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STATE OF CALIFORNIA  
STATE WATER RESOURCES CONTROL BOARD

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PUBLIC HEARING  
REGARDING WATER RIGHT APPLICATIONS FOR THE  
DELTA WETLANDS PROJECT  
PROPOSED BY DELTA WETLANDS PROPERTIES  
FOR WATER STORAGE ON WEBB TRACT, BACON ISLAND,  
BOULDIN ISLAND, AND HOLLAND TRACT  
IN CONTRA COSTA AND SAN JOAQUIN COUNTIES

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HELD AT  
901 P STREET  
SACRAMENTO, CALIFORNIA  
TUESDAY, AUGUST 19, 1997  
9:00 A.M.

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Reported by: ESTHER F. WIATRE  
CSR NO. 1564

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MR. ROBERTS

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MR. MADDOW

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MS. MURRAY

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CROSS-EXAMINATION REBUTTAL TESTIMONY BY:

MR. NOME LLINI

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SACRAMENTO, CALIFORNIA  
TUESDAY, AUGUST 19, 1997

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HEARING OFFICER STUBCHAER: Morning. We will reconvene the Delta Wetlands Project Water Rights hearing. The remaining item of business to create the record for this case is the cross-examination of the rebuttal testimony. For purpose of planning, I would like to have a show of hands of those who intend to cross-examine on the rebuttal testimony.

Oh, boy, I am just going to go down the list. Delta Wetlands Project, how long do you think your cross-examination will --

MS. BRENNER: Of others?

HEARING OFFICER STUBCHAER: Of others. Are you going to cross-examine yourself?

MS. BRENNER: Yes.

I'd say an hour and a half, for all others.

HEARING OFFICER STUBCHAER: Mr. Nomellini?

MR. NOME LLINI: I'd say about a half hour.

HEARING OFFICER STUBCHAER: Mr. Moss?

MR. MOSS: Probably about 20 minutes.

HEARING OFFICER STUBCHAER: Mr. Roberts?

MR. ROBERTS: Fifteen, twenty minutes.

HEARING OFFICER STUBCHAER: Mr. Maddow?

2522

MR. MADDOW: About 30 minutes.

HEARING OFFICER STUBCHAER: Mr. Etheridge?

MR. ETHERIDGE: About half an hour.

HEARING OFFICER STUBCHAER: Is Department of Water Resources here?

UNIDENTIFIED VOICE: We don't plan to cross-examine.

HEARING OFFICER STUBCHAER: State Water Contractors. Ms. Dignan?

UNIDENTIFIED VOICE: She was here.

HEARING OFFICER STUBCHAER: She was here. Good to see her here.

Fish and Game?

MS. MURRAY: About 30 minutes.

HEARING OFFICER STUBCHAER: Anyone else that I haven't asked?

And, of course, staff. That will be about three hours.

Ms. Dignan, do you wish to cross-examine the rebuttal testimony?

MS. DIGNAN: No, we don't. Thank you.

HEARING OFFICER STUBCHAER: Before we proceed with the cross-examination, I understand we have some time constraints and some clarifications.

Delta Wetlands, you wish to have Mr. Shaul's testimony verified?

MS. BRENNER: Yes. We would like to have Mr. Shaul's

2523

testimony verified and clarified.

HEARING OFFICER STUBCHAER: Now the clarified, is that in the nature of a redirect?

04 MS. BRENNER: In a nature of a redirect?  
05 HEARING OFFICER STUBCHAER: Redirect rebuttal?  
06 MS. BRENNER: Not necessarily. It's in the nature of a  
07 further clarification of one of the questions that is set  
08 forth in his direct testimony or his rebuttal testimony in  
09 light of his absence while the Department of Fish and Game  
10 was being cross-examined.  
11 HEARING OFFICER STUBCHAER: In fairness necessary to  
12 other parties, it may be necessary to allow them to consider  
13 this additional testimony overnight and have them here for  
14 cross-examination tomorrow.  
15 MS. BRENNER: I don't think that is a problem. No. We  
16 do have a portion of that clarification in writing already.  
17 So, they would have the opportunity to review that in a  
18 written --  
19 HEARING OFFICER STUBCHAER: When will you have it all  
20 in writing?  
21 MS. BRENNER: As soon as she transcribes it.  
22 He has some explanation of what he needs to add. It's  
23 a clarification of what Department of Fish and Game has done  
24 to some of the modeling efforts, and I don't think -- it's  
25 not a verbatim. What he's done in writing is just an  
2524  
01 outline format of what he is going to add or clarify. It is  
02 not the complete statement of everything that he is going to  
03 say, but it is the substance of what he is going to say.  
04 HEARING OFFICER STUBCHAER: As you know, one reason we  
05 continued the cross-examination of the rebuttal testimony  
06 was to give the parties an opportunity to review the  
07 rebuttal testimony and prepare their cross-examination.  
08 This could be a bit of a problem in that regard.  
09 MS. BRENNER: As I indicated, the substance of what he  
10 is going to have to say is in written format. So I don't  
11 perceive it to be a problem, and it is not a lengthy  
12 clarification. I am not talking about an hour's worth of  
13 testimony, and I don't think the clarification will be that  
14 lengthy of testimony. So, 15 minutes, perhaps, of actual  
15 testimony time.  
16 HEARING OFFICER STUBCHAER: Let's hear from Ms.  
17 Murray.  
18 MS. MURRAY: I do object. If Delta Wetlands have  
19 questions about the Department's procedures with our  
20 analysis, they can ask questions on cross-examination. Mr.  
21 Shaul was here during cross-examination, I believe. I  
22 understand that he was not here during rebuttal. But he put  
23 on rebuttal testimony and he had that opportunity to put on  
24 his rebuttal testimony.  
25 If they now have something that they want to rebut of a  
2525  
01 rebuttal, you do that with cross-examination. We did  
02 continue the hearing in order to give us time to prepare  
03 cross-examination questions, and I do feel this would  
04 unfairly prejudice the Department, to have more testimony  
05 put on now that we are supposed to ask questions  
06 immediately, without it in writing, partially.  
07 MR. NELSON: Mr. Stubchaer, let me explain a little bit  
08 what has happened. In my cross-examination of Fish and



09 Game, we had extensive discussion on Figures 12 and 7 and  
10 that winter-run entrainment index, in which Fish and Game  
11 was not able to explain what they did.

12 And Mr. Shaul, because of his absence, prepared his  
13 written rebuttal testimony before he left, working from the  
14 data he had provided from Fish and Game. And at that time,  
15 he said, when he left, I cannot figure out what those  
16 figures meant. He then -- when he came back, he looked at  
17 -- continued looking at the data, and also was then able to  
18 look at the information that Fish and Game had provided, and  
19 he was able to determine what Fish and Game did.

20 The problem is that, notwithstanding Fish and Game's  
21 efforts to explain, it became very clear, and Mr. Shaul can  
22 testify to this, that Fish and Game didn't even do what it  
23 intended to do. There are problems with what Fish and Game  
24 did in their model and how they did their calculations. I  
25 don't think anyone other than Mr. Shaul can explain what

2526 happened to Fish and Game's model, given the fact that Fish  
01 and Game wasn't able to explain it in the first place.

02 MS. MURRAY: And I just want to clarify, we were  
03 crossed extensively, and we did explain methods of analysis  
04 and the fact that all the models were given to us by Jones &  
05 Stokes. They had the opportunity. They took the  
06 opportunity to ask us about those models, and that section  
07 of this hearing is over.

08 HEARING OFFICER STUBCHAER: Mr. Nelson.

09 MR. NELSON: What Mr. Shaul is going to testify to is  
10 not what Fish and Game explained. What Fish and Game  
11 explained they did is already in the transcript. What has  
12 been clear upon Mr. Shaul's review is that Fish and Game  
13 actually didn't do that in their calculations. They'd never  
14 gotten the data that they gotten had they done what they  
15 said they did.

16 Mr. Shaul -- I can't explain it the way Mr. Shaul can.  
17 He can explain it very clearly. We offer to get this as an  
18 expedited transcript to Fish and Game. We asked Mr. Shaul  
19 to draft up an outline, to provide this. We this is short  
20 notice in the sense of giving Fish and Game an ability to  
21 respond. We are willing to work with and help Fish and Game  
22 get to -- provide them the process that they deserve, just  
23 like if Fish and Game was to provide additional testimony  
24 here, we would ask the same type of courtesy.

2527  
01 What is important here is that the record is not clear  
02 as to what happened with the entrainment index, and all we  
03 are trying to do is to make sure the record is very clear on  
04 the subject.

05 HEARING OFFICER STUBCHAER: Ms. Leidigh, do you have  
06 any comments?

07 MS. LEIDIGH: Well, I think one of the issues is  
08 whether or not if Mr. Shaul's written supplemental rebuttal  
09 testimony were provided without oral supplementation,  
10 whether Fish and Game would feel comfortable in  
11 cross-examining on that tomorrow.

12 MS. MURRAY: We have to see it before we could fully  
13 answer that.

14 MS. LEIDIGH: You have not seen it yet?

15 MS. MURRAY: No.

16 MS. LEIDIGH: I understand it.

17 HEARING OFFICER STUBCHAER: Ms. Leidigh, were you  
18 finished?

19 MS. LEIDIGH: For the moment.

20 HEARING OFFICER STUBCHAER: Mr. Nelson.

21 MR. NELSON: I really believe it would be helpful for  
22 Mr. Shaul to explain it. This is a fairly complicated  
23 model. Fish and Game wasn't able to explain it in their  
24 oral transcript, and I really believe that the best thing  
25 here and the most expedient action to have Mr. Shaul spend  
2528

01 15, 20 minutes explaining this. I don't see -- it is very  
02 important that the record be clear on this matter; it is not  
03 clear. We've read through the transcripts. It is very  
04 difficult to understand, and it's actually impossible to  
05 understand what Fish and Game did with that data. And Mr.  
06 Shaul's spending 15, 20 minutes to explain this is the  
07 easiest and the best way of clarifying the record on this  
08 matter.

09 HEARING OFFICER STUBCHAER: Mr. Nelson, my concern is  
10 one of procedure and fairness. If we allow you to do it,  
11 why not others, things they say are not clear to them and  
12 they want to explain it? I wonder, just thinking out loud,  
13 and staff will listen to this, is if we heard his testimony,  
14 but kept it as a separate part of the transcript, and after  
15 we hear it, we could decide whether or not to include it in  
16 the record? The written record is the official record.

17 Ms. Murray.

18 MS. MURRAY: Can I just say that I think Ms. Leidigh  
19 was very accurate when she characterized this as additional  
20 rebuttal testimony. Fifteen to twenty minutes of additional  
21 rebuttal testimony, that is more than many people have  
22 estimated for their time of cross-examination. And we have  
23 not seen this. We think this could be -- we have no idea  
24 what Mr. Shaul is going to say. We had a lot of problems  
25 with his model, too.

2529

01 I think this would very much prejudice the  
02 Department. I would not support even putting it off to the  
03 side, because people will read that, and we have not been  
04 prepared, not seen it, and have not been able to ask  
05 questions about it.

06 HEARING OFFICER STUBCHAER: If we rule that it was not  
07 part of the record, I don't think people would be  
08 considering it during the decision making process.

09 Is that correct?

10 MS. LEIDIGH: That is correct. Basically, what would  
11 happen is, we would take the testimony under objection and  
12 then once there was a ruling, it would either remain in the  
13 record or it would be considered stricken from the record.  
14 And that if it is stricken from the record, it will not be  
15 considered by the Board in the decision making process.

16 MS. MURRAY: Would the Board Members not here today  
17 read it in transcript?

18 MS. LEIDIGH: We can deal with that by blocking it out

19 or removing that from the copies that they get, some other  
20 way, whatever makes you comfortable. We can strike it from  
21 the record so that it won't be considered.

22 HEARING OFFICER STUBCHAER: It will be my direction  
23 that it not be part of the written transcript given to the  
24 Board Members. And Mr. Brown just made a very generous  
25 suggestion here, that perhaps he would leave during this  
2530 portion so he wouldn't hear it orally.

02 MS. MURRAY: Thank you.

03 HEARING OFFICER STUBCHAER: That is what we will do.  
04 We will hear it under objection and make the ruling after we  
05 hear it.

06 MR. NELSON: Mr. Stubchaer, could I add one thing? Ms.  
07 Murray stated the prejudice here, if any that would occur,  
08 would be Fish and Game's ability to cross-examination  
09 thoroughly. If Fish and Game --

10 HEARING OFFICER STUBCHAER: Ms. Murray, let him  
11 finish.

12 MS. MURRAY: Okay.

13 MR. NELSON: If Fish and Game's concern is that they  
14 won't be able to cross-examine thoroughly, we are willing to  
15 make Mr. Shaul available for deposition just like was  
16 offered earlier with one of, I think, the CUWA's witnesses.  
17 We are willing to work and make sure that there is no  
18 prejudice on either side. I think it is important that, for  
19 the same reason, that Fish and Game has concerns, we have  
20 concerns unless the record is clear on this. It is a very  
21 important point; it was one of the major indexes Fish and  
22 Game used in their Biological Opinion. And we believe it is  
23 vital for the Board to understand what was and wasn't  
24 actually done on that matter.

25 Thank you.

2531 HEARING OFFICER STUBCHAER: Ms. Murray.

02 MS. MURRAY: Can I clarify the statement on my concern?  
03 My concern is also that their rebuttal testimony closed.  
04 This is additional rebuttal testimony.

05 HEARING OFFICER STUBCHAER: I understand your concern.  
06 We understand your objection. We will allow 15 minutes for  
07 Mr. Shaul.

08 MR. NELSON: Mr. Shaul, did you prepare Exhibit DW-64,  
09 entitled Rebuttal Testimony of Warren Shaul?

10 MR. SHAUL: Yes, I did.

11 MR. NELSON: Given our discussions this morning, are  
12 there any corrections or additions to the testimony that you  
13 would like to make?

14 MR. SHAUL: There's one correction that I would like to  
15 make in the testimony.

16 MR. NELSON: Mr. Shaul, can I interrupt? Can I --

17 Did you prepare a paper or an outline called  
18 Explanation of Variable Methods Applied to Evaluate the  
19 Impacts of Delta Wetlands Project on Winter-Run Chinook  
20 Salmon?

21 MR. SHAUL: Yes, I did.

22 MR. NELSON: We would like to introduce this as DW-74,  
23 as a correction added to Mr. Shaul's rebuttal testimony,

24 and we have already provided copies to Board staff and  
25 distributed them to the audience.

2532

01 You can go ahead.

02 MR. SHAUL: The correction I make to my testimony or to  
03 my rebuttal, in my rebuttal I said that I could not  
04 determine how the Department of Fish and Game created this  
05 Figure 7 and 12 in the Biological Opinion, and in CESA  
06 Biological Opinion. And since I returned, I was able to  
07 look at DFG Exhibit 14, which explained the steps they went  
08 through to create those figures.

09 And in that -- by looking at those steps and relooking  
10 at Figure 7 and 12 and looking at the data or the output  
11 from models that I gave Department of Fish and Game, both  
12 the DeltaMOVE model and the model that Fish and Game calls,  
13 or that we called and gave to Fish and Game as M Salmon, I  
14 was able to determine how the chinook salmon part of Figure  
15 7 and 12 was created.

16 Basically, in the outline that I developed, it  
17 explained the methods that were applied to evaluation of  
18 impacts for chinook salmon; and they went through, instead  
19 of just starting with the method with that Fish and Game  
20 applied to create Figure 7 and 12, I went through the three  
21 methods, the methods that were included in the Environmental  
22 Impact Report and the Environmental Impact Statement, draft,  
23 and the biological assessment. That was a method that I  
24 applied on behalf of the State Board and the Corps of  
25 Engineers. And then, also, I went through the method that I

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01 applied at the request of Fish and Game, which was called  
02 Winter-Run Diversion Index, and that method was applied for  
03 evaluating the effects of the Delta Wetlands Project for the  
04 California Endangered Species Act consultation, and I think  
05 that was DW Exhibit 5.

06 And then a third method, which is the method that was  
07 used by Fish and Game to create Figure 7 and 12, which, as  
08 they described in DFG Exhibit 14, is the DF&G method for  
09 calculating winter-run entrainment index. That outline  
10 explains how each of those methods was applied.

11 So then I tried to apply those methods and to create  
12 the Figure 12 and was still unable -- basically, maybe I  
13 should explain what that method is, the DF&G method. The  
14 way I understand, anyway, from the information I have is  
15 that they assume that the salmon are -- given all chinook  
16 salmon, specifically winter-run in this case, are  
17 distributed throughout the Delta, regardless of flow  
18 divisions or the entry locations. So they're distributed  
19 equally. It assumes, then, entrainment water from any Delta  
20 location in the Delta, in Delta diversions and exports,  
21 adversely affects habitat conditions affecting survival of  
22 the juvenile salmon.

23 And the third, the index is calculated for each month  
24 and is weighted for occurrence proportional to the total  
25 population. And then it integrates four components,

2534

01 basically, with each component weighted equally.

02 The conditions represented by the entrainment index for

03 the Lower Sacramento River box in the DeltaMOVE Model, the  
04 D-30 MOVE Model that we used for the Delta Wetlands Project,  
05 that Russ Brown and I developed; conditions represented by  
06 entrainment index for the Mokelumne box in the D-30 MOVE  
07 Model; and conditions represented by the entrainment index  
08 for the Lower San Joaquin River box in the D-30 Move Model;  
09 and, lastly, the conditions represented by the entrainment  
10 index for the Central Delta box in the D-30 Move Model.

11 It might help if I showed a schematic.

12 MR. NELSON: Mr. Shaul, for the record, is this  
13 schematic from the Draft EIR?

14 MR. SHAUL: This schematic was included in the Appendix  
15 in the Draft EIR, and it's included in the biological  
16 assessment.

17 MR. NELSON: It is Appendix A, Figure 2, Transport  
18 Model Structure.

19 MR. SHAUL: The four boxes used for -- proposed to be  
20 used in this method by California Department of Fish and  
21 Game: the Lower Sacramento River box, the Mokelumne River  
22 box, the Lower San Joaquin River box, and the Central Delta  
23 box. Essentially, it takes those indices and adds those  
24 together to get an index of the entrainment of water from  
25 each of those boxes.

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01 If you put -- essentially what the model does, if you  
02 put a hundred oranges in the Sacramento River box, it tells  
03 you how many of those oranges end up being entrained in  
04 Delta diversions, including Delta exports. So, if you would  
05 do the same thing for the Mokelumne River box, do the same  
06 thing for the Lower San Joaquin, and then again for the  
07 Central. We ran it independently each time to get an index  
08 of entrainment of water that began in each one of those  
09 boxes over a 30-day period.

10 So that information, that would have been what the  
11 index was by adding these indices from each one of those,  
12 you would get an index or under each alternative no-project  
13 alternative and CESA operation's conditions and ESA  
14 operation's conditions.

15 In creating Figures 7 and 12, what they did was use the  
16 monthly index, so, for the month of March and February; and  
17 they subtracted the entrainment, the sums, the total  
18 entrainment index under the no-project condition from a  
19 total entrainment index under the CESA condition, and then  
20 they did the same thing under the ESA condition, and they  
21 have the differences. The tables, Figure 7 and 12, compare  
22 the differences from the no-project condition, basically.  
23 That was the intent.

24 However, there seems to be some misunderstanding in  
25 Figures 7 and 12, the actual data that was used. The reason

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01 I had trouble determining how those figures were created,  
02 because it didn't really -- they didn't -- the actual data  
03 used wasn't what was intended to be used. That was probably  
04 partially my fault in not explaining it as clearly as I  
05 should have to Fish and Game to begin with. But,  
06 essentially, that would have been what the results would  
07 have presented in Figures 7 and 12.

08 But in reality what happened in Figure 12 for the  
09 winter-run chinook salmon is that the four columns that they  
10 identified in this, which was columns L, M, N, and O, they  
11 identified them -- they labeled them here as column L being  
12 the Lower Sacramento River, column M being the Mokelumne  
13 River, N being the Central Delta, and O being the Lower San  
14 Joaquin River.

15 MR. NELSON: Mr. Shaul, when you're referring to here,  
16 you are referring to DFG-14?

17 MR. SHAUL: Yes, and the use of the M Salmon, the  
18 columns in the spreadsheet model called M Salmon. But,  
19 unfortunately, these columns do not correspond to those  
20 boxes. The model brings in data and in those columns are  
21 actually equations, and those equations are for different  
22 indices, and they include weighting factors and information,  
23 as far as proportional flow splits. And the model itself  
24 calculates several different indices, and you just need to  
25 tell the model which indices you want to calculate.

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01 So by using those, Fish and Game, unfortunately, didn't  
02 understand that those columns were not representing those  
03 four boxes, but representing something completely different.  
04 So that, when they created Figure 12, they pulled the  
05 information from those boxes and did this comparison. Well,  
06 the data really isn't what they thought it was. So, the  
07 actual comparison would be somewhat different.

08 It would actually be quite similar to what you see for  
09 the Delta smelt entrainment index, which was the Figure 12;  
10 it's the bottom figure and the top figure is winter-run.  
11 So, the winter-run is really not representing what they  
12 thought it was.

13 MR. NELSON: Do you have any other corrections.

14 MR. SHAUL: No.

15 MR. NELSON: We have nothing to add right now.

16 HEARING OFFICER STUBCHAER: Okay. Was Mr. Shaul going  
17 to verify his other testimony?

18 MR. NELSON: We did that with the first question.

19 HEARING OFFICER STUBCHAER: I'm sorry.

20 So, now we have to rule on the objection.

21 Ms. Murray.

22 MS. MURRAY: I would like to take a break, either at  
23 the morning break, to talk to staff about this testimony and  
24 then ask you make a ruling after we've had a chance to meet  
25 and confer. You can break now or we will use the time at

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01 the morning break.

02 HEARING OFFICER STUBCHAER: That is reasonable. Take  
03 all the time you need because we want to do this right.

04 So, okay, I thank you, Mr. Shaul.

05 Then there is another procedural matter. I understand  
06 that Dr. Horne is available only till noon today. Is that  
07 right?

08 MS. BRENNER: That is correct. Dr. Horne is only  
09 available until noon today. Dr. Kavanaugh will be in  
10 tomorrow. He is not available today.

11 HEARING OFFICER STUBCHAER: So, we are going to have  
12 split cross-examination?

13 MS. BRENNER: Right.  
14 Could I get the transcript marked at the end of Warren  
15 Shaul's testimony, please?  
16 HEARING OFFICER STUBCHAER: Mr. Maddow.  
17 MR. MADDOW: Excuse me, in regard to time  
18 considerations, like those you just discussed with Dr.  
19 Horne, Dr. Gartrell for Contra Costa is available today, but  
20 cannot be here tomorrow.  
21 HEARING OFFICER STUBCHAER: We will try and  
22 accommodate. The results are fragmented.  
23 MS. BRENNER: Outside of those two witnesses, the  
24 remaining, all the witnesses are here today other than Dr.  
25 Kavanaugh and all the other Delta Wetlands' witnesses are  
2539  
01 available both today and tomorrow.  
02 HEARING OFFICER STUBCHAER: Could I ask parties who  
03 want to cross-examine Dr. Horne, specifically?  
04 I see two, Mr. Nomellini, Fish and Game.  
05 Mr. Maddow.  
06 MR. MADDOW: I want to hear the other cross. Depending  
07 on what happens before us, they may cover the same issues.  
08 In which case, I would not cross.  
09 HEARING OFFICER STUBCHAER: All right. Just a moment.  
10 (Discussion held off the record.)  
11 MS. BRENNER: Do you want us to bring Dr. Horne up?  
12 HEARING OFFICER STUBCHAER: Yes.  
13 HEARING OFFICER STUBCHAER: One staff member go get  
14 John Brown, please.  
15 (Discussion held off the record.)  
16 HEARING OFFICER STUBCHAER: Cross-examination, Mr.  
17 Nomellini.  
18 Mr. Nomellini.  
19 ---oOo---  
20 REBUTTAL CROSS-EXAMINATION OF DELTA WETLANDS PROPERTIES  
21 BY CENTRAL DELTA WATER AGENCY  
22 BY MR. NOME LLINI  
23 MR. NOME LLINI: Morning, Mr. Horne.  
24 DR. HORNE: Morning.  
25 MR. NOME LLINI: Probably, Doctor.  
2540  
01 In your testimony you had made a rough comparison of  
02 the Delta Wetlands Project that involved consideration of  
03 the dissolved organic carbon that would result from  
04 irrigation practices in the Delta. I think I am correct in  
05 that regard.  
06 You recall that?  
07 DR. HORNE: I don't recall that.  
08 MR. NOME LLINI: I think your testimony was that with  
09 the drains in the Delta and applying irrigation water, that  
10 was a leaching condition for taking dissolved organic carbon  
11 out, peat?  
12 DR. HORNE: That is true.  
13 MR. NOME LLINI: Are you familiar with the actual  
14 irrigation practices of the Lower Delta?  
15 DR. HORNE: I am not familiar with that. They were  
16 described to me.  
17 MR. NOME LLINI: Have you heard the term "subirrigation"?

18 DR. HORNE: Yes.

19 MR. NOMESELLINI: Do you understand that the drains are  
20 blocked while the irrigation water is being applied?

21 DR. HORNE: I have no opinion either way.

22 MR. NOMESELLINI: Would that change your conclusion with  
23 regard to the removal of the carbon or leaching of carbon  
24 from of the peat soils during irrigation?

25 DR. HORNE: No. Whether the water drained out  
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01 immediately or later wouldn't make any difference. The  
02 point I was making with that comment was that there is about  
03 up to 36 inches of peat through which irrigation water must  
04 percolate before it comes out, and that has to be because  
05 one of the purposes of irrigation is to wash the salt out.  
06 That leaching process is much more efficient than simply  
07 adding water and taking it off the top. That was the point  
08 I was making. Whether the drains be two feet or four or  
09 eight feet, which this can be throughout the world, that  
10 depth, whatever it is, in this case I have been told it is  
11 36 inches, is an efficient way to remove that DOC from the  
12 peat, relative to putting a lake over the top of it, which  
13 is the case here.

14 MR. NOMESELLINI: That would -- it wouldn't make any  
15 difference to you whether the drains were blocked or not  
16 during the irrigation operation?

17 DR. HORNE: The only way I could think it would make a  
18 difference, if the water backed right up and flooded the  
19 roots and the plants died. So, I can't imagine that that  
20 would be. You would have to have standing water I think on  
21 the system before it would stop leaching. You have to,  
22 essentially, stop the flow of water through the peat. And  
23 you need that water going through. It has to take oxygen  
24 down to the roots.

25 No, I don't think it would make any difference.

2542  
01 MR. NOMESELLINI: In your testimony you had concluded  
02 that the Delta Wetlands Project would not cause a  
03 degradation in water quality; is that correct?

04 DR. HORNE: Water quality where?

05 MR. NOMESELLINI: In the Delta.

06 DR. HORNE: When the water is released from Delta  
07 Wetlands into the Delta?

08 MR. NOMESELLINI: Yes.

09 DR. HORNE: That is my overall opinion.

10 MR. NOMESELLINI: In arriving at that opinion, did you in  
11 any way evaluate the impact of the use of the Delta  
12 Wetlands' water, such as on the west side soils, for  
13 irrigation and then that would drain back into the San  
14 Joaquin River?

15 DR. HORNE: No, I did not consider reuse of Delta  
16 Wetlands' reservoir water for the irrigation water on the  
17 east side, or anywhere else.

18 MR. NOMESELLINI: Limited to operation of the reservoir  
19 and excluding where the water might being used that comes  
20 from the reservoir?

21 DR. HORNE: Only concern I was looking at was what the  
22 effects would be on the Delta channels as local Delta



23 waters, particularly the use of agricultural. In terms of  
24 distant uses, I was not considering those uses.  
25 MR. NOME LLINI: One last, couple of questions.

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01 Exhibit DW-13, that is Delta Wetlands, do you people  
02 still have that overhead, DW-13?

03 UNIDENTIFIED VOICE: No, not here.

04 MR. NOME LLINI: Let me hand you a copy.

05 MS. BRENNER: Are you taking an exhibit out of DW-13?  
06 Is that what you are saying?

07 MR. NOME LLINI: DW-13.

08 MS. BRENNER: V-3?

09 MR. NOME LLINI: V-5.

10 MS. BRENNER: From DW-13.

11 MR. NOME LLINI: This figure shows -- this was prepared  
12 by Dr. Kavanaugh, and it shows his estimate of DOC loading  
13 without the project and compares that to the DEIR/EIS which  
14 is a Jones & Stokes environmental document. And then he  
15 shows the estimate for the DW Project by Jones & Stokes'  
16 people and then he has his own. And this is comparing the  
17 preproject. Of course, without on the wetlands project.

18 Do you agree with the DEIR/EIS, the Jones & Stokes'  
19 project comparison with the project, DW Project, versus the  
20 no-project as representative of what we could expect?

21 DR. HORNE: This is a loading model that gives you  
22 annual loading. And this question would be better asked to  
23 Mr. Kavanaugh. In the aspect of which I testified, I  
24 discussed some of the ways in which he arrived at his  
25 numbers, and determined that, in my opinion, they were

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01 conservative. So, the only comment I could make on this is  
02 that my opinion brings me towards the lower estimate. Dr.  
03 Kavanaugh made some higher estimates that were made under  
04 the other situations.

05 MR. NOME LLINI: Your inclination would be that there  
06 would be less DOC loading with the Delta Wetlands Project  
07 reservoirs and habitat islands than there would be with  
08 agricultural operations on the four islands?

09 DR. HORNE: Yes.

10 MR. NOME LLINI: That is all I.

11 HEARING OFFICER STUBCHAER: Thank you Mr. Nomellini.  
12 Mr. Roberts.

13

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14 REBUTTAL CROSS-EXAMINATION OF DELTA WETLANDS PROPERTIES  
15 BY CALIFORNIA URBAN WATER AGENCIES  
16 BY MR. ROBERTS

17 MR. ROBERTS: Dr. Horne, following up on that line of  
18 questioning, I notice you have been here for most of the  
19 testimony. Have you heard the testimony that the ambient  
20 levels of DOC in channel would be 3 or 4 in the summertime  
21 when the project would be discharging?

22 DR. HORNE: Yes.

23 MR. ROBERTS: Dr. Kavanaugh testified that the  
24 discharges could be up to 8 milligrams per liter. You think  
25 that is maybe high. But double, more than double would be

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01 in the channel water?

02 DR. HORNE: I can't comment on what he said on the  
03 discharge numbers. There was much discussion whether they  
04 could be as high as 8.

05 MR. ROBERTS: But higher than 3?

06 DR. HORNE: There was discussion of that.

07 MR. ROBERTS: The yield of the project would be 50-odd  
08 thousand acre-feet of water. Do you recall that testimony?

09 DR. HORNE: I don't, but that seems reasonable.

10 MR. ROBERTS: That amount of water at higher ambient  
11 channel levels over a two and maybe three month period, you  
12 don't think that would degrade the ambient channel water  
13 quality with respect to the DOC?

14 DR. HORNE: At the same time you have -- let me try to  
15 answer. If I believe there was going to be 8 milligrams per  
16 liter in 150,000 acre-feet going into three, then obviously  
17 there would be some increase in DOC in the channels at that  
18 time.

19 MR. ROBERTS: Cut the quantity by 25 percent, say 6  
20 milligrams per liter.

21 DR. HORNE: Whenever you add a higher to lower number,  
22 all we have is some decrease into water quality in that  
23 environment.

24 MR. ROBERTS: Depending on the level of the actual  
25 discharge and the amount?

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01 DR. HORNE: Not amount, of course. The water quality  
02 argument here is somewhat complicated because the standards  
03 are based on TOC, which is not the ideal way to base the  
04 standard. And there are at least two kinds of DOC. And  
05 depending on the kind of DOC that is released from the Delta  
06 Wetlands Project, the degradation that will occur to the  
07 water treatment facility will depend on which kind of DOC it  
08 is and which kind of treatment they are going to use.

