if you -- if you look at the approach that I've taken in my analyses, wherever possible, they're based on quantitative modeling output.

And so the modeling, as you've seen in the presentation, it shows quantitatively those effects. It shows the change in frequency in currents of velocities. It shows the change in frequency and occurrence of temperatures. So it does show those effects.

I then interpreted what those effects mean to microcystis, or what a change in bromide might mean to formation of disinfection byproducts at a water treatment plant.

So assessments always start with understanding the environmental change and they go from that to what

would be the adverse effect from that environmental change --

MS. MESERVE: And --

WITNESS BRYAN: -- or if there would be an adverse effect.

MS. MESERVE: Right.

So when you opine that there would not be a very big difference between the different modeled outputs, are you saying there is no effect?

WITNESS BRYAN: How are you using the term "effect" in this question?

MS. MESERVE: Well, I'm trying to get at the relevance of -- of the opinions you've stated here in response to the Protestants, because it speaks to me in terms of an EIR consultant talking about environmental impacts, and so that's why I'm trying to put it in context for our proceeding here.

So I think it's very relevant and I think we've been pushy about this concept and we should not be.

Anyway, back to questions. Am I allowed to ask any more questions about how he analyzed it or not, because I want to ask --

CO-HEARING OFFICER DODUC: What is your question?

MS. MESERVE: Well, okay. So for instance, the

ultimate question with the HABs here in the EIR was whether there was a potential significant environmental effect; correct?

WITNESS BRYAN: If -- If you want to phrase it in CEQA lingo, it would -- the question would be, is there a significant adverse effect, yes.

MS. MESERVE: And the EIR found that there was not after mitigation; correct?

WITNESS BRYAN: For which?

MS. MESERVE: For Water Quality Impact 32, HABs Formation.

WITNESS BRYAN: I don't think it reduced mitigation. I think there would not be significant adverse effect.

MS. MESERVE: So, in your experience here as an expert today, are you opining that that means there is no injury?

MR. BERLINER: I'm going to object as vague on the use of the word "injury," as to whether we're using it in the legal context before the Board or in some other fashion.

CO-HEARING OFFICER DODUC: Miss Meserve.

MS. MESERVE: Well, I think it's very relevant, and I think I want to know what his definition of "injury" is, so --

CO-HEARING OFFICER DODUC: He's a scientist. I don't know that he has a definition of "injury."

MS. MESERVE: In preparing for this testimony, were you advised as to what injury is in this context?

CO-HEARING OFFICER DODUC: Did . . .

Dr. Bryan, did you use the term "injury" in your rebuttal testimony?

WITNESS BRYAN: No, I did not.

MS. MESERVE: In your preparation, did you discuss that in terms of being prepared to enter this proceeding in . . .

WITNESS BRYAN: Well, I guess I could give you my 2 cents on this topic since we're in as deep as we are here.

I feel that my responsibility as a scientist is to do an environmental analysis and bring factual information forward to share with this Board.

First, as I said, it's kind of a two-step process.

What would be the environmental changes due to implementing the California WaterFix relative to what those environmental conditions would be under the No-Action Alternative?

Then I analyzed those changes, those differences, to see if adverse things would happen.

In the case of microcystis, would implementation of the California WaterFix cause an increased frequency and magnitude of cyanobacteria blooms either upstream in the Delta or in the Delta?

My testimony said, no, that would not happen.

Yes, there are environmental changes due to implementing the California WaterFix. We can see them in the modeling output. I analyzed them. But, no, they would not rise to the level that would cause significant adverse changes in the frequency or the magnitude of cyanobacteria.

I feel it's my responsibility as a scientist to stop there. You now have -- The Board has that information. And I've always felt it's more of a legal determination that this Board will make based on my -- for lack of a better term -- impact assessments, whether you think what I have found constitutes injury to a legal user of water or not. I think that's your determination.

CO-HEARING OFFICER DODUC: Thank you.

MS. MESERVE: Let's see. Looking at your CV, DWR-33, there isn't any mention of experience with HABs.

Do you have direct experience yourself studying HABs in the Delta?

WITNESS BRYAN: Not until this Project.

MS. MESERVE: And that would be beginning when?

WITNESS BRYAN: Oh, a number of years ago, I guess.

MS. MESERVE: And -- Well, your CV says 2008. However, there was no discussion of HABs, for instance, in the case in chief or in the Draft EIR, so when did you begin looking at HABs with this Project?

WITNESS BRYAN: Like I said, a couple -- couple years ago.

MS. MESERVE: It would be three years ago, maybe?

WITNESS BRYAN: Well, I don't know if it's two or three. It was as a party, preparing the Environmental Impact Report, EIR/EIS.

MS. MESERVE: Do you consider yourself to be an expert on HABs as a result of this couple of years of experience?