09 And one of the DOC contributions that the Delta  
10 Wetlands undoubtedly makes will intend to be more labile  
11 DOC, which may, although generated in a model, not actually  
12 get out to the reservoir system. So, though I agree there  
13 is that talk of 8 milligrams, I am talking that the 8  
14 milligrams will be the number arrived at.

15 I think Dr. Kavanaugh was conservative, as I said  
16 previously. But if the DOC was high, and if it was of the  
17 wrong kind of DOC and if the Delta Wetlands' channels were  
18 lower in other kind of DOC, it would be a degradation that  
19 would be of importance. If the opposite of those sets of  
20 conclusions were true, that the Delta Wetlands' channels had  
21 the wrong kind of DOC and that the DOC generated within the  
22 system at Delta Wetlands was the good DOC, causes less  
23 problem. Then the degradation probably won't be  
24 significant.

25 MR. ROBERTS: Good DOC?

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01 DR. HORNE: The DOC you can take out at the treatment  
02 plant under normal conditions or DOC that has less potential  
03 to cause THM trihalomethane or any other disinfection  
04 product, which is the reason DOC is the problem in the first  
05 place.

06 MR. ROBERTS: Thank you.

07 Are you aware of any drinking water reservoirs built on  
08 peat soils?  
09 DR. HORNE: Yes.  
10 MR. ROBERTS: Could you name them?  
11 DR. HORNE: Unfortunately, not local. The PRL  
12 Reservoir, Costa Rica was built over a wetlands. There are  
13 a number of small reservoirs in Europe where peat is more  
14 common in the uplands, where small drinking reservoirs are  
15 built on peat.  
16 MR. ROBERTS: They are not local?  
17 DR. HORNE: And DOC was not the concern at the time.  
18 MR. ROBERTS: We don't have a lot of DOC information  
19 from those reservoirs with the same type of focus as we have  
20 here?  
21 DR. HORNE: One obvious concern is we don't have many  
22 examples of reservoirs such as the ones that are going to be  
23 built. We have a number of examples of what might happen.  
24 There are two currently being built, Los Vaqueros and  
25 Domenigoni Reservoir in Southern California. We can make  
2548  
01 some predictions. We don't have a large amount of  
02 information on which we might extract for a Delta Wetlands'  
03 reservoir, which, I think, is why the experimental data we  
04 have is much more important than perhaps would be the case  
05 in an ordinary case.  
06 MR. ROBERTS: You have Los Vaqueros or Domenigoni. Are  
07 they built on peat soil?  
08 DR. HORNE: Because they are not built on peat, they  
09 are more typical soil, we know more before we built them.  
10 MR. ROBERTS: Would you agree then that our  
11 understanding of what the impact of a reservoir built on  
12 peat, which is on THM, is fairly uncertain?  
13 DR. HORNE: I would expect that the Jones & Stokes"  
14 experiments play a key role here. When Domenigoni Reservoir  
15 was first proposed and when Los Vaqueros was first proposed,  
16 there was a requirement to make a little reservoir to see  
17 what would happen. We now know what would happen. We  
18 flooded Castaic, and we know what happens with these.  
19 In this case, I would say the body of knowledge we had  
20 prior to the Jones & Stokes' experiments was small. But the  
21 experiments, as I testified, were fairly good; they provided  
22 the kind of data we needed to know. In general, we don't  
23 have the information. We have to rely fairly heavily on the  
24 experiments that were made in the system.  
25 MR. ROBERTS: If they are good, we have some good  
2549  
01 information. If they are not good, we don't have good  
02 information.  
03 DR. HORNE: Right.  
04 MR. ROBERTS: I believe you said in rebuttal that you  
05 thought the peat leaches out of soils in three to five years?  
06 DR. HORNE: The DOC would leach out of the peat in  
07 three to five years, yes.  
08 MR. ROBERTS: Dr. Kavanaugh, in Exhibit 43 in his  
09 testimony, said that it would take about 20 years. Would  
10 you say that is an example of the uncertainty we have here  
11 in the system?

12 DR. HORNE: No. I'd say how conservative he was in his  
13 calculations. My three to five years was based on  
14 experience with most of our reservoirs. And the way in  
15 which I arrived at this conclusion is, if you look at what  
16 happens to reservoir water quality parameters. It takes  
17 three to five years before the water settles down. There is  
18 a lot of erosion in the eight years. Things are happening  
19 in reservoirs; all new reservoirs go through an up-and-down  
20 process.

21 And I was using empirical evidence and Dr. Kavanaugh  
22 was using a conservative modeling approach; that is,  
23 perhaps, the difference between the two.

24 MR. ROBERTS: If you used your three to five years,  
25 wouldn't that increase some of his numbers in over that  
2550  
01 period?

02 DR. HORNE: Now, he took another conservative step on  
03 top of that. What he assumed was that the DOC would  
04 continue to flow at the initial rates for a long time.  
05 Obviously, that can't happen. When you take half the DOC  
06 off, there is only half to get out. Again, a typical  
07 leaching experiment would show that is what they would be.  
08 What you initially have is the highest number, and next year  
09 lower and lower and lower. He didn't assume -- he assumed a  
10 straight line over that time at a high level. Again, I  
11 think that was a conservative estimate.

12 You know, what I stated in my testimony, what I said is  
13 a number of people had testified on what could happen. He  
14 was testifying on the low end of what would happen and other  
15 agencies that opposed the department would testify on the  
16 other way. I tried to plow the middle route.

17 MR. ROBERTS: If you are a Board Member and trying to  
18 come up with a water permit term that protects water  
19 quality, what would you plow?

20 DR. HORNE: I would be extremely conservative in  
21 setting a discharge limit for a drinking water reservoir.  
22 This would open a Pandora's box throughout the state  
23 because, normally, drinking water reservoirs don't have  
24 discharge standards on them. One of the reasons for this is  
25 part of the standard with which the Board judges whether  
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01 things are or are not going to effect the environment is  
02 whether they are going to change the environment.

03 Obviously, using a number, if you put the project in,  
04 it will increase or decrease DO or whatever other parameter  
05 by ten percent or not. Ten percent seems to be okay. If  
06 you go beyond ten percent, you begin to get worried. I  
07 agree with that, that ten percent number. I think it is a  
08 good conservative estimate for the Board to do. Reservoirs,  
09 by their very nature, change the water quality of the water  
10 above and below them, particularly below them. You have to  
11 look at a whole different world. For example, reservoirs  
12 typically modify and make more average things: make DOC,  
13 temperature, they make more available, generally, certain  
14 kinds of food, zooplankton. They make less available  
15 detritus.

16 So when you are looking at reservoirs, you have to put

17 aside whether you are making a small or large one and the  
18 receiving water, but whether it is positive or negative in  
19 the bigger picture. This is a very big decision for the  
20 Board to make. You have to say if we are taking something  
21 out of agriculture we're reducing the pesticides, we are  
22 reducing TOC; how does this balance against the other  
23 aspects which may be increasing the DOC at a time when it  
24 is less favorable for some of the people downstream and how  
25 it can be mitigated and whether annually average or

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01 quarterly average or daily average. Some of those details  
02 come in there.

03 If it is a new reservoir, water quality system doesn't  
04 easily fall, plus or minus ten change in the local discharge  
05 area.

06 MR. ROBERTS: You weren't listed as a witness on the  
07 originally witness list as a witness for Delta Wetlands?

08 DR. HORNE: That's true.

09 MR. ROBERTS: How long have you been associated with  
10 the project?

11 DR. HORNE: Probably as far as this particular hearing  
12 goes, somewhere about six weeks. However, about six months  
13 prior to that, I spent some considerable time with my  
14 graduate students discussing further experiments that might  
15 be carried out in the Delta Wetlands, particularly in the  
16 area of mixing and DOC generation. So, I became fairly  
17 familiar with the project, what was going to happen with  
18 regard to the DOC, in particular, in this case.

19 MR. ROBERTS: You think that with six weeks, plus your  
20 graduate class, you feel comfortable that you know how the  
21 project is going to operate, the impacts it is going to  
22 have, as far as you are describing at this time?

23 DR. HORNE: I've spent a considerable amount of time  
24 on the last six weeks. So I think that, given that, I have  
25 a good chunk of the data. I think I'm fairly confident that

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01 I can predict what the water quality will be.

02 MR. ROBERTS: Thank you, Dr. Horne.

03 HEARING OFFICER STUBCHAER: Mr. Maddow.

04 MR. MADDOW: Thank you, Mr. Stubchaer, and good  
05 morning, Dr. Horne.

06 Mr. Stubchaer and Mr. Brown, Mr. Roberts did cover a  
07 number of the questions that I had anticipated. I will  
08 follow up on the last part of the cross-examination.

09 ---oOo---

10 REBUTTAL CROSS-EXAMINATION OF DELTA WETLANDS PROPERTIES  
11 BY CONTRA COSTA WATER DISTRICT  
12 BY MR. MADDOW

13 MR. MADDOW: Dr. Horne, you said that you have been  
14 associated with Delta Wetlands, in regard to these  
15 proceedings, for about six weeks; is that correct?

16 DR. HORNE: Yes.

17 MR. MADDOW: You had nothing do with the design of the  
18 experiments that Jones & Stokes did to which you referred  
19 in your responses to cross-examination?

20 DR. HORNE: That's correct.

21 MR. MADDOW: You did or you and your graduate students

22 spent time looking at other experiments that might have been  
23 done; is that correct?

24 DR. HORNE: That's correct.

25 MR. MADDOW: Have any of those experiments been done by  
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01 Jones & Stokes?

02 DR. HORNE: No.

03 MR. MADDOW: Would it be advisable to do those  
04 experiments because it would be protective of the water and  
05 to help what is decided upon by this Board?

06 DR. HORNE: No. I don't think it is any reason to have  
07 to go through more of the testimony. The reasons the  
08 experiments were not done, and Jones & Stokes wasn't going  
09 to do them, my graduate students were, was because it was  
10 thought by Delta Wetlands that the time it would take before  
11 the agencies would agree on the experiments would be too  
12 long to be used for these hearings. The experiments that we  
13 actually discussed to do would be a cross between barrel  
14 expert and the big wetland, the big flooding experiments,  
15 but no flow amount and clearly we wouldn't know exactly how  
16 much mixing would be going on in the bottom. I hadn't gone  
17 through Dr. Kavanaugh's model in more detail; I hadn't  
18 understood how conservative he was being.

19 MR. MADDOW: Have similar reviewed testimonies by Dr.  
20 Losee and Dr. Shum and Mr. Krasner with regard to the  
21 formation of TOC and ferrous ammonia that can be expected on  
22 these islands?

23 DR. HORNE: I have gone through the testimony of Dr.  
24 Losee and Dr. Krasner, but not Dr. Shum.

25 MR. MADDOW: To the extent there is any uncertainty to  
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01 any phenomenon that could cause the formation of DOC and  
02 TOC, do you think there is any further experimentations in  
03 order to resolve that uncertainty?

04 DR. HORNE: That is almost a trick question.

05 MR. MADDOW: It is not intended to be a trick question.  
06 It is intended to be a direct question to an expert witness  
07 who has been associated with the project for six weeks.

08 DR. HORNE: I don't think further experimentation on  
09 DOC production by the peat or the algae production of TO  
10 that we are talking about are justified, given that we don't  
11 require this kind of experimentation when we normally design  
12 reservoirs.

13 MR. MADDOW: Thank you, Dr. Horne.

14 HEARING OFFICER STUBCHAER: Ms. Murray.

15 ---oOo---

16 REBUTTAL CROSS-EXAMINATION OF DELTA WETLANDS PROPERTIES  
17 BY DEPARTMENT OF FISH AND GAME

18 BY MS. MURRAY

19 MS. MURRAY: Good morning, Dr. Horne.

20 DR. HORNE: Morning.

21 MS. MURRAY: You mentioned in your rebuttal testimony  
22 that in shallow, unstratified waters the atmosphere is  
23 trying to keep oxygen from going very far, even the  
24 photosynthesis is shut down.

25 Do you recall that?

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01 DR. HORNE: Yes.

02 MS. MURRAY: The atmosphere reality occurs in  
03 reservoirs when many algal species, lower in the water  
04 column, express significant oxygen demand?

05 DR. HORNE: That is true.

06 MS. MURRAY: Dr. Horne, based on your rebuttal  
07 testimony that peaty soils are often nutrient depleted or  
08 acidic, is it your opinion unsuitable conditions exist for  
09 wetland plant production on the reservoir island?

10 DR. HORNE: I am not sure the two of those hold  
11 together. I often design wetlands and the ideal water  
12 regime for wetland plants would not be that which is  
13 predicted to occur for the Delta Wetlands' islands. So to  
14 that extent, regardless of the soil kind, it is not the best  
15 way to grow aquatic macrophytes.

16 MS. MURRAY: What about the habitat island?

17 DR. HORNE: I can make no comment on the habitat  
18 island.

19 MS. MURRAY: Dr. Horne, in your rebuttal testimony and  
20 as Mr. Nomellini discussed with you earlier, you have  
21 concluded that the Delta Wetlands Project would not affect  
22 water quality in the Delta; is that correct?

23 DR. HORNE: I didn't say it didn't affect water  
24 quality. What I said was that the overall water quality of  
25 water in the Delta Wetlands, surprisingly, would be better,  
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01 could be better than water in some of the standard  
02 reservoirs we have around. The typical reservoirs you would  
03 build elsewhere. And that, in a broader sense, the  
04 replacements of farming, modern farming, by a reservoir  
05 would generally improve the water quality around the system.

06 MS. MURRAY: Generally improve the water quality around  
07 the system. Assuming that is true, would you expect the  
08 temperature that Fish and Game recommends and the dissolved  
09 organic carbon criteria would be difficult to meet?

10 DR. HORNE: I don't -- the dissolved oxygen criteria  
11 would be difficult to meet? You asked me another question.

12 There are some very, very atrophic reservoirs and  
13 shallow lakes in the world; and the oxygen content of these  
14 reservoirs is very high during the day, by photosynthesis  
15 and increases at night. It has been surprising to me, the  
16 decreases at night are not as high as the increases during  
17 the day. That is to say we expect more oxygen surplus than  
18 appears. The reason is the oxygen demand, which is created  
19 during the day, in the long-term, which is part of the  
20 TOC/DOC scenario, that oxygen demand expressed may change in  
21 the colder winter. So we don't see it in the same way that  
22 we might expect. So we might get away with water quality  
23 which is higher than you would think it would be otherwise.

24 MS. MURRAY: Going back to your conclusion that the  
25 Delta Wetlands Project would not change water quality, would  
2558

01 not have an effect on the area, would the Department of Fish  
02 and Game temperature criteria be difficult to meet?

03 DR. HORNE: The temperature criteria are difficult to  
04 meet, meaning oxygen criteria; that could be met by cascaded  
05 the water pumped out of the system for further use.

06           Temperatures, you cannot do exactly the same with  
07 those. There are ways in which you can provide cooler  
08 water, evening it out. Water temperature at the Delta  
09 Wetlands' reservoirs will alter three degrees Centigrade  
10 during the day; and if you avoid pumping at the warmer time  
11 and pump during the cooler time of the day, you would assist  
12 that.

13           If there was to be any cascading -- for instance, one  
14 way to meet oxygen criteria is to cascade the water coming  
15 down the riprap, typically these small things. That would  
16 also especially help if it was done out of the very hot part  
17 of the day. It would cool the water some part. It is  
18 partially an estimate because the criteria of the fish are  
19 changed with season and time, as you know.

20           So, it's difficult to meet, but I think all of us are  
21 having the problem of having to meet reservoir criteria. I  
22 think probably most of the reservoirs in California are not  
23 being run partially to provide the most appropriate  
24 temperatures. I think successfully so far.

25           There has been two problems. One is running the  
2559

01 reservoir, running the water in the right channel. The  
02 second one has been for the fisheries biologist to give a  
03 more precise estimate of what the temperatures really are  
04 required and the range.

05           MS. MURRAY: And it is your understanding that the  
06 Delta Wetlands' reservoir does not have a deeper, cooler  
07 outlet; it is a fairly shallow reservoir?

08           DR. HORNE: Well, fairly shallow. The difference  
09 between the top and bottom will be a degree or two  
10 Centigrade. In essence, you can make -- that is the  
11 critical temperature you need.

12           MS. MURRAY: In your rebuttal you stated that you did  
13 not expect to see low oxygen levels in the Delta channels  
14 near the Delta Wetlands' islands' outflows.

15           Do you recall that?

16           DR. HORNE: Yes.

17           MS. MURRAY: That you are aware of periodically low DO  
18 conditions in the area, in these areas where the Delta  
19 Wetlands would be discharging now?

20           DR. HORNE: I am not aware that occurs precisely in  
21 those spots. I have looked at Delta water flows, DOs can  
22 occur.

23           MS. MURRAY: And is it not true that composition of  
24 detritus biomass on or below even shallow, of even shallow  
25 reservoirs, tends to have increased biology and decreased  
2560

01 dissolved oxygen?

02           DR. HORNE: Within the reservoir, that is true.

03           MS. MURRAY: Would the reuse of the water at the end of  
04 a draining cycle in the Delta impact receiving water  
05 quality?

06           DR. HORNE: No. It is a good point yet.

07           MS. MURRAY: Why not?

08           DR. HORNE: When the reservoir gets charged, it stirs  
09 around a lot, moves the oxygen excess from the surface. As  
10 we mentioned earlier, that oxygen excess, typically the top



11 20 or 30 feet of a standard reservation on a good typical  
12 windy, not a big wind, a typical windy afternoon, will mix  
13 top to bottom, and it varies from a few hours to maybe six  
14 or seven hours. So that means oxygen from the top is moved  
15 down ten or twenty feet within either two or three hours or  
16 certainly within about six or seven hours.

17 So as the reservoir becomes shallow, it is easier for  
18 oxygen to get down to the bottom, although oxygen demand --  
19 as oxygen is satisfied more for shallow reservoirs, shallow  
20 being four, five feet as it drains some, than it would be if  
21 it was deep.

22 The second part of your question comes to what would  
23 happen to the particle organic matter, other material  
24 released because it its more turbid, more stirring.

25 I have looked at this in a bunch of reservoirs around  
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01 California. The Bridgeport near Bridgeport, it was the  
02 subject of a great deal of all the fish dying below the  
03 reservoir. We spent a lot of time some years ago on this  
04 problem. As part of monitoring, we needed to know what  
05 happened to the dissolved oxygen below the discharge. And  
06 this reservoir is pertinent; it mixed top to bottom.

07 MS. MURRAY: It does?

08 DR. HORNE: Mixes top to bottom in the summer,  
09 productive shallow discharges. And we even looked at 6:00  
10 in the morning. We were unable to find decreases in the  
11 dissolved oxygen down below the reservoir. It would -- when  
12 you do discharges, the potential for unfavorable material  
13 that it is not causing an actual oxygen decline at the most  
14 critical parts of the day, which would be the circumstances.

15 MS. MURRAY: In rebuttal testimony you state that the  
16 Delta Wetlands' reservoirs would not mix from top to  
17 bottom?

18 DR. HORNE: I don't think I recall that.

19 MS. MURRAY: Not be large amount of mixing?

20 DR. HORNE: Yeah. A 20-foot reservoir will mix. The  
21 water will move. The water might from the top 20 feet, over  
22 20 feet; that is a pretty slow motion when you think about  
23 it.

24 It will not stratify in the sense that deep reservoirs  
25 would stratify with the really good layers on the bottom,  
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01 warm layer on top. It will stratify during the way a warm  
02 water will form on the top. It may be ten, or probably ten  
03 feet deep. That original layer on top will temporarily  
04 stratify.

05 MS. MURRAY: Stratify during the day and become  
06 unstratified at night?

07 DR. HORNE: After the wind comes up.

08 MS. MURRAY: I was very confused in the rebuttal, kept  
09 mixing stratified. The question is, is it going to be  
10 stratified or unstratified?

11 DR. HORNE: The technical term is polymictic. It  
12 means it mixes frequently. As a distinct practice, typical  
13 reservoirs mix through the winter. So, the example I think  
14 that Fish and Game brought up which was not here was Clear  
15 Lake. Clear Lake is a lake that during a long, calm spell,

16 if you have two or three calm weeks, that rest will  
17 stratify, will have a warm layer on top of a cold layer  
18 below. That would be distinct for several days on end.

19 Now Clear Lake is a little deeper than this  
20 reservoir. The average depth of the two smaller arms of  
21 Clear Lake are 11 meters and 40 meters. The average depth  
22 of the upper arm is about six meters. So that the bigger  
23 upper arm is comparable in depth. But, of course, it is  
24 much bigger and windier.

25 We find in the smaller arm of Clear Lake that we  
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01 occasionally -- I don't have all the data over the last 20  
02 years. I studied it for ten years. In two or three years  
03 we have periods where we would have thermostratification.  
04 That does have a top and bottom for a period of two or three  
05 weeks, and then that would cease.

06 MS. MURRAY: Then you are saying the Delta Wetlands'  
07 operation would be similar to Clear Lake?

08 DR. HORNE: It will be similar to some parts that have  
09 clearly a mixing regime. There will be, after a period,  
10 when warm water will float to the top. The difference is  
11 the Delta is a lot windier. Even though Clear Lake is  
12 bigger, the wind does more effect. The way the --  
13 obviously, the way it is set up, when wind comes howling  
14 through the Golden Gate, there are some reasonably regular  
15 winds that occur in the Delta. So, from the point of view  
16 of would we get oxygenation, this condition on the bottom of  
17 the water, not as often as you would think. It takes a  
18 while if you have a reservoir that is 20 feet deep, as this  
19 one will be. Let's assume we have several calm days, we  
20 have a warm layer on top. It takes a while for all that  
21 oxygen to be used up down below. The usual number we use is  
22 something like about a quarter of a milligram of oxygen per  
23 liter per day.

24 So, if we have the reservoir mixing, it will have  
25 somewhere between 8 or 10 milligrams of oxygen in it; that  
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01 will be several, two or three, weeks before the bottom is  
02 anoxic. The reason poorer water quality occurs in  
03 reservoirs is so strange. It should be when we first look  
04 at it, not really been very good. But the more I have  
05 looked at it, I am unable to predict these unfortunate  
06 conditions that happen in some reservoirs.

07 MS. MURRAY: No further questions.

08 HEARING OFFICER STUBCHAER: Staff have any questions of  
09 this witness?

10 ----oOo----

11 REBUTTAL CROSS-EXAMINATION OF DELTA WETLANDS PROPERTIES  
12 BY STAFF

13 MR. SUTTON: Morning, Dr. Horne.

14 DR. HORNE: Morning.

15 MR. SUTTON: Couple quickly, if I might. If  
16 zooplankton blooms, do you anticipate that you would get  
17 photoplankton blooms during the summer on the Delta  
18 Wetlands' islands, analogous to what occurs in the channels  
19 during the summer?

20 DR. HORNE: Yes. To the first part, I think you would

21 get algal blooms during the summer, spring and after early  
22 fall. But I don't think they would be analogous to the  
23 channels around the system. The greatest stirring,  
24 partially due to the tidal effect in those channels, let the  
25 diatoms do a lot better than they will in this. Diatoms

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01 might do well in the streams. They won't carry on, though,  
02 like they do in the Delta.

03 MR. SUTTON: Would you anticipate blue-green or  
04 something else growing in the summer then, or are you saying  
05 a spring diatom bloom, but not anything in the summer?

06 DR. HORNE: We don't have data from experiments to show  
07 this. This has to be what we think from the nutrient  
08 loading. I think undoubtedly some blue-green algae growing  
09 in the summer. It is a good time for them to grow. Again,  
10 as I tried to indicate, the heart of this particular  
11 reservoir system doesn't encourage blue-greens in the same  
12 way that some other reservoirs would.

13 I think in particular the nutrients are not going to be  
14 very high in the reservoirs. If you look at data from the  
15 Jones & Stokes' experiment, nutrients were added but they  
16 formed some form of middle bloom. Originally, the nutrients  
17 didn't come back over that extended period. Without a good  
18 source of nutrients, the algae are not going to grow very  
19 well.

20 You might think that such a shallow stirred system  
21 would be recycling nutrients all the time, but the nutrients  
22 are going to be fairly low, period. As I understand the  
23 operation, water taken in after a flood, we have a peak  
24 flood period, and then on the tail of the flood, water will  
25 be used be taken into the system. If I was trying to decide

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01 the way to take water for lowest algal growth, that is  
02 exactly what I'd do. After the flush of nutrients go, the  
03 water tails off. You are beginning to get pretty clean  
04 water. It would seem the water going into the Delta  
05 Wetlands' reservoir is going to be fairly clean to start  
06 with less nutrients, to keep cycling.

07 And the second part, as to the operation of the  
08 reservoirs, when water pulls down, when you get shallow,  
09 blue-greens don't do well there. So towards the end, when  
10 it gets toward dryness, which is their primary -- prime  
11 period for blue-greens is October, even November in our  
12 systems. So, I foresee blue-greens would grow, but I don't  
13 I think my specific comment was for the reasons, the fact  
14 there wasn't anoxic. So, potentially, during the fall term,  
15 which is the way in which nutrients normally fall, bloom in  
16 our reservoir. Here, this can't happen there. It looks to  
17 me that was the basis, or one of bases, why I said the water  
18 quality there would be equal, perhaps better than some of  
19 the reservoirs we look at, in a classic sense.

20 MR. SUTTON: We have received quite a bit of testimony  
21 about TOC and DOC and a lot of discussion about that. One  
22 of the -- I want to get your opinion on this. One of the  
23 things we have heard quite often for measurement purposes,  
24 that TOC and DOC values different in the Delta by typically  
25 about ten percent or less.

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01 Do you agree with that number and you can extrapolate  
02 one to the other fairly easily?

03 DR. HORNE: As a working hypothesis, pretty much. A  
04 lot of people have run their systems on that working  
05 relationship. I, however, think that your riding for a fall  
06 if you do that. Obviously, if there is algal below the 50  
07 percent of DOC could be particulates, could be algae. If  
08 you are looking at storm flow, as much as 50 percent of the  
09 TOC, again, can be particulate organic carbon. These data  
10 comes -- have been studied in Colorado, where they are  
11 worried about TOC and DOC.

12 So, once the algae blooms settle down, if you like,  
13 water is typically simple, where it is not very well  
14 stirred, I think you can get away with it. In the long run,  
15 we need no waste problem. Our problem, that the particles  
16 are not the problem at all; they are always settled out in  
17 the water stream. So to the extent that they will, of  
18 course, pick up, they make the data bumpier and we get a  
19 less good relationship. But I know previously, as of two  
20 weeks ago, we are looking at this problem nationwide, the  
21 correlation between THM and TOC coming in was fairly good.  
22 But I think when you get to a specific case, that will  
23 breakdown for the reasons I have outlined.

24 MR. SUTTON: Thank you.

25 MR. CANADAY: Dr. Horne, I want to follow up on a  
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01 couple of questions that Mr. Maddow beat me to. I  
02 appreciate that, related to experiment and some of the ideas  
03 that you have been kicking around with your students. Did  
04 you look at the testimony earlier from the Department of  
05 Water Resources where they conducted this fall some  
06 experiments.

07 Are you aware of those experiments?

08 DR. HORNE: Yes. I discussed those experiments with  
09 the DWR just over the telephone. My understanding, however,  
10 that those were mainly for habitat type islands and the  
11 Department of Water Resources' concern was a few inches to a  
12 few feet. I was looking at water that might be, say, ten or  
13 twenty feet deep.

14 So there would be some overlapping of experiments, but  
15 not of the concern that we had.

16 MR. CANADAY: We have heard testimony concerning a lot  
17 of contribution to the TOC and DOC coming from aquatic  
18 macrophytes.

19 Is that your understanding as well, or can it be --

20 DR. HORNE: It is not my understanding that DOC can be  
21 produced by macrophytes.

22 MR. CANADAY: Earlier you stated that if you designed  
23 wetlands, and that based on your understanding of the  
24 operation and nonstorage period, that you would necessarily  
25 design a wetland operation that way. Would you?

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01 DR. HORNE: No, I would not.

02 MR. CANADAY: If the Delta island, or the two islands  
03 in question that are going to be storage, you want to reduce  
04 to have the potential loading in that system, particularly

05 if they leach like that you think they going to leach, at  
06 least the peat soils, if they are going to be operated as  
07 storage islands, that you don't attempt to bring, to get  
08 wetlands in the nonstorage, period?

09 DR. HORNE: Oh, yes. For instance, if you further curb  
10 the growth of macrophytes, you would decrease the amount of  
11 potential DOC you can produce. The question from a lake  
12 management point of view, whether this would make more than  
13 the fractional difference to the milligram of DOC. The  
14 obvious thing to do, perhaps, would be to have some kind of  
15 harvesting that would keep them down. You can remove about  
16 20 percent of the production of a wetland marsh by  
17 harvesting, the removal. So you can reduce that by half if  
18 you wish to do so. I think whether it was a cost benefit  
19 thing, it is worth it for the amount of DOC reduction you  
20 are going to get. Sure, it could be done.

21 MR. CANADAY: From strictly a project sense, you would  
22 -- it would be your recommendation not to try to attempt to  
23 grow wetlands in this, particularly if these islands are  
24 used for water storage.

25 DR. HORNE: If I designed a reservoir for water  
2570

01 storage, I wouldn't have macrophytes growing there, and I  
02 would design it so they would not grow there. Normally, we  
03 try to make them steep-sided. This system, as far as I  
04 understand, has riprap down the sides for quite a bit; that  
05 would discourage the growth of a lot of macrophytes. The  
06 water gets down to, basically, at least four, five inches.  
07 You can't really start cattails. They like water about a  
08 foot deep. So to get wetlands planned growing, the big  
09 ones, you would need to have water shallow in spring. It is  
10 not going to be shallow in spring. There are emerging  
11 plants that grow from the bottom. All those plants take  
12 time, growing in about April. And the water is way too deep  
13 in April.

14 Another one of the paradoxical things about the waters  
15 running that I don't think they would have the same  
16 macrophyte problems, submerged weed problems, that we have  
17 in many of our reservoirs. These things are at a peak right  
18 now.

19 MR. CANADAY: My question goes to the fact of the  
20 proposal for in the fall to create or generate seasonally  
21 managed small wetlands. And my question to you is: If you  
22 were going to operate the reservoirs for storage of water,  
23 ultimately that would not be something you would choose to  
24 put into the mix?

25 DR. HORNE: Only time we do this, of course, done more  
2571

01 than I would like, high water quality defined for habitat.  
02 And in some cases that the habitat, especially fishing  
03 habitat or birth habitat, is equally important as water  
04 quality. The macrophytes get there or not.

05 MR. CANADAY: The hypothetical to you, if Delta  
06 Wetlands could meet the mitigation responsibilities with a  
07 habitat island, and receiving no credit in theory for  
08 seasonal wetlands, other than potential economic benefits  
09 they could for hunting clubs, from a water quality standard

10 and water storage standpoint, your recommendation is not to  
11 manage those seasonal manage wetlands and the bottom of  
12 those --

13 DR. HORNE: From a strictly water point, I agree with  
14 you.

15 THE COURT: Any other staff questions?

16 HEARING OFFICER STUBCHAER: Mr. Brown?

17 I have no questions.

18 Thank you for your testimony, Dr. Horne.

19 DR. HORNE: Thank you for letting me get out early.  
20 Thank you.

21 HEARING OFFICER STUBCHAER: If we take our morning  
22 break -- Mr. Maddow, did you tell me Dr. Gartrell --

23 MR. MADDOW: He is not here this morning. He is  
24 available; we can page him and get him here if we have about  
25 half an hour's notice. He is attending a meeting elsewhere  
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01 in Sacramento. He is not available tomorrow.

02 HEARING OFFICER STUBCHAER: Just for planning purposes,  
03 again, who intends to or desires to cross-examine Dr.  
04 Gartrell?

05 Delta Wetlands.

06 MS. BRENNER: We might have questions that he can  
07 answer versus Dr. Shum. I am not sure which one. They have  
08 joint testimony, so I am not sure which particular  
09 individual is going to be able to answer these couple of  
10 questions.

11 MR. MADDOW: Dr. Shum is here today. I believe they  
12 can appear at the same time today. Perhaps at the  
13 appropriate time Dr. Shum and Dr. Gartrell, the two of them,  
14 go for whatever cross-examining is --

15 MS. BRENNER: Very simple, two questions, so very  
16 limited.

17 HEARING OFFICER STUBCHAER: Already. What we will do  
18 right after the morning break is Delta Wetlands will begin  
19 cross-examination of the rebuttal, if there are extra  
20 questions, we can try and page Dr. Gartrell.

21 MR. MADDOW: Could you say that again?

22 HEARING OFFICER STUBCHAER: I have said that after the  
23 morning break Delta Wetlands will begin cross-examination of  
24 rebuttal witnesses. And they can --

25 You don't agree?

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01 MS. BRENNER: I was going to make a suggestion that  
02 this afternoon take Dr. Gartrell and Dr. Shum the first  
03 thing after lunch. Just to finish up Delta Wetlands'  
04 remaining witnesses for Delta Wetlands. Because it is so  
05 limited, Dr. Gartrell will be here this afternoon.

06 MR. MADDOW: We can arrange that. It would be  
07 difficult for us to get him right after the morning break  
08 because he is on the Federal Center, but we could arrange  
09 it, as Ms. Brenner has suggested.

10 HEARING OFFICER STUBCHAER: Any objections?

11 We will do that.

12 MS. BRENNER: Just a suggestion.

13 HEARING OFFICER STUBCHAER: We will finish the  
14 cross-examination of the Delta Wetlands' witnesses after the

15 morning break.

16 We will take our 12-minute break now.

17 (Break taken.)

18 HEARING OFFICER STUBCHAER: We have reconvened the  
19 hearing, proceeding with the cross-examination of the  
20 rebuttal testimony of Delta Wetlands' witnesses.

21 Who wishes -- Ms. Brenner.

22 MS. BRENNER: I was just going to indicate for the  
23 record that we have Bob Korslin, Russell Brown, Ed Hultgren,  
24 John List, Dave Vogel, and Keith Marine up as the bulk of  
25 the Delta Wetlands' panel, and Dr. Kavanaugh will be up  
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01 tomorrow morning for cross.

02 HEARING OFFICER STUBCHAER: All right.

03 And Mr. Shaul --

04 MS. BRENNER: Mr. Shaul will be, upon agreement, either  
05 later this afternoon or tomorrow, whichever Fish and Game  
06 chooses.

07 HEARING OFFICER STUBCHAER: Thank you.

08 Who wants to cross-examine?

09 Mr. Nomellini.

10 ---oOo---

11 REBUTTAL CROSS-EXAMINATION OF DELTA WETLANDS PROPERTIES

12 BY CENTRAL DELTA WATER AGENCY

13 BY MR. NOMELLINI

14 MR. NOMELLINI: Dante John Nomellini.

15 Mr. Korslin, in your direct testimony I believe you  
16 indicated that the KLMLP partnership loaned money to Delta  
17 Wetlands; is that correct?

18 MR. KORSLIN: No, that is not correct. KLMLP is a  
19 partner in Delta Wetlands, Inc., which is the entity that  
20 owns, is the equity ownership. And then later in the  
21 testimony I indicated that Lumbermen's and Kemper Investors  
22 Life Insurance Company were the lenders to that  
23 partnership.

24 MR. NOMELLINI: You didn't indicate the amount of the  
25 loan. What is the amount?

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01 MR. KORSLIN: That is proprietary.

02 MR. NOMELLINI: Is it secured by the assets of this  
03 partnership?

04 MR. KORSLIN: Yes, it is.

05 MR. NOMELLINI: So that any creditor would come behind  
06 this loan that you have against the asset?

07 MR. KORSLIN: Well, there are some other creditors that  
08 have liens ahead of us on pieces. We have some purchase  
09 money, mortgages from people that we bought land from. I  
10 believe those are all paid off now. We have some  
11 reclamation district that would be ahead of us. Of course,  
12 tax liens are always ahead, and we have a loan from  
13 Prudential on a small piece of some of the land.

14 But other than that, someone else would come, then,  
15 behind, yes.

16 MR. NOMELLINI: In giving some assurance that the  
17 project would be able to perform in accordance with its  
18 promised mitigation, what kind of information would be  
19 available to us that you would not consider to be

20 proprietary, that would lead us to feel comfortable?

21 MR. KORSLIN: I guess it would depend on exactly what  
22 mitigation measures you are talking about. I think, as far  
23 as the overall strength and stability of the proponents of  
24 the project, certainly Kemper and Lumbermen's are entities  
25 that are rated by the rating agencies. They're both

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01 investment grade credit. These two entities together have  
02 assets that approach a \$100 billion. So, they have a lot of  
03 capacity to and actually are in kinds of business that are  
04 providing guarantees. So they have very strong credit  
05 behind them.

06 MR. NOMELLINI: Are those entities on the hook,  
07 involved in the project? As I understood the structure --

08 MR. KORSLIN: Right. You are correct.

09 HEARING OFFICER STUBCHAER: -- they are just simply a  
10 lender --

11 HEARING OFFICER STUBCHAER: Please, let him finish his  
12 question before you answer.

13 MR. NOMELLINI: They are just in a lending position,  
14 basically, are they not?

15 MR. KORSLIN: That is correct.

16 MR. NOMELLINI: Are you familiar with the request by  
17 the Central Delta Water Agency to establish a security fund  
18 at \$35,000,000?

19 MR. KORSLIN: Yes.

20 MR. NOMELLINI: Are you opposed to such a fund?

21 MR. KORSLIN: I don't think I am opposed to the concept  
22 of the fund. And I think that these entities have always  
23 stood up to whatever their obligations are. I think, if the  
24 terms of the methods for the way that money would be drawn  
25 out of this fund and what the money could and could not be

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01 used for, and the actual amount of how much of this  
02 liability would need to be set up, is the -- those are the  
03 things that we would need to negotiate on. I think  
04 35,000,000 is too high.

05 MR. NOMELLINI: Is there a number that you think is not  
06 too high?

07 MR. KORSLIN: I wouldn't be making the final decision.  
08 It would also depend on what is coming in and out of that  
09 fund.

10 MR. NOMELLINI: You indicated in your direct testimony  
11 that, given the unique nature of this project, the continued  
12 permitting delays and the reduction in yield that you have  
13 experienced so far, that outside financing was not  
14 realistic, something like that.

15 MR. KORSLIN: That is correct.

16 MR. NOMELLINI: Does that also lead you to the  
17 conclusion that if the funding of the improvements of this  
18 project were permitted, it would have to be funded by you  
19 people as well?

20 MR. KORSLIN: Well, I think that we are certainly  
21 prepared and capable, have the ability to fund the  
22 improvements of the project. I think that if we would not  
23 -- even if we had the permit, we wouldn't go forward and  
24 build the project unless we thought there was a viable



25 market for the water as the project was permitted. I think  
2578  
01 at that point you would be far enough along that you would  
02 be able to raise third party financing if you wish to or you  
03 would be able to justify the further investment by the  
04 parties that are involved in the project today.  
05 MR. NOMELLINI: So, it is dependent upon the  
06 marketability of the water?  
07 MR. KORSLIN: Right.  
08 MR. NOMELLINI: In your direct testimony you indicated  
09 a minimum yield of the project, an annual yield I think it  
10 was, that would be required in order to keep, I think it  
11 was, the lending parties interested in this project.  
12 Do you remember that?  
13 MR. KORSLIN: Yes.  
14 MR. NOMELLINI: You talked about a 160,000, I think at  
15 first, and then that is a drop down to 154,000 now.  
16 MR. KORSLIN: Right.  
17 MR. NOMELLINI: You indicated in your testimony that  
18 that number was sort of a threshold because of the  
19 feasibility of the project.  
20 MR. KORSLIN: Uh-huh.  
21 MR. NOMELLINI: I would imagine that took into  
22 consideration some judgment on the marketability of the  
23 water and conditions; is that correct?  
24 MR. KORSLIN: Yes.  
25 MR. NOMELLINI: Are you also aware that the 154,000  
2579  
01 acre-feet of yield was based on a reservoir elevation of  
02 plus six feet?  
03 MR. KORSLIN: Yes.  
04 MR. NOMELLINI: If you couldn't operate the plus six  
05 feet but had to operate the plus four feet and you lost  
06 yield -- I don't think you were here, but I think Mr. Forkel  
07 said there was about a 20,000 acre-foot reduction due to  
08 that change in elevation. Would that cause your people to  
09 no longer be willing to go forward?  
10 MR. KORSLIN: I think that would cause them great  
11 concern and possibly that would cause them to -- when you  
12 say no longer go forward, we are at a position today where  
13 we are certainly going to go forward with these hearings and  
14 go forward and see what our permit is. At that point decide  
15 what we do then, really would be speculating.  
16 But when you consider what it's going to cost to build  
17 the project and the fixed costs of operating the habitat  
18 islands are and the fixed costs of operating the islands  
19 themselves, as you start moving down this yield chain, you  
20 get more and more -- it impacts your ultimate feasibility  
21 more and more. So, any kind of loss that we have beyond  
22 this 154,000 acre-feet is going to be very difficult to be  
23 able to justify.  
24 MR. NOMELLINI: With regard to your determinations of  
25 the feasibility and arriving at this 154,000 acre-feet of  
2580  
01 annual yield, did you have in mind the installation of the  
02 900 interceptor wells?  
03 MR. KORSLIN: Yes.

04 MR. NOMELLINI: Is that part of the budget or plan?  
05 MR. KORSLIN: Yes.  
06 MR. NOMELLINI: Replacement and operation of those for  
07 the life of the project?  
08 MR. KORSLIN: Yes.  
09 MR. NOMELLINI: Did you have in mind building levees to  
10 meet the Division of Safety of Dams criteria?  
11 MR. KORSLIN: Yes.  
12 MR. NOMELLINI: My next questions are for Mr.  
13 Hultgren.  
14 Ed, in your rebuttal testimony, I think I read it  
15 correctly, that you agree that the Bulletin 192-82 standard  
16 or criteria is not the adequate criteria for the design of  
17 your reservoir; is that correct?  
18 MR. HULTGREN: That's right. It states that that is  
19 for design of the levees when the water has gone down, so  
20 they are acting as levees. That is not the key criteria for  
21 designing it when they are retaining the water on the  
22 inside.  
23 MR. NOMELLINI: You talk about, I believe, a committee  
24 or consulting board or something like that, that would apply  
25 proper engineering criteria to the task of designing the  
2581 reservoir levee; is that correct?  
01 MR. HULTGREN: I think I said that we would design it  
02 section by section, and, if the Board felt more comfortable,  
03 they may wish to establish a consulting Board. That may be  
04 something the Board wishes to consider.  
05 MR. NOMELLINI: You are familiar with Clifton Court  
06 Forebay?  
07 MR. HULTGREN: Just generally.  
08 MR. NOMELLINI: In general, do you know what the  
09 criteria was for designing levees there?  
10 MR. HULTGREN: No.  
11 MR. NOMELLINI: Do you know there is an interior levee  
12 and an exterior levee?  
13 MR. HULTGREN: No.  
14 MR. NOMELLINI: Do you know what the water surface  
15 elevation of Clifton Court is?  
16 MR. HULTGREN: No.  
17 MR. NOMELLINI: Do you know what the foundation levee,  
18 foundation conditions are on Clifton Court?  
19 MR. HULTGREN: No.  
20 MR. NOMELLINI: With regard to the Delta Wetlands'  
21 reservoir islands, Bacon and Webb Tract, do you know what  
22 the current rates of levee settlement or subsidence are?  
23 MR. HULTGREN: Well, that is a number that varies a  
24 lot, and it decreases with time. And then, when one puts  
2582 fill on, the rate increases again.  
01 MR. NOMELLINI: If you had to give us a range of the  
02 rates of settlement, what would you give us?  
03 MR. HULTGREN: I looked at those numbers in the past,  
04 but I don't have it at the top of my head.  
05 MR. NOMELLINI: You would agree, if you had to raise  
06 the levee in any respect, you would cause the levee to  
07 subside or settle, would you not?  
08

09 MR. HULTGREN: Yes.

10 MR. NOMESELLINI: Your point in your rebuttal testimony  
11 is that you would do that carefully, by monitoring the  
12 loading so as to reduce the rate of settlement?

13 MR. HULTGREN: The reason we are doing it slowly is to  
14 not overstress the foundation soils. So, it is not a rate  
15 of settlement, but it is rather the margin of strength left  
16 in the foundation soils so they don't get overstressed and  
17 cause significant shear deformations. Portions of the  
18 settlements out there are not vertical, so shear deformation  
19 lateral movement. That is the real key thing you want to  
20 control.

21 MR. NOMESELLINI: The vertical settlement is going to  
22 remain the same and will be directly related to the amount  
23 of load you put on top, isn't it?

24 MR. HULTGREN: More or less.

25 MR. NOMESELLINI: The reason you don't load it fast is  
2583

01 because you don't want to shear them and cause some  
02 traumatic result in the loading process?

03 MR. HULTGREN: That is fair.

04 MR. NOMESELLINI: Now, so you are going to -- you are  
05 going to raise these levees, are you not?

06 MR. HULTGREN: Yes.

07 MR. NOMESELLINI: What's the range of the increase in  
08 height that you would anticipate?

09 MR. HULTGREN: Well, as a minimum, they are going to be  
10 192-82 standards; that is a minimum level. That is -- the  
11 other standard will be so we don't retain the water and  
12 don't overtop, or, if they do overtop, they are designed for  
13 over topping. That all results to the interior shore  
14 protection design which is going to be done during final  
15 design. So, precise numbers, I can't give you, depends on  
16 scheme and methods.

17 MR. NOMESELLINI: Can you give me a range?

18 MR. HULTGREN: It is going to depend on the method of  
19 shore protection. If shore protections are riprap shore  
20 protections, I don't disagree with Chris Neudeck's number  
21 that a maximum number of about six feet above still water  
22 level will be required for riprap slope protection on the  
23 longer fetches.

24 MR. NOMESELLINI: Excuse me, go ahead.

25 MR. HULTGREN: I also state, though, that consideration  
2584

01 of floating break waters are viable and could be considered  
02 here. They are expensive. They may be an alternate to look  
03 at. But, again, we are pointing out that all the shore  
04 protection issues for the interior is going to be done  
05 during final design, I can't give precise numbers.

06 MR. NOMESELLINI: Let's leave the shore protection alone  
07 for a minute and let's talk about the range of raising the  
08 levee to meet the Bulletin 192-82 criteria. What range of  
09 elevation increases would you expect there?

10 MR. HULTGREN: That will depend in part on where we are  
11 starting. But if you assume we are at a FEMA standard right  
12 now, an HMP standard, I believe it is about one more foot in  
13 elevation is required to get approximately to 192-82. That

14 is a foot and a half above a 300-year storm as opposed to a  
15 foot above a hundred-year storm. I think it is typically  
16 about a foot difference in portions of the levee.

17 MR. NOMESELLINI: If we were to raise the levees on Webb  
18 Tract and Bacon Island by one foot, how long would it take,  
19 in your estimation, for the levees to reach stability with  
20 regard to settlement?

21 MR. HULTGREN: Would you define what you mean by  
22 "stability relative to settlement"?

23 MR. NOMESELLINI: Let's start with an easy one, no  
24 further vertical movement.

25 MR. HULTGREN: I don't believe that's something we are  
2585

01 going to target. I believe they will continue to settle.  
02 They will require continual adding of materials to the top.  
03 If we were go to have a target elevation of, pick a number,  
04 of ten, and we wanted to be at ten, we wouldn't fill it to  
05 eleven today and allow it to settle to ten. We would fill  
06 it a little bit above ten. And if it gets down below ten,  
07 then we would add more fill. So we would be adding fill as  
08 needed, as opposed to providing all future settlement at one  
09 time.

10 MR. NOMESELLINI: How often would you expect that to be  
11 the worst case situation? Annually?

12 MR. HULTGREN: I would not expect it to be that  
13 frequent, but a few years.

14 MR. NOMESELLINI: So, every few years you would be adding  
15 some material?

16 MR. HULTGREN: At the start and then that would  
17 decrease with time. I think it would be similar with what's  
18 been going on in the Delta just to maintain the level  
19 they've been at. Every few years they are adding more  
20 material on top of the levees to maintain the flood  
21 protection you need. I don't think it's different from  
22 what's been going on.

23 MR. NOMESELLINI: Focusing in on the wave wash or the  
24 wave runup problems, you have indicated clearly that you  
25 intend to evaluate some type of boom system or some energy  
2586

01 dissipater chlorine-type device. Does that mean that you  
02 would not rock the face of the levee, the inside face of the  
03 levee?

04 MR. HULTGREN: No, it does not mean that. If those  
05 systems are used, they will dispel much of the energy, but  
06 there will still be energy. We don't want the interior face  
07 eroding, so there will be erosion protection of some form on  
08 the face of the levee.

09 MR. NOMESELLINI: So, when you say "erosion protection of  
10 some form," you are talking about rock?

11 MR. HULTGREN: That's what I envision as the most  
12 common. There are other systems. Soil cement could be  
13 used; it has a higher runup factor, might be used in lower  
14 sections of the levees.

15 MR. NOMESELLINI: With regard to placing the wave wash  
16 protection on the interiors of the levees, will that add an  
17 additional loading to the levee?

18 MR. HULTGREN: Certainly.

19 MR. NOMESELLINI: That will add to the settlement, would  
20 it not?

21 MR. HULTGREN: Yes. Same as the fill. That is part of  
22 the section of the fill we would be adding. That's part of  
23 the thought process in our design; that is the same average  
24 weight per cubic yard as the soil is basically --

25 MR. NOMESELLINI: Are you saying the average weight per  
2587 cubic foot of rock is the same as it is for soil?

01 MR. HULTGREN: Very similar. That is because there is  
02 large voids you want between the pieces of rock. A lot of  
03 the weight energy is expended because of the large void  
04 between the rock particles. You have a high void ratio.

05 MR. NOMESELLINI: You would be saying the levee section,  
06 then, would be comprised, in part, the rock?

07 MR. HULTGREN: Yes.

08 MR. NOMESELLINI: You are going to add material to the  
09 top of the levee. You are going to add rock on the face.  
10 Are you also going to enlarge the cross-section with earth  
11 rather than rock?

12 MR. HULTGREN: The combined rock/earth fill would make  
13 up the cross-section. A lot more steps, so there is a lot  
14 needed to make the shore protection.

15 MR. NOMESELLINI: With regard to the seepage trigger, I  
16 want to call it a trigger, but I think the Seepage Committee  
17 called it interpretation. There is an exhibit that you  
18 referenced, and I think we did too, in your rebuttal  
19 testimony. Perhaps somebody could put it on the overhead.  
20 That is Figure 3D-4 from the environmental document, I  
21 believe by Jones & Stokes.

22 Calling your attention, Ed, to the Case III, and your  
23 testimony questioned Mr. Neudeck's interpretation of the one  
24 foot above the two standard deviations. Is that correct;  
25  
2588 you said we were misreading --

01 MR. HULTGREN: As I read the testimony, which I do not  
02 have in front of me, but I believe he had implied that you  
03 could come up to the threshold limit, and then go a foot  
04 further. His testimony read something to that effect. I  
05 wanted to clarify that this figure is simply one foot above  
06 that two standard deviation range.

07 MR. NOMESELLINI: Let's look at Case III shown on Figure  
08 3D-4, and let's just look at September, for example. This  
09 bottom line would be the actual water elevation in the  
10 piezometer, would it not, in this example?

11 MR. HULTGREN: That is correct. The line he is  
12 referring to is the solid line labeled "Daily Mean of  
13 Individual Piezometer on Neighboring Islands."

14 MR. NOMESELLINI: That is what we would be reading in  
15 this particular piezometer, correct?

16 MR. HULTGREN: Correct.

17 MR. NOMESELLINI: Before there would be a trigger of a  
18 needed response from Delta Wetlands, that water elevation  
19 would have to get above this upper line, would it not?

20 MR. HULTGREN: Right.

21 MR. NOMESELLINI: Which is called the Seepage Performance  
22 Standard For Individual Piezometer?  
23

24 MR. HULTGREN: Correct.  
25 MR. NOMELLINI: What is the distance in feet that the  
2589  
01 water would be allowed to raise in that piezometer, in that  
02 example, before the trigger was reached?  
03 MR. HULTGREN: When it crosses that line, that is the  
04 trigger, that upper horizontal line.  
05 MR. NOMELLINI: We go one foot to 15, minus 15, and we  
06 go up to roughly, what, another half a foot or little more  
07 than half a foot?  
08 MR. HULTGREN: If I had to put an estimate on there, I  
09 would call it minus 14.3 would be the trigger for that  
10 example.  
11 MR. NOMELLINI: So there is 1.7 feet of rise before the  
12 trigger would occur?  
13 MR. HULTGREN: A rise above what?  
14 MR. NOMELLINI: Above the measured water elevation in  
15 that piezometer. Is that correct?  
16 MR. HULTGREN: No. The measured level is the measured  
17 level. It doesn't rise 1.7 feet above the measured level.  
18 They are by definition the same.  
19 MR. NOMELLINI: I am a farmer worried about water level  
20 in my field. I am right next to this piezometer, and I see  
21 the water rising, and let's say it is due to Delta Wetlands;  
22 before the trigger occurs, the water would have raise in  
23 that piezometer up to minus 14.3, would it not?  
24 MR. HULTGREN: Correct.  
25 MR. NOMELLINI: So I could take, be required to take  
2590  
01 1.7 feet more groundwater than I would otherwise have before  
02 this trigger would kick in?  
03 MR. HULTGREN: That is not correct.  
04 MR. NOMELLINI: Explain that.  
05 MR. HULTGREN: For that one piezometer, you would have  
06 recorded during a previous year or years what its natural  
07 variation is. And that variation would be reduced  
08 statistically to plus or minus two standard deviations.  
09 That typically means, covers about 95 percent of the typical  
10 data. Or stated another way, five percent of the natural  
11 data will go beyond that range.  
12 And for a performance standard we said let's take for  
13 each individual piezometer that range of natural variation,  
14 and we have to allow for some overage, because 14 days a  
15 year it is going to naturally going to exceed above or below  
16 that range. That is the way the two standard deviation  
17 concept works.  
18 On top of that we've added a fixed number. For a  
19 single well we used one foot. When we look at groups of  
20 wells, we used three inches. I am now holding up my hand  
21 saying three inches, a very small amount. We thought that  
22 was a very strict requirement to have for the Delta  
23 Wetlands. When you consider any one of the piezometers  
24 surrounding the island, if it exceeded the natural two  
25 standard deviation range by more than a foot, would be a  
2591  
01 triggering mechanism for Delta Wetlands to be out of  
02 compliance and have to do something.

03 I think that would give a lot of hammer against Delta  
04 Wetlands to do everything that it can to keep within that  
05 range when one single well can put them out of trigger.

06 MR. NOMESELLINI: Let's go back up here to Case III, and  
07 maybe three does not represent what we are talking about.  
08 This dashed line, as I understand it, on Case III is the  
09 reference lines, the top one, that incorporates the plus or  
10 minus two standard deviations of a previous year's data for  
11 background piezometers. Correct?

12 MR. HULTGREN: That is correct. The important point  
13 being that is for the background piezometers, which are a  
14 different set of piezometers, located more than a mile away  
15 from the islands, that is creating Deltawide background  
16 data, and it is not directly opposite the island.

17 MR. NOMESELLINI: What is this other line? Says  
18 "Seepage Performance Standard for Individual Piezometer"?

19 MR. HULTGREN: That is the line that is one foot above  
20 the plus two standard deviation line for the individual  
21 piezometer we are talking about.

22 MR. NOMESELLINI: In this particular case, it is correct,  
23 then, that the water elevation could be raised from minus 16  
24 up to minus 14.3 before the trigger on this piezometer, in  
25 this example, would kick in; is that correct?

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01 MR. HULTGREN: It could be raised to the trigger point  
02 for -- it is. You keep adding a single number, but that  
03 number of 16, what is it meaning statistically? You are  
04 just picking a number, and you're implying that it would  
05 have been 16 on May or June on this particular chart, too.  
06 We don't know that. What we do know is that, statistically,  
07 it is going more than one foot above its normal range.  
08 That's the trigger.

09 MR. NOMESELLINI: But the normal range is based on an  
10 annual evaluation of the piezometer and does not take into  
11 consideration the seasonal differences; is that correct?

12 MR. HULTGREN: Well, it certainly does not take into  
13 consideration the seasonal differences, because it takes in  
14 all the data for the entire year and puts the plus or two  
15 standard deviation which is the range of that data for a  
16 year.

17 MR. NOMESELLINI: In order to fit the data in the winter,  
18 when the groundwater is higher due that rainfall or produced  
19 drainage, whatever have you, the deviation line has to be  
20 raised accordingly to encompass those points of measurement;  
21 isn't that correct?

22 MR. HULTGREN: Yes.

23 MR. NOMESELLINI: The deviation line, if you are going to  
24 pick up everything that you have picked up here, picks up  
25 the extreme so that in the drier part of the year it causes

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01 a very wide tolerance, in this case 1.7 feet. Is that  
02 correct?

03 MR. HULTGREN: This example does not show what the  
04 standard deviation is for this individual well. So we  
05 simply know from this case what the upper bound of it is.  
06 Nowhere on this chart does it give the standard deviation  
07 for the individual well.

08 MR. NOMESELLINI: So the seepage performance standard for  
09 individual piezometer, in this example, does not incorporate  
10 the standard deviation for this well. Is that what you are  
11 saying?

12 MR. HULTGREN: No. What I am saying is I can't tell  
13 you for this example what that standard deviation is. It is  
14 not shown on this plot. I can simply tell what the plus two  
15 standard deviation was. It is a foot below the threshold  
16 line.

17 MR. NOMESELLINI: Is this Case III, that is shown on this  
18 Figure 3D-4 a bad example for us to understand when the  
19 triggers occur?

20 MR. HULTGREN: I think what -- there is a little  
21 confusion is when we talk about the plus or two standard  
22 deviation line. If you look at this chart, your immediate  
23 reaction is that maybe this dashed line is referring to that  
24 individual well. But one of the criteria is checking with  
25 background data. And this chart, each one of these charts,

2594  
01 shows the same set of range lines for the background data,  
02 and it was included in each one of these charts, so that you  
03 can show when background effects take place. And that  
04 occurs in a Case II, where it shows a case where the  
05 background data part exceeds its normal range. And in that  
06 case we are saying, when the whole Delta has higher water  
07 levels, then you would subtract that out and wouldn't say  
08 Delta Wetlands is causing it.

09 When you get down to the Case III issue, the heavy  
10 dashed line is staying within its normal ranges. Yet the  
11 individual piezometer exceeds its trigger. So that is  
12 saying in this particular case, we're exceeding the  
13 trigger. So this is the case where Delta Wetlands would  
14 have to start doing something in Case III, but not in Case  
15 II.

16 But the example is not a good one to try to figure out  
17 how much more because it doesn't show you what the range was  
18 for that.

19 MR. NOMESELLINI: Let's take it simply. Delta farmer  
20 wants to know how much additional seepage or increase in  
21 water level do I have to sustain before Delta Wetlands has  
22 to take to corrective action. Would you agree that it is at  
23 least one foot with regard to an individual piezometer  
24 location?

25 MR. HULTGREN: Yes, for one location.

2595  
01 MR. NOMESELLINI: For one location it is at least one  
02 foot?

03 MR. HULTGREN: But if it is next to another well, then  
04 those other two wells are going to have zero because the  
05 average of three has to be less than three inches. So there  
06 is some --

07 MR. NOMESELLINI: So, it is the one foot for the one;  
08 it's less than three inches or a quarter of a foot for the  
09 other?

10 MR. HULTGREN: Right.

11 MR. NOMESELLINI: Added to that would be whatever the  
12 spread is due to the plus or minus two standard deviation.



13 Is that correct?

14 MR. HULTGREN: Yes. I would say it just the opposite,  
15 though. I think it is a lot clearer if you start with your  
16 normal range of plus or minus two standard deviations and  
17 add this number to it. Start with the standard deviation  
18 and add this range.

19 MR. NOMELLINI: Let's take it, what could we expect for  
20 typical piezometer at a standard deviation? Just give me a  
21 range, if you could. Is it half a foot? A foot?

22 MR. HULTGREN: We have about 37 wells we have been  
23 monitoring on a weekly basis out there, not on a daily  
24 average basis like we are doing on this. But from that, we  
25 try to make an assessment of what the variations might be.

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01 We found that some wells had moved very little or very  
02 constant; some have wide fluctuations, more tidal than  
03 seasonal, but still both have both effects. Some had no  
04 tidal effects; some had significant -- excuse me, so had no  
05 seasonal effects; some had significant seasonal effects.

06 The numbers -- my impression was, and this is only an  
07 impression, that the range of numbers for some wells will be  
08 less than a foot and others may be a foot and a half, two  
09 foot, a foot and a half, that range. That is an  
10 impression. But we did didn't have daily average means like  
11 the data we are requesting here.

12 MR. NOMELLINI: So, our trigger range, then, for this  
13 former could be for an individual well or piezometer minimum  
14 number of a foot, because we have the one foot criteria, to  
15 as much as, maybe, two and a half feet, something like that?

16 MR. HULTGREN: That could be.

17 MR. NOMELLINI: I would like to put up another chart.  
18 This is entitled Central Delta Water Agency Number 8.  
19 Again, this is the table that was attached to the  
20 recommendation of the so-called Seepage Committee.

21 Do you recognize that, Ed?

22 MR. HULTGREN: Yes.

23 MR. NOMELLINI: In your rebuttal testimony, you talk  
24 about your agreement with the Seepage Committee in many  
25 aspects, in particular with regard to the monitoring and

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01 interpretation of the information that comes from the  
02 monitoring wells. Is that correct?

03 MR. HULTGREN: Yes.

04 MR. NOMELLINI: From an engineering perspective, do you  
05 have any problem with guaranteed remediation funding that is  
06 recommended by the Seepage Committee?

07 MR. HULTGREN: The funding side is not my level of  
08 expertise. But it seems to me that the concept -- part of  
09 this concept came about from the idea that the neighbors  
10 were going to come on Delta Wetlands' property to operate  
11 the wells, install new wells, and do whatever remediation  
12 measures are required. And I just can't fathom that  
13 happening. If there was a problem, I think you'd pump the  
14 reservoir dry or pump the reservoir down to stop something.  
15 That is the only thing, I think, you would consider doing if  
16 there was some serious problems and the owners walked away,  
17 whatever.

18 MR. NOMELLINI: Again, I guess you would consider that  
19 to be within the scope of the engineering aspects of the  
20 problem. Okay.

21 Would that aspect of the problem change if that entity  
22 or person was an independent water master-type person that  
23 could go onto the reservoir island and control the gate or  
24 the pumps?

25 MR. HULTGREN: I am not familiar with how that water  
2598 master, who he is and what he is. You are still talking  
01 about a separate party, other than the owner of the project?

02 MR. NOMELLINI: Separate party, totally independent.  
03 Somebody kind of --

04 MR. HULTGREN: I just imagine, in my background and I  
05 owned it, I wouldn't want anybody coming on my property to  
06 manage my swimming pool. I'll put the chlorine in,  
07 whatever. And I just don't think that's -- that is not  
08 engineering; maybe it is getting beyond my expertise.

09 MR. NOMELLINI: Let's go down the list there under  
10 interpretations, and I am almost through. I gather, with  
11 regard to funding, the representation of affected owners,  
12 that your feeling is expressed in your previous answer?

13 MR. HULTGREN: Correct.

14 MR. NOMELLINI: How about the ongoing review of the  
15 interpretation methodology?

16 MR. HULTGREN: I agree with that. The methodology that  
17 I developed for Delta Wetlands and presented to Seepage  
18 Committee, and, basically, all had concurrence. Best we  
19 could come up with. Once we are operating and we discover  
20 there is a better way to do things, I don't think we should  
21 be cemented to something we predicted would happen as  
22 opposed to coming up with a better way.