WITNESS BRYAN: Yes.

MS. MESERVE: And according to the testimony presented by -- also a doctor. I'm sorry. Preece?

WITNESS PREECE: Yes.

MS. MESERVE: She contributed significantly to the testimony and reports you're presenting today.

Can you tell me why Ms. Preece doesn't present any substantive testimony, even though Dr. Preece appears to have more substantive expertise?

WITNESS BRYAN: My -- I have had a lot of involvement in this Project, and I have the expertise that was required to do the rebuttal assessments.

Dr. Preece assisted me in these rebuttal assessments because of her expertise on algae in particular.

MS. MESERVE: With respect to the reports, DWR-651 and 653, did you prepare those?

WITNESS BRYAN: Yes, I did.

MS. MESERVE: Did Dr. Preece assist in preparing those?

WITNESS BRYAN: Yes.

MS. MESERVE: Is there any plan for a peer review of those documents, 653 and 651?

WITNESS BRYAN: Do I personally have any plans for that?

MS. MESERVE: Or was -- Yes.

WITNESS BRYAN: Not at this time.

MS. MESERVE: Did anyone review and comment on those reports prior to them being submitted here, outside of your office?

WITNESS BRYAN: DWR Legal.

MS. MESERVE: Who at DWR Legal?

WITNESS BRYAN: Mr. Mizell.

MR. MIZELL: (Raising hand.)

MS. MESERVE: Let's see.

Let's see. So on the Final EIR, your firm prepared the Water Quality chapter of both the draft and the Final EIR; correct?

WITNESS BRYAN: That's correct.

MS. MESERVE: Or you were the lead consultant, I guess.

For the -- Let's see. For the analysis of the new diversions under the Tunnels Project, did you make any substantive changes to the discussion of HABs in the Final EIR?

WITNESS BRYAN: We added some additional detail to the tunnel.

MS. MESERVE: Did you change the discussion of the significance of residence time as a factor in the formation of HABs?

WITNESS BRYAN: Can you clarify your question?

MS. MESERVE: The Draft EIR discusses residence time as one of the important factors.

I'm wondering, in the revisions, which were not provided in red line but I prepared myself, I noticed some changes, and I'm wondering if you can explain what you did differently in the Final EIR with respect to residence time.

WITNESS BRYAN: I'm not sure I understand the

question still.

MS. MESERVE: Your testimony states that increased residence time alone does not equate to microcystis bloom frequency or magnitude. It's uncertain how cyanoHABs would react.

This is DWR -- Page 16 to 17 of 81. Sorry.

And that is reflected in the Final EIR as new text. So there's a -- Would it be fair to say that the -- the weight of residence time as a factor was lightened in the Final EIR?

MR. MIZELL: I'm going to object to this line of questioning.

The relative changes between versions of the EIR/EIS was not presented as part of Dr. Bryan's rebuttal analysis.

If Miss Meserve would prefer to focus on the details of his testimony, I'm happy to let that proceed.

CO-HEARING OFFICER DODUC: Miss Meserve, how is the question that you just asked linked to the rebuttal testimony that Dr. Bryan presented?

MS. MESERVE: Because the -- the report -- 653's discussion of residence time is exactly the same as the Final EIR, and that's entirely new text from the draft.

So I'm just, you know, wondering what changed

in terms of science between the draft EIR -- sorry -- the revised draft and the final with respect to residence time.

CO-HEARING OFFICER DODUC: Can you ask him instead whether the discussion of residence time in his rebuttal testimony was new information developed?

MS. MESERVE: That's a good question. Yes.

(Laughter.)

CO-HEARING OFFICER DODUC: Try that, Miss Meserve.

MS. MESERVE: Okay.

Is the discussion of residence time in the Final EIR based on new information or new science that was developed subsequently to the revised draft?

WITNESS BRYAN: No, I wouldn't say it's new science. I -- I think, as I already indicated, when the Draft EIR came out, there was no discussion of microcystis at all.

So by the time we got to the Final EIR, knowing that there was more interest in the topic, we increased the detail of our analysis for microcystis in the Final EIR to provide more information in the EIR/EIS. And so that's when that additional information pertaining to residence time that you're speaking to came in. It's just -- It's just more detailed discussion is what I

would characterize it as.

MS. MESERVE: However, isn't Opinion -- sorry -- 6 of DWR-81 that increased residence time alone does not equate with microcystis frequency, et cetera, and that is reflected in the Final EIR?

But you would agree that it is a factor. It's one of the four main factors that you list in the Final EIR; correct?

WITNESS BRYAN: Well, yeah. And, again, residence time, if you think about residence time and what it really does for microcystis, residence time is not in and of itself necessarily a primary -- what I would call a primary driver.

The primary drivers are: You need to have the right water temperature; you need to have a calm, stable water column.