23 MR. NOMELLINI: Would you have any objection to a  
24 third, independent party, I am going to call him a water  
2599 master, arbitrator, something like that, that would have the  
01 say on what the interpretation methodology should be changed  
02 to as time goes on?

03 MR. HULTGREN: Philosophically, no, with the provision  
04 that, again, if it was my house or my property, I would  
05 certainly want some input on it. It has to be balanced.  
06 That is more of a legal issue than technical. I would  
07 certainly not want someone to come in, who you call him a  
08 water master, but if he is not bright enough to do it  
09 fairly, I would think that would be wrong. So, I would be  
10 scared of, certainly scared of an individual.

11 MR. NOMELLINI: The last item there, the arbitration  
12 board with the power to control filling, require  
13 remediation, make independent performance evaluations, that  
14 is what we have been talking about. Your problem would be  
15 the same thing in trying to make sure that somebody had the  
16 independence and adequate expertise to make these decisions.  
17 Is that a fair statement of your concern?

18 MR. HULTGREN: I think it goes back to whose water  
19 projection is it. If somebody is going to decide filling  
20 and remediation and all those things, I think the most part  
21 they should be owner-developed. But I don't have an issue  
22

23 with their being an arbitration board for issues, a place to  
24 go. That's certainly fair, but I would hope that the  
25 proponent, as well as the people next door, would all have

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01 their say to the arbitration board.

02 MR. NOMESELLINI: With the arbitration board alternative  
03 that was recommended by the Seepage Committee, you have no  
04 objection to that; you would only object to their having the  
05 authority to go over and take action on the island?

06 MR. HULTGREN: The one concept I think that would  
07 affect a neighbor is whether or not you are affecting their  
08 property, that seems like it would be the only thing that  
09 you would want to resolve. That seems like mostly seepage  
10 issues. And I think a dispute resolution board makes sense  
11 for some place for a landowner to go and say, "My field is  
12 wet. Delta Wetlands didn't do anything because their data  
13 doesn't show it." So it could be a method for them to go to  
14 somebody to complain. I don't have any problem with that.

15 MR. NOMESELLINI: Last question. With regard to a  
16 criteria against which you would evaluate or design the  
17 reservoir island levees, do you have any objection to using  
18 the criteria that would be applied by the Division of  
19 Safety of Dams?

20 MR. HULTGREN: For the levees?

21 MR. NOMESELLINI: For the reservoir island levees.

22 MR. HULTGREN: Certainly, if we are going to be in  
23 their jurisdiction, it would have to be designed to their  
24 criteria. But for the most part, I would say that the  
25 reason the levees up to elevation plus four were excluded

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01 from DSOD jurisdiction, DSOD didn't really feel they needed  
02 to have that jurisdiction because the threat to the public  
03 just isn't there. They keep in their control what they  
04 believe is important in terms of threat to public.

05 I don't believe that the level of conservatism needed  
06 to design a major reservoir upstream of housing or other  
07 important facility is the same level of conservatism that  
08 needs to go into Delta levees that are controlling water up  
09 to plus four to plus six, in those ranges.

10 MR. NOMESELLINI: If you stay below plus four, then you  
11 don't think the factors of safety that they might apply are  
12 necessary. Is that what you are saying?

13 MR. HULTGREN: I think reasonable and prudent judgment  
14 is appropriate, and I think that Delta Wetlands needs to  
15 make their levees as safe or safer than they are now.

16 MR. NOMESELLINI: Thank you. That is all I have.  
17 Did I make my half hour?

18 HEARING OFFICER STUBCHAER: No.

19 MR. NOMESELLINI: There was no buzzer.

20 HEARING OFFICER STUBCHAER: Especially when you add the  
21 first part to it.

22 I have decided we have a multiplier of two here, and we  
23 are not going to make it today. Based on the estimates, we  
24 would. That is all right.

25 Mr. Moss.

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01 (Reporter changes paper.)

02 MR. MOSS: Richard Moss for Pacific Gas & Electric.  
03 Before I begin my cross-examination, Mr. Stubchaer, I would  
04 just like to say that PG&E, pursuant to your request for an  
05 updated list of exhibits, basically, had no change  
06 whatsoever in our initial list.

07 But, for the record, I tendered to the staff 13 copies  
08 of basically what was our original list. I have additional  
09 copies for anybody who would like them. We did not, unlike  
10 perhaps other parties, introduce any additional exhibits.  
11 But I apologize for not making them out.

12 HEARING OFFICER STUBCHAER: Thank you.

13 ---oOo---

14 REBUTTAL CROSS-EXAMINATION OF DELTA WETLANDS PROPERTIES

15 BY PACIFIC GAS & ELECTRIC

16 BY MR. MOSS

17 MR. MOSS: I will start with Mr. Hultgren.

18 Mr. Hultgren, have you been hired by Delta Wetlands to  
19 design the final levees for the reservoir islands?

20 MR. HULTGREN: We are under contract to Delta Wetlands  
21 to be the geotechnical engineer, but we hadn't gotten to the  
22 phase to do final design.

23 MR. MOSS: Do you expect your firm to do that final  
24 design?

25 MR. HULTGREN: I would hope so, but there is no

2603 obligation on their part to do so.

01 MR. MOSS: Has the management of Delta Wetlands told  
02 you that they will support building whatever containment  
03 that is required, irrespective of cost, to keep what we will  
04 call the obligated impacts, and we recognize that there are  
05 some impacts that would be allowed, of the reservoir  
06 projects within the site?

07 MR. HULTGREN: That was a real long question. I think  
08 the answer to it strictly is, no, it has never been stated  
09 that way. But why don't you read the question back one more  
10 time.  
11

12 MR. MOSS: Has Delta Wetlands told you that in the  
13 design of that levee system to contain the reservoir islands  
14 that you're to be guided by your engineering judgment and  
15 not by basically cost elements so that the impacts that they  
16 have proposed will not be visited on their neighbors and so  
17 forth, and would, in fact, be contained?

18 MR. HULTGREN: Would you read back the last third of  
19 that when you get back to the neighbors?

20 MR. MOSS: Again, that you could use whatever you  
21 thought was in good engineering judgment, irrespective of  
22 what the cost of doing it, whether it was DSOD or any other  
23 standard that seemed then appropriate for the job, that you  
24 could go ahead and design that?

25 MR. HULTGREN: Well, the answer is still no, because we

2604 haven't had a specific statement or response like that. But  
01 the philosophy all along has been unrestrained completely;  
02 they have encouraged us to do what is right for the project.  
03 So, we have had no guidance or restriction saying don't do  
04 this or that because that is too expensive.  
05

06 I will say when I was first involved in the project, I

07 came up with some wild ass schemes that, quite frankly,  
08 didn't make sense; and they pointed it out to me. That is  
09 the first week or two we were brainstorming. But beyond  
10 that, no. I think we have, what I would call, one of the  
11 best clients I ever had in my life, in terms of freedom to  
12 do what we think needs to be done and to do it to the best  
13 of our ability.

14 MR. MOSS: In your rebuttal testimony you state that  
15 there is no established Delta specific criteria similar to  
16 FEMA's HMP or DWR's Bulletin 192-82 for reservoir islands.  
17 Is this not an admission that what you are proposing for  
18 Delta Wetlands will be in its nature an experiment?

19 MR. HULTGREN: No.

20 MR. MOSS: Even though there is no standard that you  
21 would be designing to?

22 MR. HULTGREN: Correct.

23 MR. MOSS: Have you ever personally designed anything  
24 like what you believe the proposed Delta Wetlands' reservoir  
25 levee containment structures will look like?

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01 MR. HULTGREN: Yes.

02 MR. MOSS: For example?

03 MR. HULTGREN: Well, small dams and the levee systems.  
04 This is simply a small dam. This thing is going to retain  
05 water with a maximum differential head of plus six in the  
06 reservoir and extreme low tide of minus one. So that is  
07 seven foot of head. I am now going to stand up and hold my  
08 hand up high and say it is only this much water.

09 MR. MOSS: Again, if it seems so simple, how is it  
10 that there is no recognized standard for designing it?

11 MR. HULTGREN: Because they are not commonly used in  
12 the Delta. As a matter of fact, none yet. The Delta is --  
13 the standard of the Delta that we are talking about are  
14 flood control standards. And in the Delta on our kinds of  
15 levees we are working with -- let me back up.

16 Are there standards for design of small dams? Yes,  
17 there are. If that is the answer you are looking for. In  
18 my testimony I was referring to that Delta specific in terms  
19 of criteria for working on levees in the Delta, there are no  
20 standards that have been promulgated by others, specifically  
21 192-82, for example, that relates to Delta islands.

22 MR. MOSS: That was what my question prefaced that.  
23 When you mentioned that you had experience designing small  
24 dams, is it correct, then, that those were not in the Delta?

25 MR. HULTGREN: Yes.

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01 MR. MOSS: In your prepared testimony you invite the  
02 Board to establish a committee of consulting -- I assume  
03 they're engineers. Are you asking the Board, basically, or  
04 asking that committee to, in essence, be a design review  
05 board?

06 MR. HULTGREN: I offered that in my testimony because  
07 there may be discomfort that there not being a standard. If  
08 there is not a standard, you may want oversight in some  
09 form, and that could be like a consulting Board.

10 MR. MOSS: What would happen if this board was not  
11 satisfied with the Delta Wetlands' design? Would they be

12 able to -- would their recommendations have affect or would  
13 they fall on deaf ears?

14 MR. HULTGREN: That is going to be up to Water Board  
15 rules.

16 MR. MOSS: You state that the design of the levee  
17 control system would be modified as construction  
18 progresses. What about further modification after it's  
19 filled; it turns out it doesn't work properly?

20 MR. HULTGREN: Restate that one, please.

21 MR. MOSS: You state that the actual design of the  
22 levee control system would be modified as construction  
23 progresses. And if I am misstating it, please correct me.

24 MR. HULTGREN: Amplify what you mean by levee control  
25 systems, so I am answering --  
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01 MR. MOSS: Well, the system that will basically keep  
02 the water in the reservoirs or keep the outside water from  
03 entering the reservoirs.

04 MR. HULTGREN: You're quoting my rebuttal testimony  
05 saying what?

06 MR. MOSS: You said it a little bit earlier today,  
07 that there would not be a fixed design at the first day of  
08 construction, but that, as construction progressed, there  
09 would be modifications. I assume based on what you're  
10 experiencing.

11 MR. HULTGREN: Probably some confusion. There's two  
12 parts that vary. One, I talk about designing it mile by  
13 mile or section by section. In other words, you don't pick  
14 one design for the full 40- or 30-mile perimeter. But you  
15 would do it piece by piece as to what fits that part of  
16 section and subsurface conditions.

17 The other part of the response that may have been  
18 confusing, I was answering Mr. Nomellini that there is  
19 continuing fill placement in response to the settlement.  
20 The ground will continue to settle. You are not going to  
21 put all that fill on in day one. That would be an ongoing,  
22 occurring even beyond the operation of the reservoir.

23 MR. MOSS: Do you envision that these ongoing  
24 responsibilities will be greater than that faced in the  
25 Delta by other reclamation districts?  
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01 MR. HULTGREN: Yes, I believe it will be. We have more  
02 elements to deal with. We are going to have internal  
03 erosion and external erosion protection. We are storing  
04 water that we have to make sure our -- we are going to --  
05 our freeboard, where we keep our freeboard. Similar to what  
06 is required to the reservoir, the island today, except it  
07 will be higher. Operating the wells, keeping them  
08 maintained. All those things are -- some of them are more  
09 than they have in a typical reclamation district.

10 MR. MOSS: Speaking of those wells, can you tell us  
11 whether you have any idea of what the cost is of  
12 constructing those 8 to 900 new perimeter wells and how that  
13 might reflect, again, on the overall cost of the project?

14 MR. HULTGREN: We prepared a portion of a cost  
15 estimate on an individual well basis several years ago and  
16 gave that data to Delta Wetlands, and they incorporated it

17 into a total cost estimate that they have included in  
18 theirs, that included -- we did not include the pumps. They  
19 included the pumps, the electrical distribution and things.  
20 So the number I have is only a partial number. My  
21 recollection, it was a number like range of \$5,000 per well,  
22 perhaps. That is not a complete number. There is more  
23 pieces than just taking that number times the number of  
24 wells.

25 MR. MOSS: You don't have any further information,  
2609 complete number?

01 MR. HULTGREN: No. I think I was asked that in the  
02 original cross. I didn't think it was important for me to  
03 chase that down.

04 MR. MOSS: You mentioned in your rebuttal testimony  
05 that the test wells on McDonald Island silted up. I don't  
06 know if that is the right term, but explain that. And,  
07 also, would that be an indication of what would happen to  
08 these 8 to 900 new wells that would require constant  
09 maintenance?  
10

11 MR. HULTGREN: That they silted up is speculation. We  
12 know they become less efficient. That is often the way  
13 wells become less efficient. It is important that one read  
14 my rebuttal here to understand this response, to cross. But  
15 I state that we put these wells in. They were put in for a  
16 specific purpose, and that was to run a short-term test, and  
17 they were very successful in doing so. And when we were  
18 done with the test and the owner, when given the option to  
19 either us take the wells out or leave in place, he said,  
20 "Leave them in place."

21 Over a period of nine months their efficiency degraded  
22 to about 25 percent of what they were initially. And I  
23 would attribute that to more than likely to not the best  
24 installation techniques. But that was the requirement of  
25 the contractor to do that when installing those wells. He  
2610 was simply doing a short-term test. So, I don't hold it  
01 against that contractor who installed them because it was  
02 not his charge.

03 And following up, do we expect that in our long-term  
04 wells? No. I would expect them to behave like any other  
05 well designed, excuse the pun, well designed well system.  
06 However, that is how I would expect them to work. There  
07 will be maintenance required like in all well systems.  
08 There could be things growing on the screens and need to  
09 rework it because of some siltation that develops in the  
10 filter pack. Those are normal maintenance operations.

11 MR. MOSS: In preparing your rebuttal testimony is it  
12 fair to say that in general you chose not to rebut the  
13 direct testimony of DWR's witness Raphael Torres?  
14

15 MR. HULTGREN: I didn't see anything necessary to  
16 rebut. I looked at -- I made notes on all of the testimony  
17 given to me, including his. I believe he made a statement  
18 that he thought the well system would be very expensive.  
19 And I thought about writing rebuttal to that, but then I  
20 recalled -- I remember that same -- I think I said in my  
21 rebuttal here, my immediate reaction was that this well

22 system would be very expensive, until I figured out it was  
23 still the best system. So, partially, I guess that is a  
24 rebuttal of Mr. Torres' testimony.

25 MR. MOSS: Mr. Torres also testified that it would very  
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01 difficult to get construction machinery onto the interior of  
02 an inundated island, and you apparently did dispute this  
03 contention.

04 Again, my question is: Were you thinking along the  
05 lines of the suggestion by Dr. Egan of having the big barge  
06 and the little barge and little one going out there to do  
07 the work, et cetera?

08 HEARING OFFICER STUBCHAER: Excuse me, Mr. Moss.

09 MS. BRENNER: I am going to object. This is beyond the  
10 scope of the rebuttal and clearly should not be gotten into  
11 by Mr. Moss today.

12 HEARING OFFICER STUBCHAER: I will sustain that.  
13 Go ahead.

14 MR. MOSS: I just wanted to comment that --

15 MS. BRENNER: It is not your opportunity to testify.

16 HEARING OFFICER STUBCHAER: You can give me reasons why  
17 on your objection.

18 Please go ahead.

19 MR. MOSS: Again, his, Mr. Hultgren's written rebuttal  
20 is very extensive and covers many subjects. So, he,  
21 obviously, had time to prepare it. It was quite different  
22 than simply an oral presentation. So, I believe that, to  
23 the extent that he chose not to rebut direct testimony on  
24 the very subjects that he testified to, such as, again Mr.  
25 Torres, a civil engineer, who spoke about his concerns with  
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01 the levees, that that is perhaps a tacit admission that he  
02 agrees with it.

03 HEARING OFFICER STUBCHAER: I am going to sustain the  
04 objection. I think you should not read into what he didn't  
05 testify to, but what he did say.

06 MR. MOSS: Again, I would like to rephrase the question  
07 and just simply say that in regards to maintenance,  
08 especially, of elements on the interior of the island, have  
09 you thought through the issues of difficulty that were  
10 raised by other parties?

11 MS. BRENNER: I am going to object. Goes beyond the  
12 scope of his rebuttal testimony. If you like to make  
13 comments about what he did not address, you can do that in a  
14 briefing.

15 MR. MOSS: Certainly, when you look at several pages of  
16 his testimony, he does talk about a number of things that  
17 touch on the design of these things, whether DSOD and they  
18 should be maintained, and so forth. So I will withdraw the  
19 question and follow your lead, but I do suggest that he has  
20 covered it in his general topic in his rebuttal testimony.

21 I would like to shift to some questions for Mr.  
22 Korslin.

23 Good morning, sir.

24 Mr. Korslin, have you had a chance to hear or review  
25 some of the testimony offered in this hearing as it relates  
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01 to the many problems and unresolved issues that face Delta  
02 Wetlands?

03 MR. KORSLIN: Yes.

04 MR. MOSS: Would you have expected opposition from such  
05 a diverse group of parties, including the State Water  
06 Contractors and CUWA and DWR and owners of all the  
07 surrounding properties?

08 MS. BRENNER: I would like to raise another objection.  
09 This, again, goes beyond the scope of Mr. Korslin's rebuttal  
10 testimony. It is very limited in rebuttal testimony in this  
11 hearing.

12 HEARING OFFICER STUBCHAER: Mr. Moss.

13 MR. MOSS: Again, I have a number of questions which  
14 hit on the very subject that Mr. Nomellini was asking, and  
15 some other aspects of it, again, the business decisions of  
16 what the owners and the lenders, what their policies are,  
17 and how they judge the possibility that their investment is  
18 appropriate or will be continued, or whatever.

19 HEARING OFFICER STUBCHAER: Ordinarily, on a regular  
20 cross-examination we allow great latitude. This is  
21 cross-examination of rebuttal testimony and should be  
22 limited to what was said in rebuttal.

23 I ask Delta Wetlands, why weren't you objecting to Mr.  
24 Nomellini's questions?

25 MS. BRENNER: I contemplated objecting several times,  
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01 and it was indicated that just to let him go ahead. Now I  
02 am getting a little tired of the same kind of questions, so  
03 I guess that I'm going to start raising my objections a  
04 little more often, so that we can get through this.

05 MR. MOSS: In fact, you know, I was just about to make  
06 a point that I -- one of my colleagues, again, raised to me;  
07 and that is that Mr. Korslin never testified on direct. So  
08 we never had that opportunity to explore in the wider  
09 latitude a representative of the owner/lenders. So, again,  
10 his testimony covered that whole relationship between that  
11 an outside financial interest and should be subject to a  
12 fairly wide range of cross-examination.

13 MS. BRENNER: We could choose --

14 HEARING OFFICER STUBCHAER: Just a minute. Mr.  
15 Nomellini was next.

16 MR. NOMELLINI: I resent the concept that an objection  
17 should have been made, but that wasn't made. I think my  
18 cross-examination was clearly within the scope of the  
19 rebuttal testimony. The testimony was with regard to the  
20 financial considerations of the money people and what they  
21 went through in terms of evaluation and the importance of  
22 each additional burden being placed on the project. I think  
23 I was well within the scope of cross-examination of the  
24 rebuttal testimony.

25 HEARING OFFICER STUBCHAER: Mr. Nomellini, I wasn't  
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01 judging that. I was looking for consistency, and why your  
02 questions were not objected to and similar questions from  
03 someone else are objected to.

04 MR. NOMELLINI: I think Mr. Moss in the last line is  
05 within the scope.

06 HEARING OFFICER STUBCHAER: I think that what is fair  
07 for one is kind of fair for all. But that was within the  
08 call of Delta Wetlands, not the Hearing Officer.

09 MS. BRENNER: That is right. It is within our  
10 prerogative to determine when we'd like to object and when  
11 we wouldn't. It is also within our prerogative to determine  
12 when we want to raise a witness, as a direct testimony  
13 witness or rebuttal testimony witness. And a lot of those  
14 issues about how large a scope we want a cross-examination  
15 to go is within our discretion. And when we choose a  
16 rebuttal witness, we take that into consideration. And  
17 those considerations are our choices.

18 And I would like to just reemphasize that Mr. Moss has  
19 the opportunity to reword his particular cross-examination  
20 question so it does fit within the scope that he is  
21 describing. I don't believe the question that he just  
22 raised is within that scope. He is asking about, "Did you  
23 think that there was going to be this much opposition?"  
24 Well, I don't see how that has anything to do with the  
25 relationship of the entities funding or non funding this

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01 particular project.

02 MR. MOSS: And I will, I will ask those questions.

03 HEARING OFFICER STUBCHAER: I think that that  
04 particular question I will sustain the objection on, but not  
05 the line of questioning about the financial responsibility.

06 MR. MOSS: Is it not true that many of the issues of  
07 the concerned parties that have been brought to this hearing  
08 are not fundamental opposition to the concept of in-Delta  
09 water storage, but to the externalization or shifting of  
10 risks to third parties brought on by what is generally  
11 perceived as an incomplete or premature project?

12 MR. KORSLIN: Well, we have been studying this project  
13 for ten years. Our company has been involved in the project  
14 for ten years. And we have built thousands of homes across  
15 the country. We have built lots of office buildings,  
16 apartments, subdivisions. We have built a lot of things  
17 that have concerns for that potentially have third party  
18 impacts. And so, it is not new for us to get involved in a  
19 project that potentially could have some third party  
20 impacts. And as a company that have millions of policy  
21 holders, both here in California and across the country, we  
22 don't build projects and then turn our backs on any third  
23 party impacts we may have. We believe that, at least part  
24 of my job is to go to the financial partners and say, when  
25 they say, "Well, have the third party impacts been analyzed

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01 and can they be mitigated and minimized?" And my belief in  
02 this project is that, yes, they can and they have been.

03 MR. MOSS: But Delta Wetlands, for example, has refused  
04 to indemnify the owners of the neighboring properties  
05 against any and all damage or loss caused by the Delta  
06 Wetlands Project.

07 Is this an example, though, of an attempt to shift?

08 MS. BRENNER: That is argumentative, for one thing;  
09 and, also, it goes beyond the scope of his rebuttal  
10 testimony. You talking about the relationship between

11 entities. That is very different than the question that you  
12 just asked.

13 HEARING OFFICER STUBCHAER: Can you point out in the  
14 rebuttal testimony where he said they would refuse to  
15 indemnify?

16 MR. MOSS: In Mr. Nomellini's questioning, he spoke  
17 about the concept of this fund and said that a certain  
18 dollar document was potentially in dispute and other terms.  
19 Basically, we're exploring the fact that, as testified to,  
20 for instance, by Mr. Hultgren, that there would -- they were  
21 not proposing to indemnify the parties.

22 HEARING OFFICER STUBCHAER: My recollection was that he  
23 stated that he was not opposed to the concept of a fund, but  
24 the amount of the fund was undetermined. And so that is  
25 different than refusing to indemnify.

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01 MS. BRENNER: Mr. Hultgren is not the same person as  
02 Mr. Korslin.

03 HEARING OFFICER STUBCHAER: Proceed.

04 MR. MOSS: Let me just ask a follow-up question. The  
05 issue of whether Delta Wetlands indemnifies the other, from  
06 your standpoint, is still an undecided question; is that  
07 true?

08 MR. KORSLIN: Well, I don't think that it is undecided  
09 as to whether or not it would cause impacts to third  
10 parties, are we going to take the responsibility to make  
11 those most parties hold. The question is: What is the  
12 mechanism for doing that?

13 And I believe, for instance, that some of these things  
14 might actually be covered by general liability insurance  
15 policies that we might carry. We have had extensive  
16 discussions with Central Delta Water Agency about how a fund  
17 might be set up and how it might be used, and how big it  
18 might be.

19 We certainly are willing to stand behind our  
20 obligations and provide some level of comfort, be it through  
21 some actual funding obligation or a letter of credit or  
22 something like that, to stand behind those obligations. We  
23 are not at all opposed to giving some comfort to our  
24 neighbors in the Delta.

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01 MR. MOSS: Would that include the Pacific Gas &  
02 Electric Company facilities on Bacon Island?

03 MR. KORSLIN: Yeah.

04 MR. MOSS: Does this discussion of risk and potential  
05 third party claims that could obviously run into a lot of  
06 money, basically have any bearing on the owner's decision  
07 whether they will construct the project itself, past the  
08 permitting stage?

09 MR. KORSLIN: Sure. It is one of the things you would  
10 consider as part of the overall risk/reward of building the  
11 project.

12 MR. MOSS: Is it fair to say that the investors, like  
13 Kemper, would be more satisfied if Delta Wetlands Project  
14 was sold to DWR or some other governmental agency rather  
15 than going into actual construction?

MS. BRENNER: I am going to object, again. It is

16 beyond the scope of this gentleman's rebuttal testimony. He  
17 is not testifying to any of these types of things. I also  
18 think it is irrelevant.

19 HEARING OFFICER STUBCHAER: Could you rephrase the  
20 question?

21 MR. MOSS: From your standpoint, representing the  
22 lenders and equity owners, would they have a greater level  
23 of comfort after the permitting process if the project was  
24 sold rather than those parties constructing it and operating  
25 it?

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01 MR. KORSLIN: Depends on the price. What we are trying  
02 to do, as a manager of Kemper's assets, is maximize the  
03 value of the assets.

04 In a lot of cases we will take projects -- I think a  
05 good example is some land we might have someplace where we  
06 will buy the land. We will get it zoned. We might sell it  
07 in bulk to someone that will develop the roads and put the  
08 lots in. We might do all of that ourselves. We have gone  
09 so far as to build and sell the homes themselves. At some  
10 point, we decide whether it makes sense for us to stay in a  
11 project or not.

12 In a case like this, when it becomes more efficient for  
13 someone like DWR to own the project than it does for us,  
14 then that seems like a logical point to break off. But if  
15 you never reach that point, we are prepared to build the  
16 project and sell the water ourselves.

17 MR. MOSS: For instance, are the owners prepared to  
18 build and operate the project if PG&E is successful in  
19 asserting its right not to have its gas transmission line  
20 easement on Bacon Island intentionally flooded?

21 MS. BRENNER: This line of questioning is beyond the  
22 scope, Mr. Stubchaer. This issue can be briefed. Mr.  
23 Korslin was brought in for limited purposes. I would like  
24 to keep those purposes in mind and move this hearing to a  
25 close.

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01 MR. MOSS: Mr. Korslin is free to give examples how he  
02 could do it, housing and everything under the sun that he  
03 wants to illustrate, which is fine with me. But if I ask  
04 him a specific here in terms of their decision making  
05 relative to something that is already clearly on the record  
06 and in issue here, then it is objected to. I don't think  
07 that that is necessarily right.

08 HEARING OFFICER STUBCHAER: Ms. Leidigh, do you have  
09 any advice? You want to give me off the record.  
10 Off the record.

11 (Discussion held off the record.)

12 HEARING OFFICER STUBCHAER: Back on the record.

13 We are going to sustain the objections, Mr. Moss. You  
14 can proceed with your questioning, and, please, ask them  
15 more narrowly focused on the rebuttal testimony. This  
16 witness was just on rebuttal, not in case in chief.

17 Please go ahead.

18 MR. MOSS: I have one final couple questions that is  
19 based on his resume, which is in the record.

20 It seems like you presided over the sale of most of the

21 Kemper's real estate homes; is that correct?  
22 MR. KORSLIN: I think presided over would probably be a  
23 little bit of a stretch.  
24 MR. MOSS: Substantially involved in?  
25 MR. KORSLIN: Yes.

2622  
01 MR. MOSS: Did you try to sell your interest in Delta  
02 Wetlands?  
03 MR. KORSLIN: No.  
04 MR. MOSS: Was there that decision because there was no  
05 market or why?  
06 MS. BRENNER: I am going to object, again. This is  
07 beyond the scope of the rebuttal testimony.  
08 HEARING OFFICER STUBCHAER: Sustained.  
09 MR. MOSS: No further questions.  
10 HEARING OFFICER STUBCHAER: We are going to take our  
11 lunch break. After lunch we have cross-examination by CUWA,  
12 Contra Costa, East Bay MUD, and Fish and Game.  
13 We will reconvene at 1:00 p.m.  
14 (Luncheon break taken.)  
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2623  
01 AFTERNOON SESSION  
02 ---oOo---  
03 HEARING OFFICER STUBCHAER: Good afternoon. We will  
04 reconvene the hearing.  
05 The parties work out anything of the appearance of Mr.  
06 Gartrell?  
07 MS. BRENNER: We are attempting to do that. I think  
08 there are a few questions that are going to be answered by  
09 Dr. Gartrell. So because of his availability, the  
10 suggestion, is to go ahead and bring him forward now; not  
11 Dr. Shum, but just Dr. Gartrell in regard to a couple of  
12 questions I have directed at the Fisher Delta Model.  
13 HEARING OFFICER STUBCHAER: Right now?  
14 MS. BRENNER: That is the suggestion.  
15 HEARING OFFICER STUBCHAER: Okay; that is fine. You  
16 folks are going to be excused for a few minutes while we  
17 take care of scheduling problems.  
18 Good afternoon, Dr. Gartrell.  
19 DR. GARTRELL: Good afternoon, Mr. Stubchaer.  
20 MS. BRENNER: If I could just have a few minutes.  
21 HEARING OFFICER STUBCHAER: Ms. Brenner.  
22 ---oOo---  
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01 REBUTTAL CROSS-EXAMINATION OF CONTRA COSTA WATER DISTRICT  
02 BY DELTA WETLANDS PROPERTIES  
03 BY MS. BRENNER

04 MS. BRENNER: Yes. I just have a couple questions for  
05 Dr. Gartrell with regard to the Fisher Delta Model. And  
06 there was a Figure 2-6, which you indicate or one of you, or  
07 Dr. Shum or Dr. Denton, indicated an overestimated salinity  
08 concentration used in Fischer Delta Model.

09 My question is: How does the CCWD's version of the  
10 Fisher Delta Model account for EC or TDS patterns for the  
11 South Delta?

12 DR. GARTRELL: For the EC or TDS in the South Delta,  
13 the Fischer Model is influenced by several factors. One is  
14 the salinity in the San Joaquin River, which is at times a  
15 major influence in the salinity in the San Joaquin is low  
16 through a relationship that relates electrical conductivity  
17 with flow in the river, and season of diversion, whether it  
18 is irrigation season or non irrigation season.

19 The other factor is agricultural drainage, and that is  
20 modeled through data taken from, I think it was, an early  
21 1954 or 1955 study by DWR and some more recent information  
22 with respect to the consumptive use and their relationship  
23 between consumptive use and applied water for drainage.  
24 But it is modeled in a gross sense with a large section of  
25 the South Delta used as an average. And then the other

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01 items that influence it are the degree of salinity intrusion  
02 caused by the relationship either between the tides and  
03 Delta inflows and outflows. And then, particularly, at  
04 periods when the export levels are significantly higher than  
05 the San Joaquin flows is influenced by the amount of water  
06 moving from Sacramento River and the east side streams in to  
07 the Southern Delta.

08 MS. BRENNER: That is the CCWD's version of Fischer  
09 Delta Model?

10 DR. GARTRELL: Correct.

11 MS. BRENNER: That would be the same things that would  
12 be taken into consideration with Dr. List's run of the  
13 Fischer Delta Model?

14 DR. GARTRELL: That's right.

15 MS. BRENNER: It's the same assumptions that are being  
16 used?

17 DR. GARTRELL: The same general assumptions in terms of  
18 what is gone into the model.

19 MS. BRENNER: Isn't it true that at times CCWD finds  
20 very large ag drains effects on chloride levels at its Rock  
21 Slough intake?