You can't have all the turbulence and mixing we've been talking about because microcystis can't do well under those conditions and compete with other algae.

So you have to have all these other what we call abiotic environmental factors, such as turbulence and mixing, temperature.

In biotic factors, the competition with other algae all have to come together for microcystis to form a bloom.

That's why Dr. Preece added -- interjected earlier about the study has been done by Spear, et al., in the deep water ship channel. It always has long residence times in the summer.

In 2012, it produced a large bloom.

In 2009, which had extremely similar environmental conditions, it did not produce a large broom.

So, what residence time really does is, while microcystis can form a large bloom, because if anything else happens and it's blooming. Those cells are either going to get washed downstream, flushed away from that region, or they're going to accumulate in that region.

So when you have long residence times, they begin to accumulate, the population keeps growing and growing and accumulates a larger and larger bloom at that location.

So you see the difference between being a primary driver versus almost an accommodating factor. It can allow microcystis bloom to last longer or become larger, but it's not necessarily a primary driver to initiate a microcystis bloom.

MS. MESERVE: Okay. So . . .

However, in the -- I'm trying to find what exhibit number it is. Sorry.

In the Final EIR, however, it lists four factors, and it doesn't say which ones are primary versus secondary: Warm temperatures, nutrient availability, water column irradiancies, clarity and flows and long residence times.

Does that sound familiar?

WITNESS BRYAN: Yeah.

MS. MESERVE: Okay. That's on Page 8-196, and I will --

WITNESS BRYAN: And all of those are primary factors. And the last one you listed, it may be listed as flow and residence time, but really the primary factor associated with flow is what we've been talking about today, is velocity and turbulence and whether you have a calm, stable water column that microcystis likes or a turbulent well-mixed water column it doesn't like.

That's a primary factor right along with temperature and the other factors that you listed.

Residence time itself, when you focus on it as an isolated factor, I would not call a primary factor. I would call that a -- almost, for lack of a better term, an accommodating factor that can allow cells to accumulate in a given area versus being flushed away short of the residence time.

MS. MESERVE: Okay. And your DWR-81 -- Maybe

we can look at it to make it a little easier. At Page --

CO-HEARING OFFICER DODUC: Miss Meserve, let me also interrupt here. We have a hard stop at 5 o'clock.

MS. MESERVE: Okay.

CO-HEARING OFFICER DODUC: And I do need at least a few minutes to try to clarify with Mr. Mizell who all will be appearing tomorrow.

So if you have just a few minutes or you want to stop now. It's not going to be --

MS. MESERVE: I'll just stop now and then I'll try to be better organized.

Thank you.

CO-HEARING OFFICER DODUC: Very good. Thank you, Miss Meserve.

All right. Mr. Mizell, let's all take a deep breath.

And Miss Sergent will appear tomorrow by herself.

If Miss Spaletta informs us that she still needs to cross-examine Miss Sergent, Miss Sergent will be required to return next Thursday for that.

MR. MIZELL: Absolutely.

CO-HEARING OFFICER DODUC: Assuming we get done with Miss Sergent's testimony and cross-examination, who do you propose to call up next?

MR. MIZELL: I'm currently in touch with all of my witnesses on the remainder of Panel 2 as you requested. And I am attempting to book flights for Mr. Munévar. John Leahigh is in an Oroville emergency briefing for most of the morning.

But it appears, based on the remainder of time we have on this panel and the estimated times for Miss Sergeant, that we will not get to the remainder of Panel 2 until after lunch. That will be compatible with that other briefing. So, as long as we don't get to the remaining panel before 1 p.m., we should have John Leahigh as well.

In that -- In that case, we would have the remaining Panel 2 witnesses, assuming that there are no flight delays.

CO-HEARING OFFICER DODUC: All right. So for Mr. Herrick's purpose, because he was the one who asked the question of preparing to conduct cross-examination --

I'm sorry. Ask your question again.

(Microphone feedback.)

CO-HEARING OFFICER DODUC: Kyle.

MS. MESERVE: (Slapping microphone.)

CO-HEARING OFFICER DODUC: Ooh.

CO-HEARING OFFICER MARCUS: I don't think this should be a practice for people to adopt.

MS. MESERVE: I don't understand that, no offense.

Does that mean all the rest of that panel is coming in tomorrow or portions of that panel?

MR. MIZELL: It was my understanding that the Hearing Officers preferred to have all of the panel ready to go tomorrow and that's what I'm attempting to do.

MS. MESERVE: Thank you.

CO-HEARING OFFICER DODUC: All right. It is 5:57. It's been a long day.

Thank you all. We will see you at 9:30.

(Proceedings adjourned at 5:56 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;

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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: May 2, 2017

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Candace L. Yount, CSR No. 2737