22 DR. GARTRELL: Not as much on chloride levels as on  
23 TDS or electrical conductivity. That is one area in the  
24 Fischer Model you need to be careful of because we found  
25 that the chloride to TDS ratio or chloride to EC ratio for

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01 ag drainage is about half of -- in ag drainage is about half  
02 that of seawater. So what we have done in the past is used  
03 generally a conservative level for translating the TDS and  
04 Fischer Model to chlorides, which over estimates that by

05 about a factor of two. That is, in fact, the case, yes, it  
06 is at times influenced by the ag drain, particularly on  
07 Veale Tract.

08 MS. BRENNER: Were the rocks with chloride with and  
09 without ag drainage?

10 DR. GARTRELL: It varies. For example, during the '87  
11 through '92 drought, there are very few instances where ag  
12 drainage could be determined to have a significant effect on  
13 chloride levels in Rock Slough; and our chloride levels  
14 during that drought ranged from low levels in the thirties  
15 to fifties, during periods of high outflows to up and over  
16 250 chlorides.

17 During periods, for example, subsequent to the drought,  
18 the chloride levels have been as high as about 130  
19 chlorides, during periods where it was highly influenced by  
20 the ag drain at Veale Tract. That would be periods when the  
21 outflow is high, our diversions at Rock Slough are low  
22 because it is wintertime and there is a significant amount  
23 of drainage coming off Veale Tract.

24 MS. BRENNER: So, are the levels that you are talking  
25 about, are those just ag drainage levels and chlorides?

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01 DR. GARTRELL: In that period, that would be highly  
02 influenced by drainage. There are other factors in there,  
03 but they're smaller.

04 MS. BRENNER: What I am trying to get at, is some  
05 quantification of what you mean by highly influenced.

06 DR. GARTRELL: It would be, in the absence of that ag  
07 drain, it would probably be in the range of 30 to 70  
08 chlorides.

09 MS. BRENNER: So 30 to 70 chlorides compared to a  
10 hundred --

11 DR. GARTRELL: 130.

12 MS. BRENNER: So there is about a 50 percent higher  
13 chloride level at Rock Slough because of ag drainage than  
14 there would be for seawater intrusion alone?

15 DR. GARTRELL: During those periods, yes. Those are  
16 pretty much restricted to periods that are very wet and  
17 there is a large amount of drainage coming off the island,  
18 and we have reduced our diversions. Similar to the  
19 situation you see in the entire South Delta when the state  
20 and federal pumps have reduced pumping in wintertime when  
21 there is a large amount of water available from  
22 precipitation and a good deal of pumping off the islands,  
23 the ag drainage tends to build up.

24 MS. BRENNER: That is all I have.

25 HEARING OFFICER STUBCHAER: Thank you, Ms. Brenner.

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01 Anyone else want to cross-examine this witness?

02 Staff?

03 Mr. Brown?

04 I just have one brief question. From your last answer  
05 it sounds like the chlorides are better with the pumps  
06 running, export pumps running. Is that pulling in the  
07 Sacramento water rather than just letting the ag drainage  
08 just sit there?

09 DR. GARTRELL: That's correct. In the Southern Delta

10 you see that. When the pumps are completely shut off, it  
11 can accumulate. An example is the winter of 1973; we had at  
12 Rock Slough the highest electrical conductivity  
13 measurements, although the chloride levels weren't  
14 particularly high compared to where they were the summer  
15 before with the Andrus Island break. They got up to 440  
16 chlorides on one day. We had a period of about two months  
17 where the electrical conductivity was well over a thousand.  
18 Out in the Delta, in general, during that period it was in  
19 the 600 to 800 millisiemens per centimeter. The state and  
20 federal pumps were running at very low levels.

21 Subsequent to that period, a lot of the winter is used  
22 for refilling San Louis or moving water further south, and  
23 that has been reduced in the Delta flows.

24 HEARING OFFICER STUBCHAER: I never heard that analysis  
25 before, that phenomenon before. No one has ever mentioned  
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01 the export pumps improving water quality in the Delta  
02 before.

03 DR. GARTRELL: It is also known as the Peripheral  
04 Canal Effect.

05 HEARING OFFICER STUBCHAER: Thank you very much.

06 MR. MADDOW: Our thanks to Delta Wetlands for letting  
07 Dr. Gartrell go out of order.

08 HEARING OFFICER STUBCHAER: Does the Delta Wetlands'  
09 panel wish to resume their seats at the witness table. Next  
10 will be Mr. Roberts, followed by Mr. Maddow.

11 ---oOo---

12 REBUTTAL CROSS-EXAMINATION OF DELTA WETLANDS PROPERTIES  
13 BY CALIFORNIA URBAN WATER AGENCIES  
14 BY MR. ROBERTS

15 MR. ROBERTS: Dr. Brown, am I correct that there were  
16 three Malcom-Pirnie Models? There is a 1991 EPA water  
17 treatment model, a '92 revision, and then a '93 revision  
18 that was requested by Metropolitan Water District?

19 DR. BROWN: I believe there are those three versions.  
20 I don't think that last date is right. The third one was  
21 not available until the end of '94.

22 MR. ROBERTS: '93 or '94.

23 The version used in the EIR is the 1992 version?

24 DR. BROWN: It is the second version. Malcom-Pirnie  
25 changed the first model. It is meant to be used by a plant  
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01 operator who is facing a certain water quality that day and  
02 is maybe adjusting his treatment process to reduce THMs.  
03 The modification was simply changing the model so that it  
04 ran and accepted the time series of monthly inputs for the  
05 same treatment processes and calculated THMs. So, the  
06 results out of the first and the second model are the same.  
07 The second model is simply a version that they created for  
08 the Delta Wetlands' analysis for the State Board that  
09 allowed a time series, 25 years of monthly input values, to  
10 be calculated all at once.

11 MR. ROBERTS: What was the purpose of the 1993  
12 revision, '93 or '94, the third version?

13 DR. BROWN: Well, as I testified, it was '94, which is  
14 fairly important. It was not available at the time that



15 this analysis was being done. And the purpose of that third  
16 revision, which was under contract to Metropolitan Water  
17 District of Southern California, was to revise the equations  
18 used in the model to predict the brominated THMs, or the  
19 THMs are that are formed with relatively high bromide  
20 levels.

21 The data that was used to revise those equations was  
22 provided by Metropolitan and some of the member agencies.  
23 So this was just a revision to the basic equation relating  
24 to DOC, time of treatment, chlorine dose, bromide levels to  
25 the THM species that would be formed in that treated water.

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01 MR. ROBERTS: That 1994 version wasn't used in 1995 EIR?

02 DR. BROWN: The 1994 model was not used in the 1993  
03 analysis that was done for this project.

04 MR. ROBERTS: You testified on rebuttal that your  
05 evaluation was that the results of the second and third  
06 model, the 1994 model, would be substantially the same. So  
07 you don't see any need to revise your analysis of the THM  
08 formation?

09 DR. BROWN: That is right. By comparing the two  
10 models, that is, the equation used in the two models, we  
11 determined that the relative effects of a change in DOC or a  
12 change in bromide, which would be the project impacts that  
13 are being evaluated in the environmental analysis, the  
14 results of those would be substantially the same; and,  
15 therefore, we did not need to revise the 1993 analysis.

16 MR. ROBERTS: Can I ask you to put up this  
17 transparency. This should be Delta Wetlands' 12.

18 Do I have that number right?

19 DR. BROWN: That is right.

20 MR. ROBERTS: We made a transparency from a hard copy  
21 that we were making notes on, so this may look a little  
22 different data, ought to be the same. What you got here,  
23 you're comparing the 1992 or second version of the model  
24 with the 1994 version, which is shown as revised, in bold?

25 DR. BROWN: That is right. Revised refers to the new

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01 equations in the Metropolitan Water District Versions.

02 MR. ROBERTS: You've got in the far left column DOC and  
03 in the top line you've got different bromide values?

04 DR. BROWN: That is right; those are the two axes of  
05 this matrix.

06 MR. ROBERTS: When I look at this, I see substantial  
07 differences in virtually every case. The 1993 revision  
08 gives you greater THM impacts.

09 DR. BROWN: There are distinct differences between the  
10 results predicted by the two models. Let's try.

11 For a DOC of 4, which would be the middle line and for  
12 a bromide of 0.2, the revised equation would be 34.8  
13 micrograms per liter of THM. The model that we used, the  
14 National EPA Model, would give a value of 29.3. So the  
15 revised, because it is reported to better reflect the  
16 bromide effects, gives us a slightly higher THM.

17 However, these are not the differences that we are  
18 concerned with in an impact analysis. The impact analysis  
19 is concerned with moving from one point in the matrix to

20 another. Let's try that.

21 Let's say that the bromide, because the project  
22 increased from 0.2 to 0.4, then we would be moving over one  
23 block of numbers.

24 MR. ROBERTS: 0.2 to 0.4?

25 DR. BROWN: That's right. If we increased the bromide  
2633

01 from 0.2 to 0.4, that might be a project impact that we  
02 would be assessing. What we find is that the revised model  
03 would predict 47.5, or about 12 micrograms more.

04 And the old -- the EPA model would have predicted from  
05 29.3 up to 31.7. So we find that the revised equation has a  
06 greater sensitivity to a change in bromide. So if the  
07 project had large, that is, the Delta Wetlands Project being  
08 evaluated, had large simulated increases in bromide, then  
09 the impacts with this revised equation would have been  
10 larger than the equation that we were using.

11 But if we go in the other direction, let's increase DOC  
12 from 4 to 5, holding the bromide at 0.2, now we are moving  
13 down in this matrix. So the revised model would move from  
14 34.8 up to 42.1. That is an increase of about 7 micrograms  
15 per liter of trihalomethanes.

16 The model that we were using, the EPA general model,  
17 would have gone from 29.3 to 38.7. That is a larger change  
18 in THM, in this case a unit change in DOC. So what turns  
19 out is that since the DOC is the variable that is more  
20 likely to be increased because of the Delta Wetlands  
21 Project, and the sensitivity of THMs resulting from a change  
22 in DOC is reduced by the revised equation, the original EIR  
23 analysis has the greatest potential environmental impacts  
24 already simulated.

25 So, to the extent that there is uncertainty in these  
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01 equations, we are not quite sure what the THMs would be.  
02 More relevant for impact analysis is the sensitivity of the  
03 equation to a change in one of the precursors, either DOC or  
04 bromide.

05 MR. ROBERTS: If either one of those change, you are  
06 going to get an increase in the THMs, right?

07 DR. BROWN: Both equations will give you an increase of  
08 some sort.

09 MR. ROBERTS: But the revised equation will show you a  
10 higher, more accurate increase, won't it?

11 DR. BROWN: For bromide, it will show a higher  
12 increase. For DOC, it will show a lower increase.

13 MR. ROBERTS: But increase?

14 DR. BROWN: An increase, but less of an increase than  
15 the original equations that were used.

16 MR. ROBERTS: But still an increase?

17 DR. BROWN: Yes, still an increase.

18 MR. ROBERTS: Let's go back to the before DOC column  
19 and .4 bromide. Under the existing -- under the analysis  
20 you used, you came up with a 31.7 milligrams per liter. If  
21 we used the revised version, we have a 47.5 milligrams per  
22 liter. Under the existing analysis, then, you would show no  
23 violation of the Stage II, assuming Stage II is adopted.  
24 Using a revised, you would show a violation of Stage II.

25 Don't you think that is a significant difference?

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01 DR. BROWN: No. Because the treatment process that was  
02 simulated, that is incorporated in this example of the  
03 equation, is strict chlorination without any -- it doesn't  
04 have the treatment process changes that we require for  
05 stage, a Stage II. This hypothetical matrix does not say  
06 whether or not the real treatment plant in the future is  
07 going to violate Stage II.

08 MR. ROBERTS: How about Stage I?

09 DR. BROWN: Neither one, in this hypothetical case,  
10 would exceed Stage I. Again, it is not the absolute value  
11 here; it is the change from the no action to the project  
12 conditions, which are really the only numbers used in the  
13 impact analysis.

14 So, I agree that the base case times series will be  
15 different for these two equations, but the relative change  
16 in trihalomethanes caused by an increased DOC was simulated  
17 about right the first time, relative to the revised  
18 equation.

19 MR. ROBERTS: But, again, under every situation in  
20 here, except for the 0 bromide, which I believe you said  
21 cannot occur, the revised version would show you higher THM  
22 levels?

23 DR. BROWN: Would show a higher THM level for the base  
24 series of numbers. But when you went to look at the  
25 increased THM caused by a change in DOC, the revised

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01 equation will actually show a smaller increment caused by  
02 the project.

03 MR. ROBERTS: It still seems to me that using your  
04 earlier version is going to understate impacts. Let's look  
05 at the .4 bromide column, for example.

06 So, .4 bromide and then hold that constant and we go  
07 from 2 down to 6 DOC. Under the version that has been used,  
08 there would be two instances there where a Stage II would be  
09 violated. But under the revised version, it will show three  
10 instances where the Stage II was violated.

11 So, it just seems to me, in using the older version,  
12 you are understating the potential impacts to water quality.  
13 Water utilities are going to have to meet these water  
14 quality standards.

15 DR. BROWN: No, we are not overstating the impacts.  
16 Because the impacts are the relative change from an assumed  
17 no-project or base case. And what I am trying to explain is  
18 that the revised equation actually has a lower response of  
19 THMs to a change in DOC than the original equations. So  
20 that is what our impacts, and we are not trying with these  
21 equations or with the model to predict what Metropolitan's  
22 treatment plant operators will get at their treatment  
23 plant. This is simply an index of the effects of a change  
24 in the precursor delivered to the treatment plant.

25 I am trying to de-emphasize the values in the chart and  
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01 focus on the changes that are likely by the change in water  
02 quality caused by this project.

03 MR. ROBERTS: I can see that. Contrary, I am trying to

04 emphasize the values in here. For example, under the  
05 existing model there are no violations of the current  
06 rules. If you used the revised version, you'd come up with  
07 three violations. The same things under the existing model,  
08 you'd have no violations of the Stage I; under the revised  
09 version, you'd have six violations, if I count right. And I  
10 see a total of 19 violations at Stage II with the revised  
11 model and only 9 using the existing model. It just --

12 The point that this makes, it seems to me, if you use  
13 the revised version of the model in your analysis of  
14 impacts, you are going to get the greater possibility --

15 MS. LEIDIGH: Mr. Roberts, are you asking a question or  
16 making an argument?

17 MR. ROBERTS: Would show a greater possibility,  
18 wouldn't you?

19 MS. LEIDIGH: I think you've already asked him the  
20 same question about three, maybe four times now.

21 MR. ROBERTS: Let me go to the footnote on this table  
22 here. The assumption was that the chlorine dose is .5 times  
23 DOC.

24 Were you here when Mr. Krasner testified that  
25 Metropolitan, for example, the dose is often .75, .8 times  
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01 DOC?

02 DR. BROWN: I don't actually recall that, but I agree  
03 this is just an assumption to create a table to compare the  
04 two. And, of course, if they are using a .8 even a 1  
05 chlorine dose, the higher the chlorine dose the higher  
06 those numbers would be. We might have our whole table  
07 showing what you suggest are violations if we change the  
08 chlorine dose to 1 times the DOC; these numbers will jump up  
09 quite dramatically. So, they are using high of a chlorine  
10 dose in real operations, then they must be doing something  
11 else to counteract that and control the THMs to the current  
12 regulated levels.

13 MR. ROBERTS: Something else, probably at a cost,  
14 though?

15 DR. BROWN: Probably what?

16 MR. ROBERTS: At a cost.

17 DR. BROWN: Very possibly at some cost.

18 MR. ROBERTS: That is all I have, Dr. Brown, and all I  
19 have for the panel, Mr. Stubchaer.

20 HEARING OFFICER STUBCHAER: Thank you.

21 Mr. Maddow, followed by Mr. Etheridge.

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01 REBUTTAL CROSS-EXAMINATION OF DELTA WETLANDS PROPERTIES  
02 BY CONTRA COSTA WATER DISTRICT  
03 BY MR. MADDOW

04 MR. MADDOW: Thank you, Mr. Stubchaer.

05 Just to follow up on the line of questions and answers  
06 that Mr. Roberts took you through just a moment ago, Dr.  
07 Brown. I just want to be sure that I understand the  
08 difference between the absolute values and the change. And,

09 again, your focus on the use of this chart to show change  
10 was in regard to environmental impact analysis. Is that  
11 correct?

12 DR. BROWN: That is right. Where we are considering  
13 this as one possible environmental impact variable.

14 MR. MADDOW: Does this pair of equations, the data from  
15 which is summarized on Table 1 of Delta Wetlands 12, does  
16 that comparison give the regulatory agency any information  
17 about absolute values which might be used from a regulatory  
18 context, for example, in regulating the discharges from the  
19 the Delta Wetlands' islands?

20 DR. BROWN: No. I don't believe this table is of any  
21 help for setting discharge standards.

22 MR. MADDOW: Do the EPA equations and Malcom-Pirnie  
23 work that has been done, does it provide any information on  
24 projections with regard to trihalomethane formation  
25 potential that can be used in a regulatory context?

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01 DR. BROWN: I don't know how EPA might be using it.

02 MR. MADDOW: From a regulatory agency perspective, and,  
03 again, I am just asking you in the context of your expert  
04 testimony on rebuttal, from a regulatory agency context, do  
05 you think that a relative value of trihalomethanes, which  
06 are projected by the two equations, have any significance at  
07 all?

08 DR. BROWN: I have no answer.

09 MR. MADDOW: I would like to ask Dr. List a few  
10 questions about his rebuttal testimony concerning salt mass  
11 flux.

12 I have a cold, Mr. Stubchaer, and I can feel my voice  
13 kind of starting to fade out.

14 HEARING OFFICER STUBCHAER: We have some water.

15 MR. MADDOW: I think I can muddle through here.

16 Dr. List, you testified that the drainage assumptions  
17 used in the Fisher Delta Model resulted in about one-half  
18 the salt mass flux that would have resulted using a higher  
19 estimated drainage flow rate and lower measured drainage  
20 salinity. Is that correct?

21 DR. LIST: That's correct.

22 MR. MADDOW: Because of that, as I understand it, you  
23 concluded that the Fischer Delta Model simulation, which you  
24 did, would underestimate the improvement in Delta water  
25 quality due to removing drainage. Is that correct?

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01 DR. LIST: That is correct.

02 MR. MADDOW: Dr. List, didn't you base this conclusion  
03 on the mass flux of salt to the Delta being lower in the  
04 Fisher Delta Model than your estimate using other data on  
05 the salinity of flow rate of drainage from Bacon Island?

06 DR. LIST: That's correct.

07 MR. MADDOW: In those cases where the salinity  
08 concentration in the drainage from the island was less than  
09 channel salinity, even if the mass flux was high, the salt  
10 concentration in the channel would decrease rather than  
11 increase, wouldn't it?

12 DR. LIST: That is a very complicated situation.  
13 Because it may be locally within the channel, but not within

14 the Delta itself because of the potential for a subsequent  
15 mixing out of the channel.

16 It's the old question of whether you are addressing an  
17 NPDES permit or whether you are addressing an overall  
18 impact. From an NPDES point of view, you're concerned with  
19 the immediate environment. From the Delta Wetlands' point  
20 of view, we are interested in overall impact on the Delta,  
21 not the local concentrations.

22 MR. MADDOW: If the channel salinity and the drainage  
23 salinity are the same, then the discharge flow rate won't  
24 change the Delta channel salinity, will it?

25 DR. LIST: Not locally, but may well change the  
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01 salinity elsewhere in the Delta because of the diluting  
02 effect of the volume of water that comes out of the  
03 channel. So you could, in fact, reduce -- improve the  
04 quality of water elsewhere in the Delta.

05 MR. MADDOW: So, I take it, Dr. List, it is not just  
06 the salt mass flux that determines the impact on salinity in  
07 the channel, it is also the relative difference in salinity  
08 between channel water and drainage water; is that correct?

09 DR. LIST: It is the total mass flux of salt. What the  
10 project does, in effect, is take water out of Delta, put it  
11 back in the Delta, take salt out of the Delta and put it  
12 back in the water in the Delta. It does not create any salt  
13 in the process. So the net effect of the project is just to  
14 move the water from one period of year to a different period  
15 of year. As such, the overall impact on the Delta, which is  
16 in balance, has to sum essentially zero.

17 So, if you make an improvement at one time of the year,  
18 you are going to make a degradation at another time of the  
19 year. So that the purpose of the Water Board here is to  
20 make a judgment of whether overall benefits that approve the  
21 project is worth that shift from one time of the year.

22 I might point out that the net effect of the project,  
23 this effect, as I pointed out in my original testimony, is  
24 to degrade the water quality at the time of the year when it  
25 is less important; in other words, when salinity is very low  
2643

01 and improve the quality of the water when salinities are  
02 high.

03 MR. MADDOW: One final question, Dr. List, if the  
04 actual drainage and channel salinity are about the same, the  
05 salinity of the actual drain and the channel salinity are  
06 about the same, and if the Fischer Delta Model is assumed a  
07 much higher salinity for the drainage, wouldn't the model  
08 simulate water quality improvements that really don't exist  
09 when all the drainage is removed?

10 DR. LIST: No, I don't believe so.

11 MR. MADDOW: I have some questions for Dr. Brown  
12 regarding DWRSIM.

13 Dr. Brown, I wanted to follow up on some of your  
14 rebuttal testimony regarding feasibility of using DWRSIM to  
15 simulate Delta Wetlands' operations. I believe you  
16 testified in rebuttal that DWRSIM does not include an  
17 in-Delta storage facility, and, therefore, you could not  
18 reoperate the operation of Delta Wetlands in conjunction

19 with the existing upstream reservoirs and Delta export  
20 pumps. Is that correct?

21 DR. BROWN: That is right.

22 MR. MADDOW: I believe that rebuttal testimony was in  
23 response to other party's testimony regarding the suggested  
24 need to reoperate under DWRSIM in order to account for Delta  
25 Wetlands' operations. I want to go into that just a little  
2644 bit and to focus on your rebuttal testimony.

01 After your simulation of Delta Wetlands' operations  
02 using the Delta SOS, did you check the flows in the storage  
03 at the times of release against the capacities in the  
04 California Aqueduct at San Luis Reservoir to confirm that  
05 the water that Delta Wetlands would release would have  
06 someplace to go?

07 DR. BROWN: No. I testified in my direct testimony  
08 that we were not checking whether there was some place to  
09 put the water potentially available from this new project.  
10 But that we were checking the actual export capacity; that  
11 is, there was pump and canal capacity to deliver it to a  
12 undefined, what do you call that person, the person  
13 receiving the water, but we are not --

14 MR. MADDOW: The buyer?

15 DR. BROWN: The buyer. But we are not checking because  
16 we do not know who those buyers might be in the future.

17 MR. MADDOW: In regard to your inability to fully model  
18 the operations to do the reoperations because you could not  
19 fully model the operations of the Delta Wetlands Project, I  
20 was wondering whether or not you could have added the Delta  
21 Wetlands' diversions by adjusting the Delta consumptive use  
22 file or by simply adding a new node to the Delta Wetlands --  
23 excuse me, to the DWRSIM model in order to simulate Delta  
24 Wetlands' diversions?  
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01 DR. BROWN: There is no need to do that. Because the  
02 way we are simulating using the Delta SOS Model, we are  
03 checking to be sure that the operations that we are  
04 simulating for the new project diversions onto reservoir  
05 storage deliveries off of the storage to the pumps when all  
06 of the rules that we have talked about are being met. We  
07 are checking that those operations would not, in any way,  
08 interfere with the simulated operations of the state and  
09 federal projects, nor with any senior water rights. So that  
10 we already know ahead of time that this additional  
11 incremental operation of a new project would not interfere  
12 and, therefore, there is no need to reoperate the existing  
13 projects. They have already operated to their maximum under  
14 the simulated conditions in the model. And so there is no  
15 need to add the diversion node, as you suggested, to the  
16 original model. We are getting the same results using the  
17 two-step process of using the DWRSIM results and adding to  
18 them this simulated operation of a new project that cannot  
19 interfere with the already simulated project operations.

20 MR. MADDOW: Do you recall meetings between yourself  
21 and others from the Delta Wetlands' team, Mr. Winther, Mr.  
22 Forkel, and representatives of the Contra Costa Water  
23 District, in which this particular type of adjustment of the

24 DWRSIM model was discussed? I am specifically referring to  
25 a meeting in June of 1991 in which there was a discussion of  
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01 adding a special Delta Wetlands' mode or by adjusting the  
02 Delta consumptive use file?

03 DR. BROWN: There were, and probably remain, many ideas  
04 of how the project might be simulated using the existing or  
05 modified models. So, I am sure that was one of the ideas  
06 early on. That was not the methods selected by State Board  
07 staff at the Corps to actually implement this environmental  
08 assessment.

09 MR. MADDOW: Dr. Brown, I want to talk for just a  
10 moment about some of your testimony regarding evaporative  
11 losses, your testimony on that.

12 I believe you testified on rebuttal that the long-term  
13 average for both June and July is on the order of 2,000  
14 acre-feet for the diversions to refill evaporative losses  
15 as compared to approximately 15 to 20,000 acre-feet for  
16 existing agricultural diversions in June and July,  
17 respectively. Is that correct?

18 DR. BROWN: That's right.

19 MR. MADDOW: As I understand your testimony, your  
20 estimate of 2,000 acre-feet does not account for any water  
21 diverted onto habitat islands during those months or any  
22 water needed to maintain the one foot minimum depth in the  
23 reservoir islands, which has been discussed in earlier Delta  
24 Wetlands' testimony. Is that correct?

25 DR. BROWN: That would be right. That 2,000 is simply  
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01 the amount of diversions during those two months that are  
02 simulated under the new water right being applied for that  
03 would meet all of rules that the new water right is subject  
04 to; that is, water quality control plan objectives and the  
05 final operating criteria, which are the ESA additional  
06 criteria; and 2,000 is the average over the 70 years for  
07 both, what are those months, June and July, I believe, and  
08 does not include the water used on the habitat islands.

09 MR. MADDOW: In Table A1-8 of the Draft EIR to which  
10 you referred in your rebuttal testimony, do you recall the  
11 data that were provided for the amount of evaporation that  
12 can be expected on the Delta Wetlands' islands in the months  
13 of June, July, and August?

14 DR. BROWN: What those numbers are? I don't have them  
15 without looking at the table.

16 MR. MADDOW: Again, you have the EIR in front of you on  
17 the table there?

18 DR. BROWN: I actually have an overhead. Are you going  
19 to be asking about the numbers?

20 MR. MADDOW: Yes. If you do have an overhead, that  
21 would be convenient. I just have a couple of questions  
22 about it.

23 Directing your attention to the line in the lower half  
24 of this chart, which is Table A1-8 from the Draft EIR, there  
25 is a line that is entitled Water Evaporation in Inches.

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01 Do you see that, Dr. Brown?

02 DR. BROWN: Right. Are you looking under the -- I am



03 with you.

04 MR. MADDOW: In the lower half of the chart, it is the  
05 fifth line from the subhead.

06 DR. BROWN: Yes.

07 MR. MADDOW: And across the top of the chart are the  
08 months. Could you read in the line concerning water  
09 evaporation inches, the entries for the months of June,  
10 July, and August, please.

11 DR. BROWN: June is 7.9 inches. July is 9 inches, and  
12 August is 8 inches.

13 MR. MADDOW: Dr. Brown, if 9 inches is approximately  
14 three-quarters of one foot, I wonder if you could do a  
15 quick mathematical calculation in your head as to the amount  
16 of evaporation that might be experienced in a 5,000 acre  
17 partially flooded island in the month of July if the  
18 evaporation rate is nine inches.

19 DR. BROWN: 3,750.

20 MR. MADDOW: Because it is 3,750, I guess I am a little  
21 confused as to your testimony that the long-term average for  
22 both June and July is on the order of 2,000 acre-feet for  
23 diversions to refill evaporative losses. Perhaps I should  
24 ask it in the form of a question as opposed to a statement.

25 I apologize to the Hearing Officer for launching into  
2649 it that way.

02 Wouldn't that 2,000 acre-foot value be increased to a  
03 number closer to the 15 or 20,000 acre-feet under existing  
04 agricultural operations if anything approximating the 9  
05 inch evaporation actually occurred?

06 DR. BROWN: If you were allowed to refill all of the  
07 water lost from the reservoir islands to evaporation, yes.  
08 The amount of water that would then be diverted to refill  
09 that total lost water would be on the order of 35,000  
10 acre-feet.

11 However, what I am simulating is only the diversions  
12 allowable under the new water right being applied for; and  
13 because the rules are quite restrictive in the months when  
14 this evaporative refilling is needed, beginning in May,  
15 June, July, and August, there is rarely opportunity under  
16 the new water right to satisfy this evaporative loss and  
17 refill. Therefore, only an average 2,000 amount of this  
18 much greater evaporative loss target, you might call it, are  
19 allowed under the new water right.

20 MR. MADDOW: If, in fact, the Delta Wetlands' reservoir  
21 islands are being operated to maintain the one foot storage  
22 elevation that was testified to earlier, wouldn't it be  
23 necessary to use water from some other source in order to  
24 counteract evaporation?

25 DR. BROWN: Well, we would have to agree on how the  
2650 one foot is being maintained, how much water is being  
01 syphoned on and passed through.

02 MR. MADDOW: To the extent that that type of operation  
03 is occurring, wouldn't that reduce the differential between  
04 current operations and the agricultural diversions that  
05 would be foregone if the project was implemented?

06 DR. BROWN: Well, that operation -- I guess all I can  
07

08 say is that that operation, that potential operation, was  
09 not simulated as a part of our planning analysis for this  
10 project.

11 MR. MADDOW: I understand. Thank you Dr. Brown.

12 I have a few questions for Mr. Hultgren.

13 I am confused about the number of interceptor wells  
14 that you believe Delta Wetlands will need, Mr. Hultgren. As  
15 I understood your rebuttal Exhibit 62, on Page 1 you said  
16 there would be a hundred plus wells. Is that correct?

17 MR. HULTGREN: Let's check. Should not be true. Where  
18 did you see this?

19 MR. MADDOW: On Page 1 of Exhibit 62.

20 MR. HULTGREN: I haven't found it yet, but I am pretty  
21 sure you are referring to of a hundred plus wells, those are  
22 monitoring wells, not pump wells.

23 MR. MADDOW: So, in the area a hundred plus monitoring  
24 wells?

25 MR. HULTGREN: On neighboring islands. Yeah, that's

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01 what that is.

02 MR. MADDOW: Then on Page 2 at the bottom of the page,  
03 as I understand it, Mr. Hultgren, it is your rebuttal  
04 testimony that you would be putting interceptor wells in all  
05 areas where seepage is expected to be a significant concern  
06 prior to commencement of filling. Is that correct?

07 MR. HULTGREN: Correct.

08 MR. MADDOW: How many wells would that be?

09 MR. HULTGREN: Our guess was in the range of 8 or 900.  
10 Basically covered about 20 miles of levee, I believe. That  
11 is shown on the exhibit in the Draft EIR.

12 MR. MADDOW: 800 to 900 wells for 20 miles of island  
13 perimeter; is that correct?

14 MR. HULTGREN: I believe so.

15 MR. MADDOW: Will the entire Webb Tract perimeter levee  
16 require this type of well?

17 MR. HULTGREN: No.

18 MR. MADDOW: How many wells would it be, then? Does  
19 that reduce your 800 to 900 estimate?

20 MR. HULTGREN: No. The 8 to 900 is my estimate.

21 MR. MADDOW: Including those portions of Webb Tract  
22 which would have some wells?

23 MR. HULTGREN: Correct.

24 MR. MADDOW: So, the total number of wells that would  
25 be necessary in order to accomplish the seepage control

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01 function, as I understand it, is between 800 and 900  
02 interceptor wells and approximately 100 or a hundred plus  
03 monitoring wells; is that correct?

04 MR. HULTGREN: Definitely more than a hundred  
05 monitoring wells. The purpose of that 100 number was to  
06 simple create image that there were lots of wells,  
07 monitoring wells. I didn't bother to count them when  
08 writing my rebuttal testimony.

09 MR. MADDOW: I am interested in the amount of water  
10 each of the 8 to 900 interceptor wells is expected to pump.  
11 As I understand your rebuttal testimony, that you would get  
12 something on the order of 15 acre-feet per day of

13 interceptor well water from Bacon Island, which would pass  
14 through peat soil; is that correct?

15 MR. HULTGREN: Yes.

16 MR. MADDOW: That is based upon an assumption that 85  
17 to 90 percent of the reservoir islands is peat material,  
18 correct?

19 MR. HULTGREN: Not just that. How we did that analysis  
20 is we actually made an assumption for this analysis that the  
21 whole island was blanketed with peaty soils for the Bacon  
22 Island analysis. Then assumed that certain area of borrow  
23 site which would have, by definition, borrowed the peat  
24 soils and be removed from there and be exposing the sand.  
25 And then we'd have a lot of recharge going in through that

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01 sand. That is a portion of the recharge, and the balance of  
02 the recharge is coming through the peat soils. So that a  
03 number of acre-feet per day for Bacon Island was based on  
04 assuming whatever is percolating through the soils that were  
05 not part of the borrow area. So, in fact, it is overstating  
06 it slightly.

07 MR. MADDOW: I am not quite sure I know how to  
08 reconstruct those calculations, Mr. Hultgren, unless you  
09 tell us how much water those wells are pumping.

10 MR. HULTGREN: I don't have that in front of me. What  
11 we did was a model where we did -- we computed the total  
12 water being discharged from wells. But the only number I  
13 reported here was the number that is going through the peat  
14 soils. But I believe for Bacon Island it was a fairly high  
15 percentage. I don't straight recall that, but this was a  
16 number that was computed.

17 MR. MADDOW: Can you give us some estimate of how much  
18 water each interceptor well would pump in a rate per minute  
19 or some other commonly used figure?

20 MR. HULTGREN: I don't have that number in front of  
21 me. It was not a large number. I think it is probably a  
22 smaller number than the 20 GPM that was thrown out earlier  
23 in an example. So, the average borrow area would be further  
24 away. But there will be some wells that pump a lot faster  
25 because of some sand close to them, to the levees.

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01 MR. MADDOW: When you've just been meaning borrow  
02 areas, Mr. Hultgren, are we to assume that you are talking  
03 about borrow areas for the material used for the levee  
04 bolstering, and those borrow areas would be within those  
05 reservoir islands?

06 MR. HULTGREN: Correct.

07 MR. MADDOW: Your rebuttal testimony says that this  
08 seepage control method is a proven method; is that correct?

09 MR. HULTGREN: Yes.

10 MR. MADDOW: Can you tell us of an example where that  
11 technique is in permanent operation?

12 MR. HULTGREN: If permanent means running all the time,  
13 I'll --

14 MR. MADDOW: Let me say, to bracket the question, why  
15 don't we say running on a pattern that would be similar to  
16 that which is expected for the Delta Wetlands' reservoir  
17 islands.

18 MR. HULTGREN: The range of concept that comes to mind,  
19 I think, they were addressed in the direct. One concept is  
20 along on Mississippi/Missouri Rivers where relief wells are  
21 used for flood conditions to control the rising groundwater  
22 table when these rivers rise. There are numerous wells  
23 along the line of wells which would correlate somewhat to  
24 what we are doing.

25 In terms of wells that produce for a long time, I think  
2655 you can't get away from the image of a water well that  
01 supplies cities. They run near constant, and they provide  
02 water, and they lower the water table.

03 On large excavations when I was involved with the  
04 early part where the Montgomery Strip station was there when  
05 we were drilling the drinking water wells for that. I was a  
06 young kid working night shifts. Interesting event in  
07 downtown San Francisco, by the way. Those wells ran for, I  
08 think, for two or three years. I worked the summer on that  
09 project a long time.

11 MR. MADDOW: Are there examples you can give us where 8  
12 to 900 wells would be constructed on the crown of the dam  
13 that is containing the water?

14 MR. HULTGREN: No.

15 MR. MADDOW: Can you give us an example of water  
16 containment levees like those you are proposing for Webb and  
17 Bacon which has received approval from the Division of  
18 Safety of Dams, water containment levees like those you are  
19 proposing?

20 MR. HULTGREN: No.

21 MR. MADDOW: This morning you said that early in your  
22 engagement by Delta Wetlands there were a number of schemes.  
23 I won't use your term to characterize them, but I think you  
24 will remember what I am talking about, which you proposed.  
25 Was one of those schemes a setback levee?

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01 MR. HULTGREN: There was a concept of a setback levee  
02 for the original project, not Delta Wetlands' idea. But I  
03 think we were sitting down and drawing ideas. When I was  
04 first involved in the project, we had large beach slopes.  
05 And the ideas, we would have habitat on these islands as  
06 opposed to having separate islands. So, I put together a  
07 concept in my own mind, penciling together a levee further  
08 out in the island interior, and then having a large wetland  
09 habitat between the two levees. But it wasn't practical.  
10 It was much more practical -- the project has evolved in a  
11 much more practical way. You know, it's been ten years. I  
12 have had a lot of different schemes. I don't think I even  
13 discussed that with John, with my client.

14 MR. MADDOW: If it should develop that the Division of  
15 Safety of Dams, for some reason, is unwilling or unable to  
16 approve storage to elevation plus six, using the system you  
17 have designed to date, would it be your opinion that the  
18 next best alternative would be a setback levee?

19 MR. HULTGREN: That would be in close negotiation and  
20 cooperation with the DSOD on what they would want and what  
21 they consider prudent and appropriate for this site. I  
22 would doubt that they would be that conservative. They are

23 a very conservative organization. But I believe -- to the  
24 extent their hands are tied by law, I don't know. I think  
25 that rational, it can be done with existing levees. The

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01 threat to public safety just isn't there.

02 MR. MADDOW: Have you done any analysis of the  
03 alternative of the setback levee, Mr. Hultgren?

04 MR. HULTGREN: No.

05 MR. MADDOW: I have a few questions for Mr. Korslin and  
06 he is the last member of the panel for whom I have  
07 questions.

08 Good afternoon, Mr. Korslin.

09 MR. KORSLIN: Good afternoon.

10 MR. MADDOW: In listening to your discussion on  
11 rebuttal, your testimony on rebuttal, and your discussions  
12 with other attorneys and on cross-examination this morning,  
13 I found myself wondering whether you anticipate that --  
14 excuse me, I said you, that the lenders whom you represent  
15 anticipate selling the project or selling the water?

16 MR. KORSLIN: And what was the question?

17 MR. MADDOW: I wonder whether you can tell us whether  
18 the lenders anticipate that the outcome of their efforts  
19 here would be to sell the project as a development project  
20 as you described where sometimes you sell lots and sometimes  
21 you sell houses. Here, are you going to sell lots, sell the  
22 project, or are you going to sell water?

23 MS. BRENNER: I am going to object on two grounds.  
24 One, it is beyond the scope of the rebuttal; and, two, it  
25 has been asked and answered.

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01 HEARING OFFICER STUBCHAER: I will sustain on the  
02 second ground; it was asked and answered this morning.

03 MR. MADDOW: I guess I have to go read the transcript  
04 to understand it.

05 In your rebuttal testimony on July 31st, Mr. Korslin,  
06 you talked about basic economic principals telling us that  
07 the marginal unit price of Delta Wetlands' water will rise  
08 as the yield goes down. Do you recall that testimony?

09 MR. KORSLIN: Yes.

10 MR. MADDOW: Can you tell us the acre-foot, per  
11 acre-feet price for which Kemper and Lumbermen's expect to  
12 sell this water?

13 MR. KORSLIN: No.

14 MR. MADDOW: Can you tell us to whom they expect to  
15 sell the water at this time?

16 MR. KORSLIN: No.

17 MR. MADDOW: You talk in your rebuttal testimony about  
18 taking into account, your lenders taking into account, the  
19 expected value of the Delta Wetlands' water, and I am trying  
20 to understand that concept from the standpoint of your  
21 discussion of economic feasibility on rebuttal. In  
22 particular, I was wondering whether, in determining the  
23 expected value, you take into account whether the water  
24 would be sold to municipal/industrial water agencies as  
25 opposed to being sold for agricultural purposes or for some

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01 other beneficial use?

02 MR. KORSLIN: Well, I think that what we have always  
03 tried to do is we've tried to monitor the transactions that  
04 do occur throughout California for water transfers in both  
05 long-term and short-term; and a lot of, I think, our pricing  
06 expectations are dependent on how those transactions would  
07 relate to water that is actually delivered as close to the  
08 pumps as ours is as opposed to water that might be sold by a  
09 farmer that is upstream of the Delta and out of the Delta or  
10 some other entity.

11 MR. MADDOW: You talked on rebuttal the relative risk  
12 of the permitting process; is that correct?

13 MR. KORSLIN: Yes.

14 MR. MADDOW: You have talked about the lending agency's  
15 interest in seeing a permit issued by this Board. Is that  
16 correct?

17 MR. KORSLIN: Yes.

18 MR. MADDOW: Can you tell us when you expect that to  
19 happen?

20 MR. KORSLIN: You know, they ask me the same thing,  
21 the investment committee. What I have always said is I  
22 expect it to happen within the next year or so, but I've  
23 been saying that for last six or seven years.

24 MR. MADDOW: Have you investigated the time that can  
25 elapse between the conclusion of a water rights hearing on a  
2660 complex matter and the issuance of a decision?

01 MR. KORSLIN: We've had some discussions with the Board  
02 Members, actually the Board staff, about their expectations  
03 of timing between when the hearing is over and how long it  
04 might take to do the actual permit.

05 MR. MADDOW: From the perspective of your advice to  
06 Kemper and Lumbermen's, can you tell us what time delay you  
07 estimated?

08 MR. KORSLIN: We estimated it would take about six  
09 months.

10 MR. MADDOW: Six months from the conclusion of the  
11 hearing until the State Board issues the water rights  
12 permit?

13 MR. KORSLIN: Yes.

14 MR. MADDOW: Would a significant delay beyond six  
15 months affect the Kemper and Lumbermen's view of the project  
16 feasibility?

17 MR. KORSLIN: Yes.

18 MR. MADDOW: If I told you that a water rights hearing  
19 of approximately the same length of this, as this one, in  
20 perhaps a similar degree of complexity, a hearing that was  
21 conducted in 1992, the Board has not issued a decision,  
22 would that surprise you?

23 MR. KORSLIN: No.

24 MR. MADDOW: You testified 154,000 acre-foot yield  
25  
2661 number was the "last yield reduction" which Kemper and  
01 Lumbermen's would agree to; is that correct?

02 MR. KORSLIN: I am not sure if that is exactly what I  
03 said. If you're reading from the transcript, I will take  
04 your word for it.

05 MR. MADDOW: I believe I read it from the transcript a  
06

07 few days ago, Mr. Korslin. Let me check. I think I can  
08 find it.

09 I am reading from Page 27 of the transcript of July 31  
10 at Lines 9 through 10:

11 And their directive to us at this time was  
12 that this was the last yield reduction that  
13 they would agree to it. (Reading.)

14 Do you recall that testimony, Mr. Korslin?

15 MR. KORSLIN: Yes.

16 MR. MADDOW: Have you heard anything in this hearing,  
17 to date, which has caused you to infer that the Delta  
18 Wetlands Project yield could raise above 154,000 acre-feet  
19 of average annual yield?

20 MR. KORSLIN: Well, I think that, first of all, that  
21 might be a bit of a misdirected question. This 154,000  
22 acre-feet of average annual yield calculated on a monthly  
23 basis is a calculation that we have been doing, really,  
24 since we started the project. I think it is more of an  
25 index number than an actual -- what the actual average

2662  
01 annual yield would be.

02 MR. MADDOW: I understand.

03 MR. KORSLIN: We believe, and I think as Dave Forkel  
04 testified extensively, that there are things that could make  
05 the actual yield higher than that and things that could make  
06 the yield lower. We felt, coming into the hearing that -- I  
07 don't think I've heard anything that really changed my  
08 perspective on that.

09 MR. MADDOW: It is your testimony that you have heard  
10 things in the hearing that would cause you infer that the  
11 154,000 acre-foot index number to which you just testified,  
12 could in fact underestimate what the ultimate index number  
13 would show. Is that correct? You think it can go up --

14 MR. KORSLIN: There should be an ultimate index number.  
15 There should be an ultimate actual yield.

16 MR. MADDOW: So, it is your testimony that you think  
17 it could be higher than your current index number?

18 MR. KORSLIN: Yes.

19 MR. MADDOW: I believe I heard you testify and respond  
20 to a cross-examination question this morning about water  
21 storage elevation -- excuse me, water storage to elevation  
22 plus four. Do you recall that?

23 MR. KORSLIN: Yes.

24 MR. MADDOW: If, in fact, the project is only permitted  
25 from the standpoint of dam safety to store water up to

2663  
01 elevation plus four, have Kemper and Lumbermen's evaluated  
02 that reduction in storage capacity which would result?

03 MR. KORSLIN: No.

04 MR. MADDOW: Do you believe a storage capacity  
05 reduction would result?

06 MR. KORSLIN: Yes.

07 MR. MADDOW: Do you believe that that would have an  
08 impact on project yield?

09 MR. KORSLIN: Yes.

10 MR. MADDOW: I was interested in the reaction of  
11 yourself, as the representative of the lenders, to the

12 testimony about such things as interceptor well efficiency  
13 by other rebuttal witnesses presented by Delta Wetlands.

14 If the interceptor wells do not function efficiently,  
15 would that have an effect on project yield as you describe  
16 it in your testimony?

17 MS. BRENNER: I object. This goes beyond the scope of  
18 rebuttal. You are asking him about the interceptor wells.  
19 I don't think he testified anything with regard to  
20 interceptor wells. So --

21 HEARING OFFICER STUBCHAER: Was the question on his  
22 understanding of the effect on efficiency on yield?

23 MR. MADDOW: The sole reason this gentleman testified,  
24 as I understand it, is to tell us, "Yes, there is a lender  
25 out there, and this lender has looked at this index number  
2664  
01 of 154,000 acre-feet of yield as the principal criteria in  
02 determining whether or not to continue funding this project.

03 There are a number of issues that have been raised  
04 during the testimony by others, I agree, that may have a  
05 bearing on that yield. I think that we have the right to  
06 inquire into the sensitivity analysis that can be done  
07 around that 154,000 acre-feet, given his testimony on  
08 rebuttal.

09 HEARING OFFICER STUBCHAER: I will overrule the  
10 objection with the understanding that you are asking of his  
11 understanding, not the technical details.

12 MR. MADDOW: I was not asking the technical details. I  
13 wanted to know whether, from the standpoint of Kemper and  
14 Lumbermen's, questions about the efficiency about the  
15 functioning of these interceptor wells could have a bearing  
16 on project yield?

17 MS. BRENNER: Function of the efficiency?

18 MR. MADDOW: I'm sorry. The efficiency of the  
19 functioning -- pardon me, Ms. Brenner, I think that is the  
20 antihistamine talking. The efficiency of the functioning of  
21 the interceptor wells.

22 And, Mr. Korslin, my specific question was whether,  
23 from the standpoint of Kemper and Lumbermen's, that issue  
24 could have a bearing on project yield?

25 MR. KORSLIN: To tell you the truth, I really don't  
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01 understand the question. Are you asking me if the  
02 interceptor wells don't work, is that going to impact the  
03 yield or --

04 MR. MADDOW: That is the question.

05 MR. KORSLIN: If they don't work, meaning that they  
06 don't reduce the water level and so that there is seepage on  
07 another island, then what?

08 MR. MADDOW: I'd like you to tell us.

09 MR. KORSLIN: I think --

10 MR. MADDOW: From the perspective of Kemper and  
11 Lumbermen's, then what?

12 MR. KORSLIN: That is kind of like asking me if you  
13 build a 50-story building and you don't expect it to get  
14 blown down, but it does get blown down, then what? I think  
15 that we have designed the thing so that we don't expect that  
16 to happen. And when we have designed it to a level of



17 certainty, that we don't anticipate that happening.

18 Now if some -- if what you are talking about to me  
19 would be a rather infinitesimal risk, in which case we take  
20 those -- that is a calculated risk we take when we invest in  
21 the project and build it. So, if something like that did  
22 happen, we would have to take some type of corrective action  
23 to get the seepage out of the neighboring islands fields.

24 MR. MADDOW: Still focusing on the project yield  
25 consideration, Mr. Korslin, I believe you testified that  
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01 Kemper and Lumbermen's consider average annual yield to be  
02 the most important, measurable objective factor that affects  
03 economic feasibility of the Delta Wetlands Project. Is that  
04 correct?

05 MR. KORSLIN: Yes.

06 MR. MADDOW: Have Kemper and Lumbermen's reviewed, with  
07 regard to that project yield consideration, have they  
08 reviewed the stipulations Delta Wetlands entered into with  
09 the Bureau of Reclamation and the Department of Water  
10 Resources?

11 MR. KORSLIN: They have not reviewed them directly. I  
12 have.

13 MR. MADDOW: Can you tell us whether you believe that  
14 there is the potential for your having entered into those  
15 stipulations and being subordinated to the various measures  
16 that may have an impact on the state and federal project,  
17 that that could have a bearing on the project yield?

18 MR. KORSLIN: I think I would put those impacts in sort  
19 of the same bag with all of the other qualitative things  
20 that we need to consider along with the model number that we  
21 got.

22 MR. MADDOW: I think I will stop there, and thank you  
23 very much, Mr. Korslin.

24 Thank you, Mr. Stubchaer.

25 HEARING OFFICER STUBCHAER: Before we proceed with the  
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01 cross-examination this panel, I would like to ask Fish and  
02 Game, have they reached conclusions on their objections to  
03 Mr. Shaul's testimony?

04 MS. MURRAY: What we have agreed to do with Delta  
05 Wetlands is to -- we sent Jim Starr back to Stockton, and we  
06 are hoping Mr. Shaul will go back to his office this  
07 afternoon and that the two will run the numbers one more  
08 time and come to an agreement tonight on those numbers. And  
09 then Jim is prepared to work late and redo Figure 7 and 12  
10 and some other testimony in our Exhibit 5 that might be, but  
11 right now we don't know, might be different, and that we  
12 would revisit this tomorrow to see how successful they were  
13 this evening and come back to it tomorrow.

14 MR. NELSON: I would just like to add that what we are  
15 doing is that they have discussed the error that Mr. Shaul  
16 was talking about. Mr. Shaul would run and make his runs on  
17 this would be introduced as part of that outline that we  
18 had. So we have an actual graph based upon the outlines.

19 So Mr. Starr would run -- they would make sure they are  
20 both on the same page. I believe at that time Mr. Shaul --  
21 we would like to have the opportunity to have Mr. Shaul

22 explain what he did tomorrow morning when has that chart  
23 ready.

24 MS. MURRAY: Can I just clarify, that what we asking  
25 for is monthly data, not average annual over 70 years, that  
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01 they were both to come up with the monthly.

02 HEARING OFFICER STUBCHAER: Thank you. That sounds  
03 like a very reasonable approach.

04 MS. MURRAY: Can I ask one other thing? If we are not  
05 able to come up with all the data and the new figures by  
06 tomorrow, and the new tables for DFG-5, we would like to  
07 leave the hearing record open to get those new tables in, in  
08 case we have one person that is worried about having to stay  
09 up till midnight when she's already doing a lot of other  
10 things.

11 HEARING OFFICER STUBCHAER: I think that is a  
12 reasonable request. I take it -- I beg pardon?

13 MS. MURRAY: There are potential differences. We don't  
14 know right now.

15 HEARING OFFICER STUBCHAER: As far as the Hearing  
16 Officer is concerned, Mr. Shaul does not need to remain  
17 here. If you want to let him go back to his office and get  
18 to work --

19 MR. NELSON: I assume any cross-examination of Mr.  
20 Shaul would occur tomorrow by any parties?

21 HEARING OFFICER STUBCHAER: Understood.  
22 Mr. Etheridge.

23 ---oOo---

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01 REBUTTAL CROSS-EXAMINATION OF DELTA WETLANDS PROPERTIES  
02 BY EAST BAY MUNICIPAL UTILITY DISTRICT  
03 BY MR. ETHERIDGE

04 MR. ETHERIDGE: Thank you, Mr. Stubchaer.

05 For the record, my name is Fred Etheridge on behalf of  
06 East Bay Municipal Utility District.

07 I have a few questions for Mr. Hultgren. Before I do,  
08 just a very brief administrative matter, Mr. Stubchaer.

09 Similar to PG&E, East Bay MUD had no new exhibits and  
10 no changes to its exhibit list. So we did not mail a new  
11 list out. The exhibit list and exhibits that we submitted  
12 in early June will stand for East Bay MUD's submissions.

13 HEARING OFFICER STUBCHAER: Thank you.

14 MR. ETHERIDGE: Mr. Hultgren, my first question is on  
15 the issue of seepage beyond the perimeter levees of an  
16 adjacent island. This is dealt with on Page 5, Question 10  
17 of your rebuttal testimony, which is Delta Wetlands Exhibit  
18 Number 62. Is that correct?

19 MR. HULTGREN: Yes.

20 MR. ETHERIDGE: That testimony states that there is a  
21 potential that deep seepage can occur from the Delta  
22 Wetlands Project, thereby causing impacts beyond an adjacent  
23 islands' levee. Is that correct?

24 MR. HULTGREN: Yes.

25 MR. ETHERIDGE: Now, your proposed solution to this

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01 deep seepage problem is that Delta Wetlands would have to  
02 drill deeper interceptor wells to reach and collect that  
03 deep seepage. Is that correct?

04 MR. HULTGREN: Yes.

05 MR. ETHERIDGE: What mechanism does Delta Wetlands  
06 propose to use to monitor this problem of deep seepage?

07 MR. HULTGREN: The current plan is to monitor at the  
08 perimeter of the islands; and if a farmer had a problem with  
09 his field, I think he would be very quick to come tell  
10 us that there was some sort of difficult case.

11 MR. ETHERIDGE: So, Delta Wetlands monitoring plan for  
12 deep seepage would be to rely on neighboring landowners?

13 MR. HULTGREN: Yeah. That was actually part of the  
14 discussion all along with the Seepage Committee, that a lot  
15 of observation were to go on as well the numerical things.  
16 We emphasize the numerical side of it because that was  
17 definitive. But, certainly, if somebody discovers something  
18 they think is related to Delta Wetlands filling of the  
19 reservoir, we need to be receptive to that. We don't have a  
20 plan to go out and monitor the entire Delta. We believe  
21 what we set up is a reasonable approach to start with.

22 MR. ETHERIDGE: Is it part of the Delta Wetlands'  
23 proposal to drill deeper piezometers or monitoring wells to  
24 pick up seepage?

25 MR. HULTGREN: Initially?

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01 MR. ETHERIDGE: Right.

02 MR. HULTGREN: No, not initially.

03 MR. ETHERIDGE: What about if deep seepage was  
04 discovered on an adjacent island?

05 MR. HULTGREN: The only way it would manifest itself is  
06 higher groundwater level, and, since almost all of our  
07 neighbors are in agricultural, it would be readily apparent  
08 to them. And I think what would happen during the initial  
09 stage filling, we would stop our filling and take corrective  
10 action at that point in time. It would be a first year  
11 event kind of correction.

12 MR. ETHERIDGE: What would that corrective action be?

13 MR. HULTGREN: We still believe that the concept, the  
14 basic concept of interceptor wells is the best and most  
15 efficient way to control groundwater. And if we simply had  
16 a zone where there was a coarse aquifer going beneath the  
17 system, somehow getting past it, and delivering water to the  
18 other side, we would explore deeper.

19 MR. ETHERIDGE: You would drill deeper interceptor  
20 wells?

21 MR. HULTGREN: Deeper interceptor wells; that's  
22 correct.

23 MR. ETHERIDGE: Does drilling deeper wells raise the  
24 cost of drilling a well?

25 MR. HULTGREN: Certainly.

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01 MR. ETHERIDGE: On Page 6, Question 11 of your rebuttal  
02 testimony, you state Delta Wetlands' seepage test wells  
03 became clogged when the next drilling season came around.  
04 Is that correct?

05 MR. HULTGREN: Yes.

06 MR. ETHERIDGE: You were questioned on this earlier  
07 today. Your testimony also states that those wells lost  
08 about three-quarters of their efficiency. Is that correct.

09 MR. HULTGREN: Correct.

10 MR. ETHERIDGE: This clogging of the test well occurred  
11 in just several months of non use of the wells. Is that  
12 correct?

13 MR. HULTGREN: Restate the question.

14 MR. ETHERIDGE: Did the clogging, the clogging of the  
15 test wells -- I am using the word "clogging" in the sense  
16 that they lost three-quarters of their efficiency. I am  
17 assuming they became clogged with some materials, and they  
18 couldn't pump 100 percent efficient?

19 MR. HULTGREN: Please restate the question.

20 MR. ETHERIDGE: Did the clogging of the test wells  
21 occur in just several months of non use?

22 MR. HULTGREN: No. They were constantly in use. They  
23 were -- at this point they were set up as a relief well  
24 system and gravity operated. So, they were in constant use  
25 over this period of time. And we believe that most -- it  
2673

01 may be that problem was clogging, materials building up on  
02 the screens, silts getting into the filter pack.

03 Also, it could have been a rising of the water level  
04 ditches. I am not sure. We have not been back to know  
05 what's happened in terms of ditch maintenance and if the  
06 ditch wasn't maintained and the head at the receiving end,  
07 where discharge ditches was raised, that could also cut down  
08 efficiency.

09 MR. ETHERIDGE: Given that the test wells efficiency  
10 was reduced to about three-quarters, or lost about  
11 three-quarters of their efficiency, is it fair to assume  
12 that the interceptor wells proposed by Delta Wetlands could  
13 also lose their efficiency?

14 MR. HULTGREN: No.

15 MR. ETHERIDGE: Why is that?

16 MR. HULTGREN: I've already testified to this, I  
17 believe. These wells were drilled for the purpose of a  
18 short-term test. A contractor was hired and given that  
19 charge, to what we were going to do, a short-term test. And  
20 they worked just fine for a short-term test. They were  
21 only left in place because the landowner said, "Yes, leave  
22 them in place. You don't have to take them out." There was  
23 an advantage to him to leave them in place.

24 They weren't designed as long-term wells in terms of  
25 keeping track of the nature of the gradation of materials  
2674

01 with depth as we drilled the wells. I think a much better  
02 system would be done on a classical production well. They  
03 did serve the purpose just fine for what we intended to do.

04 MR. ETHERIDGE: Is it fair to assume that interceptor  
05 wells could become clogged or lose efficiency if they are  
06 not properly maintained?

07 MR. HULTGREN: Any well system could degrade with time,  
08 and needs maintenance. Redeveloping wells is a common  
09 practice and would expect some of that to go on Delta  
10 Wetlands' wells, as most other or long-term production

11 wells.

12 MR. ETHERIDGE: Does that mean, then, that maintenance  
13 of the interceptor wells will be a critical component of  
14 preventing any seepage?

15 MR. HULTGREN: I wouldn't describe it as critical. It  
16 is routine maintenance, just like keeping the pumps oiled.

17 MR. ETHERIDGE: If the interceptor wells become clogged  
18 or lose their efficiency, you essentially lost part or all  
19 of your ability to control seepage, correct?

20 MR. HULTGREN: You wouldn't allow that to happen. If a  
21 well became a less efficient, you would redevelop it. If  
22 for some reason, you couldn't redevelop it, you would drill  
23 a new well. So, you would maintain your ability to control  
24 on the groundwater.

25 MR. ETHERIDGE: So, the interceptor wells must be  
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01 maintained in operating condition in order for Delta  
02 Wetlands to have the ability to control seepage; is that  
03 correct?

04 MR. HULTGREN: Yes.

05 MR. ETHERIDGE: Your rebuttal testimony states that  
06 there could be between 800 and 900 interceptor wells. I  
07 know you just hit on that earlier; is that correct?

08 MR. HULTGREN: Correct, and I should add that that's  
09 ballpark number so people have a feeling for the size of  
10 the project.

11 MR. ETHERIDGE: Each of those 8 to 900 interceptor  
12 wells would need to be maintained; is that correct?

13 MR. HULTGREN: Yes, like every car in our fleet.

14 MR. ETHERIDGE: Do you have any idea of the annual cost  
15 of such a well maintenance program?

16 MR. HULTGREN: No.

17 MR. ETHERIDGE: Would the wells need to be maintained  
18 even during drought when Delta Wetlands' islands might not  
19 be flooded and might not be in use.

20 MR. HULTGREN: The reason they'd be maintained is  
21 during periods when water is flowing through them. Most  
22 common problem wells have is silting off or incrustations on  
23 the screens. When they are not in use, you wouldn't expect  
24 much, really no impact. So, it is during periods of use  
25 that you'd expect degradation to be happening that may need  
2676

01 redevelopment.

02 MR. ETHERIDGE: Regarding Delta Wetlands' planned levee  
03 improvements, your rebuttal testimony discusses the issues  
04 of fill sinking into the ground. Is that correct?

05 MR. HULTGREN: Yeah. I was describing a situation  
06 where a lot of fills placed on one location; and I am not  
07 directly familiar with that, but I hypothesize that is what  
08 might happen at that location because we've seen it at other  
09 places.

10 MR. ETHERIDGE: Is it your testimony that "careful  
11 monitoring" by Delta Wetlands will avoid this problem?

12 MR. HULTGREN: Yes.

13 MR. ETHERIDGE: Could you please explain how that  
14 monitoring will work?

15 MR. HULTGREN: Sure. The most important aspect of this

16 is the rate of placement of fill. We have found out there  
17 in Delta that on any kind of dry ground you could place  
18 about five feet of fill and not have -- minimized risk of  
19 any kind of punching failure; and on the very saturated  
20 grounds that have really never been dry, probably only  
21 about three feet. You need to place initial lift of fill  
22 and give it some time to consolidate, a matter of several  
23 months. Then you start placing fill after that. One of the  
24 issues is controlled placement of fill.

25 Another is careful horizontal/vertical survey control.  
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01 You do that with a series of surface stakes, which are  
02 measuring both settlement and also lateral spreading. There  
03 is a lateral squeeze or a lateral deformation component to  
04 the soft foundation soil. In the areas where there may be  
05 significant erosion offshore, water side, which we'll be  
06 probably having to buttress the riprap and take some other  
07 correction action. But those areas that look very suspect  
08 will probably put some instrumentation, perhaps  
09 inclinometers, to measure lateral deformation.

10 MR. ETHERIDGE: Given that this levee strengthening  
11 work will be done in stages, do you have any idea how long  
12 it will take to get the levees up to standard once you begin?

13 MR. HULTGREN: Assuming you're using the construction  
14 force that would be working many spreads at once, which I  
15 would expect this project to do, it seems to me that it  
16 would take a couple of years to get the levees up to where  
17 you can store water.

18 MR. ETHERIDGE: At this point, has Delta Wetlands  
19 developed any criteria for the careful levee monitoring that  
20 it proposes?

21 MR. HULTGREN: Not for the Delta Wetlands Project. We  
22 are very active in the Delta on some of these very islands  
23 where we are placing fill as part of 192-82 criteria, and we  
24 are putting inclinometers. We do lateral deformation. We  
25 are carefully monitoring the thickness of the fill. These  
2678

01 are things that we already do as part of the care we take  
02 to make sure we don't damage the levee while strengthening  
03 it.

04 MR. ETHERIDGE: Thank you very much.

05 Thank you, Mr. Stubchaer.

06 HEARING OFFICER STUBCHAER: This morning, Ms. Crothers,  
07 I don't believe you were here when we asked if you wish to  
08 cross-examine. Somebody said from the Department that you  
09 didn't wish to cross-examine on the rebuttal. Is that  
10 correct, or do you?

11 MS. CROTHERS: Yes, that is correct. We did not.

12 HEARING OFFICER STUBCHAER: Ms. Murray.

13 ---oOo---

14 REBUTTAL CROSS-EXAMINATION OF DELTA WETLANDS PROPERTIES  
15 BY DEPARTMENT OF FISH AND GAME  
16 BY MS. MURRAY

17 MS. MURRAY: Good afternoon. Mr. Vogel.

18 MR. VOGEL: Yes.

19 MS. MURRAY: In your rebuttal testimony you described  
20 inconsistencies in DF&G's characterization of winter-run

21 life history.  
22 Do you recall that?  
23 MR. VOGEL: Yes, I do.  
24 MS. MURRAY: Are you aware that the assumed temporal  
25 distribution of winter-run described in Figure 1 of DF&G's  
2679  
01 Biological Opinion was agreed to by all the fish and  
02 wildlife agencies as to what should be used in the  
03 environmental analysis?  
04 MR. VOGEL: That is my understanding.  
05 MS. MURRAY: In your rebuttal you quoted DF&G's  
06 Biological Opinion on Page 12 as follows:  
07 The evaluation of Delta Wetlands Project's  
08 impacts on winter-run chinook salmon for the  
09 Biological Opinion took into account their  
10 occurrence in the Delta based on their  
11 distribution as depicted in Figure 1.  
12 (Reading.)  
13 Do you recall that?  
14 MR. VOGEL: Yes, I do.  
15 MS. MURRAY: Now, your rebuttal testimony states that  
16 you weren't sure what time period DF&G used in its  
17 Biological Opinion based on statements in our testimony that  
18 winter-run salmon may also be present in September or May.  
19 Do you recall that?  
20 MR. VOGEL: Yes, I do.  
21 MS. MURRAY: Isn't it true that although, as stated in  
22 our testimony, we believe that winter-run could be present  
23 in September and May, we are all aware of the difficulty in  
24 detecting winter-run, the Biological Opinion on Page 12, as  
25 you quoted, clearly states that Figure 1 was the basis of  
2680  
01 the evaluation of the Biological Opinion?  
02 MR. VOGEL: Normally, I would have assumed so.  
03 However, there is additional discussion within the  
04 Biological Opinion that would be more applicable to the  
05 additional months beyond those months you just described,  
06 which makes it quite difficult to understand how Fish and  
07 Game would have evaluated potential effects. One example  
08 would be water temperature.  
09 MS. MURRAY: However, the Biological Opinion, as you  
10 quoted on Page 12, says we used Figure 1.  
11 MR. VOGEL: Again, that is true.  
12 MS. MURRAY: As agreed to by the fish and wildlife  
13 agencies?  
14 MR. VOGEL: That's true. Normally there would not have  
15 been any confusion if it had stopped there. But there was  
16 subsequent discussion that made it more confusing.  
17 MS. MURRAY: This is Figure 1 from our Biological  
18 Opinion, Exhibit 11. Looking at the month of March, isn't  
19 it correct that the juvenile production is about, would you  
20 say, 48 percent?  
21 MR. VOGEL: I believe the actual number is 49 percent.  
22 MS. MURRAY: This is Figure 5.7 from the Draft EIR.  
23 Using the mean number, which is the average. Figure 1  
24 average. For March, isn't the figure closer to 35 percent?  
25 MR. VOGEL: Which figure is this now? This is from --

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01 MS. MURRAY: The X is the mean. This is from Figure  
02 5-7 from the Draft EIR.

03 MR. VOGEL: Yes. I believe if I understood your  
04 question, that would be true.

05 MS. MURRAY: Can you explain why the Draft EIR did not  
06 use the Figure 1 numbers that the fish and wildlife agencies  
07 agreed to and asked be used in the analysis?

08 MR. VOGEL: To answer that question, I would have to go  
09 back to both the biological assessment and the EIR, because  
10 that particular graphic was generated, if I understood what  
11 it is -- is that out of the EIR, you said?

12 MS. MURRAY: Yes.

13 MR. VOGEL: That was generated at least, maybe, two  
14 years prior to the biological assessment. So I would have  
15 to look at the biological assessment, compare that with that  
16 graphic to see if that is actually the case. In fact, it  
17 would probably be best to ask Jones & Stokes since they  
18 generated that graphic.

19 MS. MURRAY: Mr. Vogel, you testified in rebuttal that  
20 DF&G's analysis was largely qualitative. Do you recall  
21 that?

22 MR. VOGEL: Yes, I do.

23 MS. MURRAY: Isn't it also true that the National  
24 Marine Fishery Services Biological Opinion is also  
25 qualitative?

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01 MR. VOGEL: Well, again, it is a relative term.  
02 Qualitative to what extent? Any biological assessment that  
03 I've ever been involved in, any section seven consultation,  
04 CESA consultation, simply by virtue of, in many cases, a  
05 lack of sufficient data tends to have some qualitative  
06 nature associated with it. The problem, though, that I was  
07 pointing out with the Fish and Game Biological Opinion is  
08 that there were insufficient quantitative pieces of  
09 information to try to attempt to evaluate the adequacy of  
10 the measures; things like unacceptable levels of take.

11 Normally, you would think that, well, to find out what  
12 an unacceptable level of take means, you would want to have  
13 some relative term, quantity of terms to define what that  
14 means. Make a judgment call whether or not it is acceptable  
15 or unacceptable.

16 MS. MURRAY: That quantitative measure of take defined  
17 in the National Marine Fishery Services?

18 MR. VOGEL: I don't presently recall. It's been quite  
19 a while since I read them, and I'd have to go back and  
20 review them.

21 MS. MURRAY: You also testified that our methods were  
22 not disclosed. Isn't it true that the Biological Opinion  
23 contains an eleven-page section entitled Methods?

24 MR. VOGEL: The Fish and Game Biological Opinion?

25 MS. MURRAY: Yes.

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01 MR. VOGEL: I believe so.

02 MS. MURRAY: Does the National Marine Fishery Service  
03 opinion have a similar section entitled Methods or  
04 Methodology?



05 MR. NELSON: Mr. Stubchaer, I would like to object to  
06 the line of question with respect to the NMFS' Biological  
07 Opinion. Mr. Vogel's testimony was on the Fish and Game's  
08 Biological Opinion, its sufficient, and he wasn't testifying  
09 in his rebuttal testimony as to what NMFS did in their  
10 Biological Opinion. He was testifying as to his  
11 professional opinion as to whether Fish and Game's  
12 Biological Opinion was on a scientific basis. That is  
13 different than comparing it to the NMFS' Biological Opinion.

14 HEARING OFFICER STUBCHAER: Ms. Murray.

15 MS. MURRAY: I'm simply getting to the point of the  
16 standard of biological opinions.

17 HEARING OFFICER STUBCHAER: You have been asking him,  
18 "Doesn't the NMFS' Biological Opinion say this and that?"  
19 He didn't testify to that, and he doesn't know, so, perhaps,  
20 you could rephrase your questions or focus them a little  
21 differently.

22 MS. MURRAY: I will, but I think it is relevant as to  
23 what other biological opinions do as to compare ours with --  
24 so you are comparing apples and apples.

25 HEARING OFFICER STUBCHAER: He said doesn't remember;  
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01 it's been a long time since he read it. You are kind of  
02 pursuing a dead end.

03 MS. MURRAY: I am going to ask one more because they  
04 are in the part of the hearing record, and I assume that  
05 he's read things in preparation for testimony.

06 Does the U.S. Fish and Wildlife Service have a similar  
07 section entitled Methods or Methodology?

08 MR. NELSON: I object. In fact, we just went over the  
09 NMFS' Biological Opinion. I am not sure why she's --

10 MS. MURRAY: He said it's been a while; when was the  
11 last time he read --

12 HEARING OFFICER STUBCHAER: I will sustain the  
13 objection.

14 MS. MURRAY: In your rebuttal you state that in order  
15 to seriously analyze the potential effects of the project on  
16 fish, it is important to know the presence of fish in the  
17 vicinity of the project.

18 Do you recall that?

19 MR. VOGEL: That would be one of several important  
20 components, to assess the effects on fish.

21 MS. MURRAY: Do fisheries' biologists know what  
22 geographic distribution of winter-run salmon in the Delta is  
23 during the months of January, February, or March?

24 MR. VOGEL: Did you say winter-run?

25 MS. MURRAY: Uh-huh.  
2685

01 MR. VOGEL: Not specifically, no. There is a -- as I  
02 understand, one of the processes of the consultation process  
03 was to solicit numerous experts on winter-run chinook salmon  
04 and come up with the best available information or  
05 collective consensus among the agency experts, as well as  
06 outside experts, and that that in turn would be used as the  
07 analytical input, as you would, into many of the Jones &  
08 Stokes' models, which were discussed previously.

09 MS. MURRAY: Mr. Vogel, in your rebuttal you talk of

10 the presence of fish in the, quote-unquote, zone of impact  
11 of the project.

12 Do you recall that?

13 MR. VOGEL: Yes.

14 MS. MURRAY: Have you defined "zone of impact" in your  
15 analysis?

16 MR. VOGEL: I was referring to Fish and Game's  
17 analysis, not mine.

18 MS. MURRAY: What is your definition of zone of impact  
19 of the Delta Wetlands' project?

20 MR. VOGEL: It would be generally those described that  
21 were previously agreed upon during the consultation process  
22 and portrayed in the Jones & Stokes' biological assessment.

23 MS. MURRAY: So the zone of impact that the fish and  
24 wildlife agencies had discussed, had agreed upon, and, in  
25 fact, used in the Biological Opinions?

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01 MR. VOGEL: Yes, in a very loose way I would say that  
02 would be true.

03 MS. MURRAY: In your rebuttal testimony you state that  
04 the Department of Fish and Game in its Biological Opinion  
05 implied that increased entrainment indices constituted take  
06 under the California Endangered Species Act.

07 Do you recall that?

08 MR. VOGEL: Yes, I do.

09 MS. MURRAY: Are you aware that during consultation,  
10 consultation participants agreed with the premise that  
11 increased entrainment indices were assumed to result in  
12 decreased survival?

13 MR. NELSON: Mr. Stubchaer, once again, Mr. Vogel did  
14 not testify as to what happened in the Fish and Wildlife  
15 Service joint consultation. He was commenting on the Fish  
16 and Game Biological Opinion. I am not sure -- she's asking  
17 him to confirm an agreement that happened outside of the  
18 process and wasn't reflected in the Biological Opinion.

19 If she wants to ask, "Does the Fish and Game Biological  
20 Opinion -- doesn't the Fish and Game Biological Opinion  
21 state that there was an agreement?" Then that would be a  
22 fine question. But in this case she is asking Mr. Vogel to  
23 testify on matters that he did not address in his rebuttal.

24 MS. MURRAY: I am asking him the basis of some of his  
25 very broad conclusory statements in his rebuttal, why are

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01 you saying that? That is just trying to find out what is  
02 the basis of these very broad statements.

03 HEARING OFFICER STUBCHAER: Can you rephrase the  
04 question? Try again. Not repeat the question, rephrase it.

05 MS. MURRAY: Do you agree with or disagree with the  
06 premise agreed upon during consultation that increased  
07 entrainment indices are assumed to result in decreased  
08 survival?

09 MR. VOGEL: I will answer that two ways. Would go back  
10 to your very first question, actually. The whole purpose  
11 for my rebuttal testimony on that topic of take had to do  
12 with very specific, very explicit statements portrayed or  
13 given within Fish and Game documents that implied a direct  
14 translation from definition of a diversion index over into a

15 take, which I said would signify proximal cause of death.  
16 The answer would be, "No, I never heard that agreed to."

17 MS. MURRAY: You were not aware when you made the  
18 statement that the fish and wildlife agencies had agreed  
19 that increased entrainment indices were assumed to result in  
20 decreased survival?

21 MR. VOGEL: That is a different question.

22 HEARING OFFICER STUBCHAER: You're testifying. Ask  
23 another question.

24 MS. MURRAY: I thought I was clarifying.

25 MR. VOGEL: That is a different question. The answer  
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01 to that one would also be, "No, I wasn't aware of that  
02 agreement."

03 MS. MURRAY: You were aware and you were here when you  
04 heard DF&G testify that these indices were not exact  
05 measures of mortality, but were indicators of the direction  
06 and relative magnitude of impact, as Warren Shaul also  
07 testified?

08 MR. VOGEL: Yes. In fact, the verbal testimony  
09 provided by Fish and Game provided more clarification on how  
10 they used the diversion indices as contrasted with the  
11 written testimony.

12 MS. MURRAY: Mr. Vogel, in your rebuttal testimony you  
13 say that the Delta Wetlands Project is going to have some  
14 extremely effective fish screens. Is that correct? Do you  
15 recall that?

16 MR. VOGEL: Yes.

17 MS. MURRAY: Is there currently an agreement regarding  
18 fish screens between Delta Wetlands and the Department?

19 MR. VOGEL: I would say, in general, yes. In terms of  
20 the actual specific design, that has been deferred.

21 MS. MURRAY: And I would.

22 MR. VOGEL: In terms of design and meeting criteria,  
23 those type of things. But in terms of what the structure is  
24 going to actually look like, nobody has done that yet.

25 MS. MURRAY: In terms of the design criteria, isn't it  
2689

01 that efficiency is decreased if the screen is not constantly  
02 cleaned and maintained.

03 MR. VOGEL: It depends, depends on site-specific  
04 conditions. If the screen is not cleaned continuously, and  
05 you have a heavy debris load, which is impinged on the base  
06 of the screen, the answer would be yes.

07 MS. MURRAY: The efficiency of the screens are lowered  
08 when they get this heavy debris load and you need to clean  
09 that and maintain that constantly?

10 MR. VOGEL: My understanding is for properly  
11 functioning fish screens that would meet the criteria of  
12 Fish and Game, you would have to ensure that it meets that  
13 criteria. In many cases if you have heavy debris loading,  
14 you have to ensure that debris loading does not occur on the  
15 faces of the screen, otherwise the screen performance would  
16 drop off.

17 MS. MURRAY: Mr. Marine, you state in your rebuttal  
18 testimony that it is not true that, under the Delta  
19 Wetlands' temperature management criteria, Delta Wetlands

20 would be allowed to raise temperatures to a minimum of 66  
21 degrees Fahrenheit and a maximum of 69.9 degrees Fahrenheit.  
22 Do you recall that?  
23 MR. MARINE: Yes, I do.  
24 MS. MURRAY: If the ambient temperature was 62 degrees  
25 Fahrenheit, wouldn't the final operations criteria allow the  
2690 temperatures to increase by four degrees?  
01 temperatures to increase by four degrees?  
02 MR. MARINE: That's correct.  
03 MS. MURRAY: Wouldn't that mean a water temperature of  
04 66?  
05 MR. MARINE: That would be a water temperature of 66  
06 degrees.  
07 MS. MURRAY: If the ambient temperature is 65.9,  
08 wouldn't the final operations criteria allow the temperature  
09 to increase by four degrees Fahrenheit?  
10 MR. MARINE: The criteria provided in the final  
11 operating criteria for the project -- I was simply asked to  
12 provide biological criteria which within the range of less  
13 than 66 degrees that a Delta T or a temperature change of up  
14 to four degrees Fahrenheit would not result in what, by my  
15 assessment, would result in a deleterious effect on the  
16 salmonids of concern, the life stages and so forth.  
17 The actual implementation, I was not asked specifically  
18 to provide actual implementation criteria or those  
19 temperatures. So whether or not the final implementation  
20 criteria would allow at 65.9 a four degree temperature  
21 increase, that was something that I wasn't asked to do.  
22 MS. MURRAY: But you made a statement saying that it  
23 would not be allowed. That is what I am trying to get at.  
24 Why, on what basis, would you say that this would not be  
25 allowed? From my reading of the criteria, it would be.  
2691  
01 MR. MARINE: My rebuttal testimony, the Fish and Game  
02 testimony said that the temperature criteria, temperature  
03 management criteria in the final operating criteria would  
04 allow temperatures to be raised to a minimum of 66 and a  
05 maximum of 69.5. That is simply not true the way it is  
06 stated.  
07 It would simply be allowed to increase four degrees or  
08 up to four degrees above ambient when water temperatures  
09 were less than 66.  
10 MS. MURRAY: So, if they are 65.9, it would be allowed  
11 to go to 69.9?  
12 MR. MARINE: Potentially.  
13 MS. MURRAY: You state in your testimony that the  
14 magnitude and frequency of potential temperature differences  
15 between Delta Wetlands' reservoirs and adjacent channel  
16 islands has not been specifically established.  
17 Do you recall that?  
18 MR. MARINE: That's correct.  
19 MS. MURRAY: You also state in your rebuttal testimony  
20 that the frequency of potential temperature differences  
21 between the Delta Wetlands' reservoirs and adjacent Delta  
22 channels are expected to be infrequent due to the location  
23 and dominance of meteorological conditions on Delta  
24 Wetlands' water conditions.

25 Do you recall that?  
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01 MR. MARINE: Yes, I do.  
02 MS. MURRAY: Are you a hydrologist or a meteorologist?  
03 MR. MARINE: No, I am not.  
04 MS. MURRAY: So determining the effect of  
05 meteorological conditions on frequency of potential  
06 temperature differences between Delta Wetlands' discharges  
07 and adjacent channels is outside your area of expertise; is  
08 that correct?  
09 MR. MARINE: Specifically outside my area of  
10 expertise. However, in previous hearings and during the  
11 course of numerous discussions with the Jones & Stokes'  
12 folks who prepared the DEIR/EIS, the agency biologists  
13 during the course of the consultations, it was generally  
14 understood and agreed that at the level of the Delta water  
15 temperatures are primarily under the control of ambient  
16 meteorological conditions. In other words, there is very  
17 little affect of operations of upstream reservoirs on the  
18 temperature of water in the Delta channels.  
19 MS. MURRAY: Do you know what the basis of that  
20 underlying assumption of the analysis is?  
21 MR. MARINE: In general, yes. Water temperatures  
22 primarily will come to -- into equilibrium with the average  
23 daily air temperature, provided all other sources of  
24 temperature, if you will, heat inputs or sinks are quite  
25 distant, and, as a general rule of thumb, most of the  
2693

01 modeling efforts that have been done on water temperature  
02 beyond 30 miles from a temperature source, meteorological  
03 effects, take dominance.  
04 MS. MURRAY: Thirty miles, what about in the channel  
05 adjacent to the Delta Wetlands Project?  
06 MR. MARINE: Would please restate that question?  
07 MS. MURRAY: You mentioned 30 miles; and my question  
08 is what about less 30 miles. What about the channel  
09 adjacent to the project?  
10 MR. MARINE: Well, again, the only source of heat input  
11 to the Delta Wetlands' reservoirs, under my understanding,  
12 would be that of the ambient meteorological conditions. So  
13 there would --  
14 MS. MURRAY: If the Delta Wetlands' island were to be  
15 as deep as the channel next to it?  
16 MR. MARINE: Depends on the location.  
17 MS. MURRAY: Mr. Marine, you also stated in your  
18 rebuttal testimony that no claims by fishery agencies have  
19 ever be made before that temperature conditions in the Delta  
20 in midwinter are stressful for salmon.  
21 Do you recall that?  
22 MR. MARINE: Yes, I do.  
23 MS. MURRAY: Mr. Marine, are you familiar with the  
24 National Marine Fishery Service proposed recovery plan for  
25 the Sacramento River winter-run chinook salmon?  
2694

01 MR. MARINE: Not with the specifics.  
02 MS. MURRAY: So, you are not familiar with the plan,  
03 the NMFS plan, that says that temperatures higher than 60

04 degrees Fahrenheit are likely to lead to psychological  
05 stress and mortality in juvenile winter-run chinook salmon?  
06 MR. NELSON: Mr. Stubchaer, could I object. Ms. Murray  
07 is referring to the document that was issued after Mr.  
08 Marine even testified in his rebuttal. This is a document  
09 that was produced, I think, on August 13. Mr. Marine's  
10 testimony is prior to that.

11 If she is crossing him for the purpose of stating that  
12 there has been a document making this assertion, she is now  
13 referring to a document that was not even in existence when  
14 Mr. Marine made his rebuttal testimony.

15 HEARING OFFICER STUBCHAER: Ms. Murray.

16 MS. MURRAY: I know the document is recent, and that we  
17 are trying to use new and better science, and that this new  
18 and better science does say that 60 degrees causes great  
19 stress for winter-run salmon, which is the Department's  
20 position. I am just asking him if he was aware of that.

21 HEARING OFFICER STUBCHAER: Mr. Nelson.

22 MR. NELSON: If the question is he aware of it, is a  
23 question that is moot in this case because she has to ask  
24 the question of was he aware of it on the day that he gave  
25 his rebuttal testimony.

2695

01 HEARING OFFICER STUBCHAER: Ms. Leidigh.

02 MS. LEIDIGH: Well, it seems to me that perhaps this is  
03 going beyond the scope of the rebuttal testimony that he  
04 provided, and there must be some other way to get this  
05 information in, or that you can try to do. I don't think  
06 this is really the proper way to introduce the information.

07 HEARING OFFICER STUBCHAER: I will sustain the  
08 objection.

09 HEARING OFFICER STUBCHAER: Ms. Murray, for purpose of  
10 planning the break, how much more do you have?

11 MS. MURRAY: Just a few questions.

12 HEARING OFFICER STUBCHAER: A few questions or a few  
13 pages?

14 MS. MURRAY: I would recommend taking a break, and I  
15 will finish.

16 HEARING OFFICER STUBCHAER: Let's break until 3:00.

17 (Break taken.)

18 HEARING OFFICER STUBCHAER: Reconvene the hearing.

19 Ms. Brenner.

20 MS. BRENNER: I just would like to make a request. I  
21 have a couple of individuals that are sitting up here that  
22 have planes to catch; and I am wondering if it is okay if  
23 Dr. List could be excused for the day, if there is any other  
24 cross-examination questions of him?

25 HEARING OFFICER STUBCHAER: Well, staff would be the --

2696

01 I don't know if Ms. Murray is going to have any questions.  
02 does staff have any questions of Dr. List?

03 He may be excused.

04 MS. BRENNER: Thank you, Mr. Stubchaer.

05 DR. LIST: Thank you.

06 HEARING OFFICER STUBCHAER: Thank you for your  
07 forbearance with the process.

08 Ms. Murray.

09 MS. MURRAY: I have just one more question.

10 Mr. Marine, going back, again, let's go over this one  
11 more time. Your statement that there are no claims by  
12 fisheries agencies have ever been made before that  
13 temperature conditions in the Delta in midwinter are  
14 stressful for salmon?

15 MR. MARINE: That is correct. That was with specific  
16 regard to existing, naturally occurring temperatures.

17 MS. MURRAY: We discussed the final recovery plan that  
18 has been put out by NMFS, that was potentially put out after  
19 your rebuttal. Did you ever see the draft plan that was put  
20 out in March 19 -- issued in March 1996? Did you ever read  
21 that?

22 MR. MARINE: I do not recall reviewing any temperature  
23 related recovery objectives for winter-run in the draft  
24 document.

25 MS. MURRAY: Did you ever read this draft document?  
2697

01 MR. MARINE: No. However, during the break, I was  
02 provided with three relevant pages of the document.

03 MS. MURRAY: And isn't it true that the draft document,  
04 consistent with the final, states that a daily average  
05 temperature of 60 degrees Fahrenheit is considered the upper  
06 temperature limit for juvenile chinook growth and rearing;  
07 whereas warmer water temperatures are likely to lead to  
08 physiological stress and mortality?

09 MR. MARINE: If you could point out where that is,  
10 perhaps, on these three pages, I could read it for myself  
11 and see if I concur with your statement.

12 HEARING OFFICER STUBCHAER: Ms. Murray, how could you  
13 say consistent with the final, ask him that, if he doesn't  
14 have a final?

15 MS. MURRAY: Okay. Just, doesn't the draft say that.  
16 Thank you.

17 It's on Page 36.

18 MR. MARINE: That I don't have.

19 HEARING OFFICER STUBCHAER: Is this document in  
20 evidence? Is it in the record or going to be offered?

21 MS. MURRAY: It was referred to, I believe, in our  
22 testimony of Ms. McKee.

23 MR. MARINE: As I am reading this here, the sentence  
24 is:

25 A daily average temperature of 60 degrees  
2698

01 Fahrenheit is considered the upper  
02 temperature limit for juvenile chinook growth  
03 and rearing; whereas, warmer water  
04 temperatures are likely to lead to  
05 psychological stress and mortality.  
06 (Reading.)

07 There is no citation associated with that  
08 contention. And based on my review, understanding of the  
09 data, the limitations, the experimental context in which the  
10 relevant data that I had reviewed and provided in my  
11 testimony, as well as that which I've reviewed presented in  
12 Fish and Game's, I would disagree that 60 degrees Fahrenheit  
13 is considered the upper temperature limit for juvenile

14 chinook growth and rearing that would be considered a  
15 stressful level. I disagreed with that. I do not believe  
16 the data support that.

17 MS. MURRAY: Mr. Marine, do you also, reading further  
18 down in the paragraph, are there several, if not, several,  
19 approximately four citations during that paragraph to  
20 support the first sentence that --

21 HEARING OFFICER STUBCHAER: Excuse me, what document is  
22 this?

23 MS. MURRAY: This is the Draft Recovery Plan for  
24 Winter-Run Chinook Salmon.

25 HEARING OFFICER STUBCHAER: Issued by NMFS?  
2699

01 MS. MURRAY: NMFS.

02 As we were taught in English, we make a sentence and  
03 then you support it. The paragraph below supports the  
04 sentence.

05 HEARING OFFICER STUBCHAER: Did they teach you in  
06 English not to take out of context; not that this is  
07 happening.

08 MS. MURRAY: All I am saying is he made a statement  
09 that no fish and wildlife agency had ever said that there  
10 was temperature problems in winter. And we are saying in  
11 winter that this statement doesn't say, 60 degrees, but only  
12 in summer, not in winter. We are just saying this says 60  
13 degrees.

14 HEARING OFFICER STUBCHAER: I would like to ask staff  
15 the status of this document.

16 MS. LEIDIGH: I would -- I think it would be helpful if  
17 you would tell us what the date of this document is, and is  
18 this the draft or final.

19 MS. MURRAY: We now have a final. In our rebuttal  
20 testimony, we referred to it in our rebuttal, and the date  
21 is March 1996. The draft is March 1996. The final is  
22 August 1997. So, it was out for over a year being peer  
23 reviewed by, I would think, biologists that are claimed to  
24 be experts in salmon.

25 MR. VOGEL: Could I say something?

2700

01 HEARING OFFICER STUBCHAER: Just a moment. We will get  
02 to you. Just a minute.

03 Ms. Leidigh.

04 MS. LEIDIGH: Are you asking him questions from the  
05 draft?

06 MS. MURRAY: Yes.

07 MS. LEIDIGH: Is the draft in evidence so that people  
08 can look at it, or is it just something that has been talked  
09 about?

10 MS. MURRAY: It was referred to in our testimony.

11 MS. LEIDIGH: What do you mean by "referred to"?

12 MS. BRENNER: It was not submitted as an exhibit.

13 MS. LEIDIGH: So, it is not an exhibit.

14 MS. MURRAY: But it is referenced.

15 HEARING OFFICER STUBCHAER: Was it submitted by  
16 reference?

17 MS. MURRAY: It was referenced; it was not submitted.

18 MS. LEIDIGH: It is not listed in your list of exhibits



19 for this hearing?

20 MS. MURRAY: No, it is not on our exhibit list.

21 MS. LEIDIGH: I think the main value of it here is to  
22 find out what the witness' testimony is, based on his own  
23 expertise, not what it says.

24 MS. MURRAY: Right. What I am trying to say, did he --  
25 was he aware of this when he made a statement in rebuttal?  
2701

01 And I think he is saying yes.

02 MR. VOGEL: There is one additional clarification, I  
03 think is necessary. I just received last week a copy, a  
04 more recent copy of this document that I was asked to review  
05 it, peer review it. My understanding is it is currently out  
06 for review and it is still in draft form. It won't be  
07 finalized until sometime later this year. So it is still a  
08 draft, is my understanding. It may have been internally  
09 reviewed, but it has not gone out for final documentation at  
10 this point.

11 Isn't that true?

12 MS. MURRAY: I think that is true.

13 HEARING OFFICER STUBCHAER: Mr. Nelson.

14 MR. NELSON: I was going to add one other point. I am  
15 not sure -- I don't know the procedural status of this. But  
16 I do know that the draft recovery plan, that you are working  
17 off right now, was reviewed by the internal technical review  
18 committee, which I think Ms. McKee is on. I am not sure,  
19 and you can clarify with Ms. McKee, whether it was ever  
20 published and issued for public comment. I believe the  
21 proposed recovery plan has been issued for public comment,  
22 and I am not sure as to whether it was not or --

23 Secondly, Ms. Murray, on the objection noted, I would  
24 like to object to this line of questioning by Ms. Murray  
25 because she is not questioning with respect to Mr. Marine's  
2702

01 rebuttal statement that he has not heard of a statement that  
02 winter temperatures in the Delta are affecting winter-run  
03 chinook salmon. That is different than the 60 degrees  
04 Fahrenheit statement. The distinction there being is that  
05 she has not asked a question dealing with seasonal  
06 temperature issues in the Delta. She is asking a question  
07 solely on temperature, a temperature threshold level, not on  
08 a seasonal impact, which is what Mr. Marine is discussing.

09 MS. MURRAY: I would like to respond to that by saying  
10 that the NMFS' opinion regarding 60 degrees does not have  
11 seasonal limitations. It is winter, fall, spring, and  
12 summer. And so they complain about 60 degrees in winter as  
13 equally as they do in summer.

14 HEARING OFFICER STUBCHAER: Mr. Nelson.

15 MR. NELSON: If she wants to ask a question, cite to  
16 where NMFS complains, in her words, of a 60 degree  
17 temperature in winter, then I wouldn't object to this  
18 question. She is not citing to anything that says "a  
19 seasonal impact." She is citing to a specify degree, not a  
20 seasonal impact, and that is a distinction that I think does  
21 make a difference in this context.

22 HEARING OFFICER STUBCHAER: Time out.

23 (Discussion held off record.)

24 HEARING OFFICER STUBCHAER: Back on the record.  
25 I am going to sustain the objection. And please ask  
2703  
01 the witness what his opinions are, not what somebody else's  
02 opinions are on a document that is not in the record that  
03 other parties have not had a chance to review and comment  
04 on.  
05 MS. MURRAY: And can I probe the basis of his statement  
06 about no --  
07 HEARING OFFICER STUBCHAER: Without reference to that  
08 document?  
09 MS. MURRAY: I would like to reference this and then  
10 get to the seasonality that Mr. Nelson objected to or  
11 wanted me to ask.  
12 HEARING OFFICER STUBCHAER: You can probe his  
13 opinion. I don't know how you are going to work in that  
14 document.  
15 MS. MURRAY: Can I recall and maybe even look at the  
16 transcript -- did you say that you had read the document?  
17 MR. MARINE: No, I have not read either the draft  
18 document or the final document. I am familiar with their  
19 issuance, but I am not familiar with the specifics of the  
20 temperature sections in this document.  
21 HEARING OFFICER STUBCHAER: From what we just heard,  
22 there is no final document.  
23 MR. MARINE: Or the most recent document, excuse me.  
24 MS. MURRAY: You have been aware that they have been  
25 issued? This one, the earlier draft in March and the later  
2704  
01 draft in August of this year?  
02 MR. MARINE: Yes.  
03 MS. MURRAY: You are aware that they are out, out for  
04 circulation among fishery biologists for a year and a half  
05 or so?  
06 MR. MARINE: Yeah.  
07 MR. NELSON: Mr. Stubchaer, I already asked for  
08 clarification. Mr. Vogel already stated that he was not  
09 sure if it was out for public comment. And I specifically  
10 asked if that was actually confirmed. If Mrs. McKee can  
11 confirm that it wasn't just her review team that is working  
12 this, but it was actually out for public comment. I would  
13 not object to the question, but I haven't heard that answer,  
14 that statement.  
15 MS. MURRAY: I will withdraw the question.  
16 No further questions.  
17 HEARING OFFICER STUBCHAER: Thank you.  
18 Staff.  
19 ---oOo---  
20 REBUTTAL CROSS-EXAMINATION OF DELTA WETLANDS PROPERTIES  
21 BY STAFF  
22 MR. CORNELIUS: Yes, I have a couple questions of Mr.  
23 Hultgren.  
24 I would like to maybe give you Xeroxes and overhead and  
25 help explain something.  
2705  
01 In your rebuttal on Page 8 on levee stability, you  
02 included this table on criteria for the different types of

03 standards. And it talks in terms of, on the bottom there,  
04 about we greatly reduce the upgrading of levees, the risk  
05 would be greatly reduced by the proposed Delta Wetlands'  
06 construction standard or criteria.

07 What is that standard then? Is it simply 192-82 as  
08 given here?

09 MR. HULTGREN: Correct. I think I can see where you  
10 are going with this picture on here, so maybe I will just  
11 jump right into it. We are showing a broken -- lower on  
12 this picture you've referenced something from the Draft  
13 EIR/EIS, 12?

14 MR. CORNELIUS: Right.

15 MR. HULTGREN: That shows two slopes. It shows a three  
16 to one slope in the upper half and a ten to one slope on the  
17 lower half, the buttress. 192-82 actually gives two  
18 alternate criteria. You can use a single slope, one  
19 constant slope; and those are the numbers I've referenced in  
20 my rebuttal, Page 8, DW-62, where it talks about constant  
21 slopes going from three to one to seven to one. Another  
22 alternate that they considered having is a three to one  
23 slope that goes approximately half way down the slope, that  
24 is buttressed by a flatter slope. And I think those flatter  
25 slopes go all the way out to ten and half to one, if you use  
2706 this broken slope buttress.

01 For simplicity, I chose only to show the single slope  
02 inclination on this chart in my rebuttal testimony. But  
03 there is actually an alternate way you can use a broken  
04 slope, two different slopes combined together, and as part  
05 of the 192-82.

06 MR. CORNELIUS: Is it conceivable, then, that you may  
07 use the alternate standard in certain locations, depending  
08 upon the on-site physical conditions there?

09 MR. HULTGREN: That is correct. What the project has  
10 committed to is to use the 192-82 criteria. And what I  
11 believe DWR did when they put together this guideline is  
12 they analyzed these two different types of slopes, a  
13 constant slope and a broken slope, and computed equal  
14 factors of safety for given thicknesses of peat. And they  
15 said, "Okay, if the peat is 15 feet thick, use either," and  
16 I am making these numbers up, "five to one constant or a  
17 three to one slope down half the way and a seven to one  
18 slope below that."

19 The numbers may actually be different. That is the  
20 example I am trying to -- and they have give equal factors  
21 of safety, so reclamation district had a choice of which to  
22 use.

23 MR. CORNELIUS: On the lower diagram it talks about, or  
24 it shows, a one-hundred year flood level. And in the  
2707 192-82, they take one and half foot above the 300 year.  
01 Where might that be if we were to look at this, as trying to  
02 add that or discuss it or amplify a little bit with the  
03 diagram?

04 MR. HULTGREN: My understanding is the 300-year flood  
05 is about half a foot higher than a hundred year flood in  
06 this portion of the Delta, for round numbers. So if you  
07

08 compare this with the 192-82 crest, with the FEMA HMP crest,  
09 it is about a foot higher, total. Half a foot for the  
10 height in flood and another foot for being one and a half  
11 feet above 300 years.

12 MR. CORNELIUS: The other question is earlier you had  
13 mentioned that there would be a six-foot freeboard.

14 Did I mis --

15 MR. HULTGREN: We were talking about wave runup in the  
16 most extreme cases.

17 MR. CORNELIUS: If you are looking at the 192-82  
18 standard, then your crest height would be at six feet,  
19 rather than at one and a half?

20 MR. HULTGREN: That runup is for water retained inside  
21 our reservoirs. That is what the long fetch is. The 192-82  
22 criteria is against floods in the sloughs.

23 MR. CORNELIUS: On the outside?

24 MR. HULTGREN: On the outside. It is flood protection  
25 for the island. So all they're required, 192-82, is foot  
2708

01 and a half foot of freeboard above a 300-year storm,  
02 300-year flood.

03 MR. CORNELIUS: If you were taking a plus six foot  
04 above the mean low, low water level, plus would be the  
05 storage level in the inside. You would add six feet to  
06 that, would that indicate it would be twelve feet from your  
07 zero zero as shown on here?

08 MR. HULTGREN: Yes. If you are going to use straight  
09 riprap on a four-mile fetch, three half mile fetch across  
10 the island, under extreme storm event, such as the 70 mile  
11 an hour winds, you would probably get around about six feet,  
12 somewhere in that range.

13 MR. CORNELIUS: Then, the next step is crest height.  
14 If you go up 12 feet and then the width of the 16-foot crest  
15 height would be at that level then with the slopes. Right?

16 MR. HULTGREN: You would still want to maintain at  
17 least a 16-foot crest width.

18 MR. CORNELIUS: Even with the 12-foot height?

19 MR. HULTGREN: Yes. That is not just -- we would still  
20 be -- you would meet the 192-82 criteria with a smaller  
21 crest at plus 12. You only have to have a plus 16 at one  
22 and half foot above 300. Just for practicality, you don't  
23 want your levees any narrower than that for driving around  
24 and doing maintenance. Sixteen foot is a very reasonable  
25 for absolute minimum for working up there. I think often  
2709

01 our final levees will be wider when we actually build it.

02 MR. CORNELIUS: Speaking then in terms of adding  
03 potentially 12 feet to the height, you were saying you do  
04 this over a period of time in order to keep from having  
05 shear, or I guess that is the term you used, could you give  
06 us a little overview on the decade in the life of a Delta  
07 Wetlands' levee?

08 MR. HULTGREN: Decade in a life?

09 MR. CORNELIUS: As to how this would kind of  
10 conceptually all be put together?

11 MR. HULTGREN: Sure. I think I will leave this picture  
12 up and go higher, if you would. Again, I am referring to

13 the DW --

14 MR. CORNELIUS: That is the executive summary,  
15 actually.

16 MR. HULTGREN: Executive summary, Page 12. The fill on  
17 the lower slope, that shows a ten to one slope in that  
18 example, is the fill that would get placed first. That  
19 would be buttressing the levee. Most of that would go on  
20 in, perhaps, the first year. You get it all on in the first  
21 year. You would go most of the material further up the  
22 slope on probably within a year, a year and a half.

23 When we get nearer the crest, we will have put some  
24 material on the top. Going to be a lot more careful because  
25 that height becomes very critical. So you would have done

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01 stages; we would be monitoring settlement and monitoring  
02 lateral deformation. It may be in some extreme areas where  
03 we have real deep peat deposits and a lot of erosion on the  
04 river side, we might curtail and not go to plus 12 for the  
05 first couple years, maybe three or four years. Take some  
06 time to get there.

07 There could be cases like that. That would be decided  
08 upon design, and I don't know that yet. It would be done in  
09 stages so as to not overstress it. It maybe the first few  
10 years we can't go to plus six for storage. We can only go  
11 to plus four or plus three. We haven't got enough runup.  
12 We want wave protection. That is a possibility. That is  
13 how it would be built in stages and allowing settlement to  
14 occur as you're filling. So these crews would keep moving  
15 around and down; they wouldn't come and go. The islands are  
16 big enough. The constant filling, but location, location.  
17 Allowing settlement to happen, go back and place more fill.  
18 Starting from the lower end, buttressing at first, and then  
19 building up higher on the levee.

20 MR. CORNELIUS: On the downwind side, where the fetch  
21 is longer, or expected to be longer, you would have higher  
22 there possibly than other areas?

23 MR. HULTGREN: That would be -- again, the wave  
24 protection design would be site-specific, too. And areas  
25 with long fetch will have higher runup and more, maybe

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01 heavier rock than areas with shorter fetch and different  
02 risk of exposure.

03 MR. CORNELIUS: Thank you.

04 HEARING OFFICER STUBCHAER: Ms. Leidigh.

05 MS. LEIDIGH: I have a couple questions.

06 First questions are for Mr. Hultgren.

07 You were showing Figure 3D-4 from the EIR, and I think  
08 you have a overhead for that. Would you put that up.

09 We are talking about -- Mr. Nomellini was asking you  
10 about Case III on that chart and seepage increased caused by  
11 the project and where you would wind up in terms of the  
12 elevation of the water on the island, on the neighboring  
13 islands.

14 The question I have is: As I understand it, this is  
15 how you would control your mitigation on the neighboring  
16 islands. This is when you would trigger trying to remove  
17 the seepage or pumping to avoid seepage.

18 Is that right?

19 MR. HULTGREN: It's a compliance issue. We would be  
20 controlling the seepage the whole time. We expect to be  
21 required to stay within these criteria.

22 MS. LEIDIGH: And I want to know how you interpret the  
23 criteria. You say that you look at the previous years' data  
24 for background. If the previous year -- what happens over a  
25 period of years? Does the trigger elevation change from one  
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01 year to the next?

02 MR. HULTGREN: I foresee that happening. We would  
03 install these, all the neighboring monitoring wells, at  
04 least one year before first fill in the reservoirs. So we  
05 have at least one year of continuous data, and recorded by  
06 data logs, and recorded at least once per hour, and the  
07 daily average, and average that over the year  
08 statistically. We'd have at least one-year's picture.

09 We recognize there could be dry years and wet years.  
10 There will be some abnormalities, and that is part of a  
11 risk. At least we are getting a year's worth of data. If  
12 we get two years, that is better.

13 As the project goes on in time, if more years of data  
14 could be collected, and that would be during periods of no  
15 storage, or even portions of years with no storage, I'd  
16 think you want to look at that data and make adjustments  
17 accordingly. You have to carefully make the adjustments  
18 when you only have portions of years, because there may be  
19 seasonal variations. You don't want to bias your data.

20 There is going to take some thought in how to do that.  
21 Right now, initially, our thought was you take whole year  
22 blocks of data and analyze it.

23 We expect that the groundwater levels will slowly drop  
24 in the Delta because our neighbors are continuing to farm.  
25 As they farm, they are losing part of the ground to  
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01 subsidence, oxidation, losing about three inches a year.  
02 So, four years from now they will be nominally a foot lower  
03 in elevation. And what is lowering the water table below  
04 the islands is their farming practices. By putting ditches  
05 in to control water, to keep it below the root zone and  
06 getting air into the soil, they're basically, you know, two  
07 miles under the wells. If you want to recharge, coming from  
08 the sloughs around them. They are very much controlling the  
09 water, and we are, too, on our islands today, where that  
10 water level is. So, it will be dropping.

11 So during the years of no storage, we get a full year  
12 of data on which to make a basis to adjust criteria. If we  
13 are very successful, and lots of years of wet years, and we  
14 don't have a full year of non storage, we may have to make  
15 adjustments just based on portions of years. But I think  
16 that is part of being able to make readjustments to the  
17 criteria as we go along.

18 MS. LEIDIGH: Would you have a particular set elevation  
19 above which you would not want to have the soil water level  
20 rise?

21 MR. HULTGREN: The well's groundwater level is very  
22 dramatic, drastically throughout the Delta. Wells a few

23 thousand feet apart, they are going to be much different  
24 than a few hundred feet apart; they have much different  
25 water elevations, depending on how close they are in

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01 continuity to the sloughs for recharge.

02 So it has to be site-specific. So we don't want them  
03 to rise above what they would normally would rise if our  
04 project wasn't there. That is basically the philosopher  
05 criteria.

06 MS. LEIDIGH: But you have a changing water level and  
07 you probably have been, according to your testimony, also  
08 have a changing soil water level over a period of years.

09 If you have a period of years when you are storing  
10 reservoir and you measure each year to find out where your  
11 soil water level is, is it your concept that you would set  
12 the current year's trigger based on the previous year's  
13 trigger, and it would go up or down depending on whether the  
14 trigger was higher or lower than the previous year? Or is  
15 this going to be a series of years?

16 MR. HULTGREN: One year as opposed to a series of  
17 years?

18 MS. LEIDIGH: Yes.

19 MR. HULTGREN: I think we would look at the data and  
20 see if the data showed a trend downward. Then you would  
21 have to use the most recent data. If you saw the trends  
22 being somewhat consistent, you have a lot of confidence they  
23 are staying the same. We have been monitoring groundwater  
24 levels for eight or nine years now. In some of the wells we  
25 have seen a distinct pattern of mining the groundwater,

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01 basically, the water being lower in some islands. And other  
02 islands we have seen absolutely no change in the water  
03 level, average water levels over those eight, nine years.

04 MS. LEIDIGH: Do you have any kind of a formula that  
05 you would recommend so far as setting a permanent term or  
06 condition to regulate the distance to groundwater surface on  
07 neighboring islands for setting this trigger?

08 MR. HULTGREN: Yes. And that is to use the data  
09 recorded at a given piezometer on a neighbor's island and  
10 collect that data for at least a year, and look at it  
11 statistically, and look at the range that that data moves in  
12 over a year. Most of that data will fall, what I call, a  
13 plus or minus two standard deviation. Ninety-five percent,  
14 all the but 14 days of the year, will fall within that  
15 band. I am suggesting for any one well that one foot above  
16 that would be a trigger, no exceedance zones, and for an  
17 average of three or more continuous wells, just use three  
18 inches, because you have a lot more liability of data  
19 averaging three wells.

20 MS. LEIDIGH: But you are going to have to constantly  
21 readjust that; isn't that correct?

22 MR. HULTGREN: It is an natural system, so we need to  
23 -- it can't be a fixed number. There is no fixed number out  
24 there. Groundwater levels we will measure there range from  
25 a minus six to a minus 23, a wide variation.

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01 Those islands close to flooded islands, ones like north

02 end of Bethel Island, that's been near a flood island for a  
03 long, long time, so, therefore, the ground hasn't -- those  
04 areas where the groundwater stayed high, they haven't been  
05 able to farm much and the ground is very shallow, very high  
06 in elevation, that groundwater is high and it varies -- in  
07 some areas you see real close coordination with the tides,  
08 lots of amplitude, some are very small amplitudes, lot of  
09 variation. There is natural conditions that have a lot of  
10 variability.

11 MS. LEIDIGH: Next question is: Assuming these  
12 interceptor wells return seepage water to the reservoir  
13 island, is this going to affect the project yield?

14 MR. HULTGREN: In our concept, no. The water returning  
15 is the water that was escaping through seepage. So by using  
16 the neighbors' islands as our reference point, we're not  
17 causing any seepage onto or off of their island. Therefore,  
18 we are not --

19 MS. LEIDIGH: What about onto or off of the Delta  
20 Wetlands' islands?

21 MR. HULTGREN: That is the water that was trying to come  
22 off of the Delta Wetlands' island. We are catching it. We  
23 are putting it back onto the Delta Wetlands' island. So it  
24 hasn't left their property. So we consider it-- I am not  
25 on the legal side. As an engineer, I think we should return  
2717

01 it there because it just came off their island.

02 MS. LEIDIGH: How do you make sure that it doesn't  
03 actually add to the amount of water that is stored on the  
04 Delta Wetlands' reservoir island?

05 MR. HULTGREN: Well, to do so you would have to be  
06 pumping at a rate that would start dropping the water level  
07 below your neighbors' islands. Those piezometers, or water  
08 level monitoring devices on your neighbors' islands, if we  
09 start lowering the water table below historical ranges, it  
10 will draw it down. It will see that we are mining water off  
11 that system. And if it goes up, then we are not pumping  
12 enough. So, it's not just trying to keep water from going  
13 on your neighbors' islands; you can also check whether we  
14 are mining water, lowering water table, too much water.  
15 These monitoring levels will tell all.

16 MS. LEIDIGH: That answers my questions.

17 HEARING OFFICER STUBCHAER: Mr. Sutton.

18 MR. SUTTON: Can I just follow-up on that last question  
19 from Ms. Leidigh?

20 You are talking about mining water from the adjacent  
21 island by measuring piezometer. With hydraulic head  
22 difference between the channel and the Delta Wetlands'  
23 island when it is full, you are going to have a hydraulic  
24 gradient across or underneath the channel to the adjacent  
25 island. In order to maintain that adjacent island at the  
2718

01 same level, don't you have to remove a certain amount of --  
02 a net removal of water from the adjacent channel in order to  
03 reduce that head -- below the adjacent channel aren't you,  
04 in essence, mining water from the channel, to a certain  
05 degree?

06 MR. HULTGREN: I agree, we are. What we are taking is



07 the same -- in my opinion, we are taking the same amount of  
08 water that is seeping in today. In other words, we are not  
09 putting in an impermeable barrier vertically through our  
10 island and forcing all the head to go to the neighbor's  
11 island. We are continuing to take our portion of that  
12 seepage onto our island. And if we do not do so, it would  
13 go to our neighbor's island and raise the groundwater  
14 level.

15 So, we have a commitment, I think, to maintain the  
16 average groundwater level around the perimeter of our island  
17 similar to what it is today in agriculture. If we don't do  
18 that, we will be causing water to seep toward our neighbor.  
19 So, the seepage that is coming onto the islands now that is  
20 caused by seepage, et cetera, we'll also have to be pumping  
21 that in order not to affect our neighbor.

22 MR. SUTTON: Thank you.

23 Just a couple of clarification questions, Dr. Brown.

24 In response to a question from Mr. Maddow today, Mr.  
25 Korslin testified concerning the stipulations entered into  
2719

01 between Delta Wetlands and various parties, and those  
02 stipulations have been entered into the record.

03 Have you had a chance to examine the terms and  
04 conditions of any of those stipulations?

05 DR. BROWN: I have read them.

06 MR. SUTTON: In your opinion, do those stipulations  
07 appear to apply primarily to recognition of prior rights?

08 DR. BROWN: Yes. I think we can summarize it that way,  
09 prior rights and, say, operations of the current  
10 facilities.

11 MR. SUTTON: In your opinion, if those stipulations  
12 were to be implemented in a water right permit for Delta  
13 Wetlands, would implementation of those stipulations provide  
14 for any significant change in the operation or yield of the  
15 Delta Wetlands Project compared to what was modeled in the  
16 Draft EIR/EIS?

17 DR. BROWN: I don't think there would be any changes to  
18 the modeling results because the assumptions for the  
19 modeling analysis was that, indeed, all prior water rights  
20 and existing operations were not interfered with by this  
21 new, potential project. So the stipulations are more of the  
22 real life agreement that is consistent with the modeling  
23 assumption that we have already made.

24 MR. SUTTON: Thank you.

25 You indicated in your testimony concerning the issue of  
2720

01 topping off, that the modeling showed that there was  
02 occasional topping off; is that correct?

03 DR. BROWN: Yes.

04 MR. SUTTON: In the Draft EIR/EIS, did you assume there  
05 was no topping off when the Delta was in balance condition?

06 DR. BROWN: That is right. If the Delta is in balance  
07 conditions, there was no available water for diversion under  
08 the new water right, then there would be no allowable  
09 topping off in the analysis that we have done.

10 MR. SUTTON: Finally, Mr. Wernette, from Fish and Game,  
11 testified that with the Department of Fish and Game's

12 Biological Opinion it was the Department's estimate that the  
13 Delta Wetlands' yield would drop about 20,000 acre-feet to a  
14 net average annual yield of approximately 134,000 acre-feet  
15 compared to the yield obtained under the final operating  
16 criteria.

17 You testified that you thought there would be an  
18 approximately 538,000 acre-feet reduction, for a net average  
19 annual yield of about 106,000 acre-feet, plus 18,000  
20 acre-feet for Delta outflow.

21 Can you account for the difference in the yield impact  
22 calculations between your numbers and Fish and Game's  
23 numbers?

24 DR. BROWN: No, I cannot. I do not know how Fish and  
25 Game estimated their yield under their proposed criteria.  
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01 MR. SUTTON: Thank you.

02 HEARING OFFICER STUBCHAER: Mr. Canaday.

03 MR. CANADAY: No.

04 HEARING OFFICER STUBCHAER: I just have kind of a  
05 hypothetical question for Mr. Hultgren.

06 If you had the channel and the levees and the islands  
07 and the soils were totally homogeneous, could there be any  
08 seepage from the reservoir island to neighboring islands or  
09 would the water level in the channel control the hydraulic  
10 gradient in the soils underneath? Or do you know?

11 MR. HULTGREN: Try it one more time.

12 HEARING OFFICER STUBCHAER: A little background first.  
13 It is my understanding that some of the seepage problems are  
14 because of sand lenses down underneath the peat going under  
15 the channel.

16 MR. HULTGREN: Yeah.

17 HEARING OFFICER STUBCHAER: They provide a conduit for  
18 water from the reservoir island to seep into the farm  
19 island?

20 MR. HULTGREN: Correct.

21 HEARING OFFICER STUBCHAER: My question had to do with:  
22 What if there were no sand lenses, the whole thing was a  
23 homogeneous soil, whether it is sand, clay or peat, whatever  
24 it was, could there be a seepage from the reservoir island  
25 to the farm island under the channel under that

2722  
01 circumstance?

02 MR. HULTGREN: Sure, yes. Because of the head  
03 difference. We are storing water on our island and the soil  
04 has some permeability at all, there is a head, therefore,  
05 there is a flow.

06 HEARING OFFICER STUBCHAER: Would the head in the  
07 channel determine the head in the soil under the channel and  
08 neutralize the gradient between the islands?

09 MR. HULTGREN: If you assumed a real deep profile, then  
10 the large body of water we are storing would have some  
11 effect on the neighbors. If you are talking a very shallow  
12 aquifer, then the slough would dominate.

13 HEARING OFFICER STUBCHAER: Just a hypothetical. Sorry  
14 to take your time on that one.

15 That concludes the cross-examination of this panel. We  
16 want to thank you, Mr. Korslin, for running the slide

17 projector for everyone.

18 MR. KORSLIN: I am willing to stay up here for other  
19 people.

20 HEARING OFFICER STUBCHAER: Ms. Brenner.

21 MS. BRENNER: I would request that the exhibits be  
22 moved into evidence and make some clarification with regard  
23 to the exhibit identification list.

24 HEARING OFFICER STUBCHAER: When I said concludes the  
25 cross-examination of this panel, I wasn't excluding Mr.  
2723

01 Shaul.

02 MS. BRENNER: Do we wait until Kavanaugh and Shaul  
03 tomorrow?

04 HEARING OFFICER STUBCHAER: Yes.

05 MS. BRENNER: Can I go ahead and make a clarification  
06 with regard to the exhibit identification list or index?

07 HEARING OFFICER STUBCHAER: Yes.

08 MS. BRENNER: We have previously submitted exhibits by  
09 reference. Exhibit DW-24, the API Standard 1104, 17th  
10 Edition, Welding and Pipelines at Related Facilities; and  
11 DW-25, ASME B-31.4-92 Edition; and the B 31-4 Liquid  
12 Transportation System for Hydrocarbons, Liquid Petroleum,  
13 Gas, and Hydrous Ammonia and Alcohols. They were cited by  
14 Dr. Egan in his direct testimony. We supplied a copy of  
15 each document to the State Water Resources Control Board.

16 And, Mr. Stubchaer, you requested further  
17 clarification with regard to these particular exhibits.  
18 Because the API 1104 addresses testing and repair of wells,  
19 and that issue hasn't come up, we would like to withdraw  
20 that exhibit from our exhibit list. So that would be  
21 withdrawal of Exhibit DW-24. And with respect to the ASME  
22 B-31-4, we refer to the Board Chapters 5 through 8,  
23 addressing Construction, Inspections, Testing, Operation and  
24 Maintenance Corrosion Control on Liquid Transportation  
25 Pipelines.

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01 The previous identification list indicated for ASME  
02 B-31-4 that we referenced only a '92 publication date.  
03 Actually, we also provided a '94 Addenda to the Water  
04 Resources Control Board when we submitted those particular  
05 documents and both publication and addenda are offered as  
06 exhibits by reference. We, again, have modified our exhibit  
07 list to reflect that.

08 The other thing I would like to do is clarify with  
09 regard to the Flow Science reports that were submitted. I  
10 had a discussion with Water Board staff regarding what would  
11 be Delta Wetlands 14B, which is the current reference to the  
12 Flow Science report produced by Dr. List. What I would like  
13 to do is keep the original Flow Science report in as 14B and  
14 add the errata as Delta Wetlands 14C, so that both of those  
15 documents will remain in the record. And reason for that is  
16 the attachments are A through D in the original Flow Science  
17 report were not submitted with the errata. That way you  
18 will have a complete set here with the Water Board. All the  
19 -- everybody has been served with all these documents; it's  
20 just a matter of clarification of the exhibit identification  
21 exhibit list.

22 HEARING OFFICER STUBCHAER: Staff have that?  
23 Mr. Sutton.  
24 MR. SUTTON: Yes. We have all of that. I would just  
25 like to point out that Exhibit DW-25 was offered and,  
2725  
01 because it was protested, it has not been accepted yet.  
02 That matter has to be clarified before the end of the  
03 hearing.  
04 HEARING OFFICER STUBCHAER: Remind of that again  
05 tomorrow when we act on these.  
06 MS. BRENNER: Thank you, Mr. Stubchaer.  
07 HEARING OFFICER STUBCHAER: According to my notes here,  
08 the next panel will be cross-examined on rebuttal testimony  
09 would be CUWA.  
10 I am sorry, Mr. Nomellini. Just trying to get even  
11 with you, I guess.  
12 Who's going to want to cross-examine Central Delta?  
13 I see two parties. Mr. Etheridge.  
14 Was it you or Mr. Roberts?  
15 Come forward. Come up.  
16 ---oOo---  
17 REBUTTAL CROSS-EXAMINATION OF CENTRAL DELTA WATER AGENCY  
18 BY EAST BAY MUNICIPAL UTILITY DISTRICT  
19 BY MR. ETHERIDGE  
20 MR. ETHERIDGE: Thank you, Mr. Stubchaer.  
21 Fred Etheridge for East Bay MUD. I just had a few  
22 short questions for Mr. Neudeck.  
23 I would like to refer to some photographs that you  
24 introduced in your rebuttal testimony, beginning with  
25 Central Delta Water Agency Number 18. Do you by chance have  
2726  
01 overheads of those?  
02 MR. NEUDECK: Yes, I do. As you recall, they are not  
03 very good.  
04 MR. ETHERIDGE: That's right.  
05 MR. NOME LLINI: I'm at fault. I made them.  
06 MR. ETHERIDGE: But they work. You testified this  
07 photograph, Central Delta Water Agency Number 18 shows the  
08 1980 flooding of Jones Tract; is that correct?  
09 MR. NEUDECK: That's correct.  
10 MR. ETHERIDGE: Does that photograph also show the  
11 three Mokelumne aqueducts in the upper right corner?  
12 MR. NEUDECK: Yes, it does.  
13 MR. ETHERIDGE: Are those aqueducts located down on the  
14 island itself and not on top of the levee; is that correct?  
15 MR. NEUDECK: Yes. In this photo, you see the location  
16 is on the floor of the island. It does go over the top of  
17 the levee on the east and west ends.  
18 MR. ETHERIDGE: That is only for a brief distance where  
19 it crosses over the levee?  
20 MR. NEUDECK: That's correct.  
21 MR. ETHERIDGE: As depicted in this photograph, don't  
22 the aqueducts run roughly parallel to the railroad track and  
23 the Jones Tract levee shown in the photo?  
24 MR. NEUDECK: Yes. Actually, this is the railroad  
25 embankment that is serving as a levee between the two, Upper  
2727

01 and Lower Jones.

02 MR. ETHERIDGE: The Mokelumne Aqueducts in the  
03 photograph run roughly parallel to that?

04 MR. NEUDECK: Yes.

05 MR. ETHERIDGE: Does this photograph show the piles or  
06 supports upon which the Mokelumne Aqueducts are resting?

07 MR. NEUDECK: Yes. You can see them in the photo.

08 MR. ETHERIDGE: Turning now to Central Delta Water  
09 Agency Number 19, another photograph.

10 You testified that this photograph also shows the 1980  
11 Jones Tract flooding, water moving in a southerly direction.  
12 That would be from left to right in the photograph; is that  
13 correct?

14 MR. NEUDECK: This is the break that occurred in the  
15 railroad embankment, whereas Lower Jones spilled into Upper  
16 Jones.

17 MR. ETHERIDGE: This photograph, at least in the color  
18 version, it is visible. You can see a breach in the levee  
19 with water pouring through onto Upper Jones towards the  
20 stores, Mokelumne Aqueduct. Is that correct?

21 MR. NEUDECK: That is correct.

22 MR. ETHERIDGE: I will say this, on the color version  
23 of this photograph --

24 MR. NEUDECK: Which is right in there.

25 HEARING OFFICER STUBCHAER: Mr. Nomellini, I have a  
2728 scanner and color ink jet printer I would like to sell you.

01 MR. NOMESELLINI: I am going to have to be interested.

02 MR. ETHERIDGE: On the color photographs we have here,  
03 can you now see the piles that support on the Mokelumne  
04 Aqueduct?  
05

06 MR. NEUDECK: You cannot. You can see some relative  
07 locations where there are supports that actually come over  
08 the top but I believe are coincidental to pile supports.  
09 But all the below flow line pile supports are submerged in  
10 this photo.

11 MR. ETHERIDGE: And they are submerged underneath the  
12 flood waters; is that correct?

13 MR. NEUDECK: That is correct.

14 MR. ETHERIDGE: Didn't you also testify that the three  
15 railroad cars fell into the water as a result of this  
16 flooding.

17 MR. NEUDECK: Yes. There was two locomotive engines  
18 and one box car. One of the engines you can see is directly  
19 in the center of the break. The box cars off to the west;  
20 and another locomotive is buried in the center in the hole,  
21 which you cannot see.

22 MR. ETHERIDGE: I believe you testified in an  
23 approximately 50-foot deep hole is where that second  
24 locomotive was resting?

25 MR. NEUDECK: Yes. That was the scour that occurred  
2729 once the break occurred.

01 MR. ETHERIDGE: So, in other words, the force of this  
02 flood waters poured through the levee causing the breach  
03 seen in the photograph; is that correct?

04 MR. NEUDECK: That is correct.

05

06 MR. ETHERIDGE: Of course, those flood waters also dug  
07 out or scored a hole into which the locomotive fell?

08 MR. NEUDECK: Yes.

09 MR. ETHERIDGE: In your opinion, could scour caused by  
10 flood waters undercut the supports of the Mokelumne  
11 Aqueducts?

12 MR. NEUDECK: It could. In fact, as part of the  
13 process, during the initial stages of restoring the railroad  
14 embankment, I understand East Bay MUD actually came in and  
15 placed material around some of the pile supports that had  
16 been washed out as result of the flow going by them.

17 MR. ETHERIDGE: So, it would not be necessary for flood  
18 waters to actually overtop the aqueduct pipelines to damage  
19 them?

20 MR. NEUDECK: No. They could be -- depending upon the  
21 depth of foundation, the foundation could be scoured away.

22 MR. ETHERIDGE: That is all the questions I have.

23 Thank you very much.

24 HEARING OFFICER STUBCHAER: Who is going to  
25 cross-examine for Delta Wetlands? Ms. Brenner.

2730

01 ---oOo---

02 REBUTTAL CROSS-EXAMINATION OF CENTRAL DELTA WATER AGENCY

03 BY DELTA WETLANDS PROPERTIES

04 BY MS. BRENNER

05 MS. BRENNER: Good afternoon, Mr. Neudeck.

06 MR. NEUDECK: Good afternoon.

07 MS. BRENNER: Isn't it true that if a Delta Wetlands'  
08 levee were to breach in a full condition, that the water  
09 would move into the Delta channels adjacent to that breach?

10 MR. NEUDECK: Yes, that would.

11 MS. BRENNER: Wouldn't the flow of water from the  
12 Delta Wetlands' island, assuming water was in storage, just  
13 dissipate into the adjacent channels, much as occurs during  
14 a high tide event?

15 MR. NEUDECK: Depending on the location, there could be  
16 dissipation. If it's in a channel that is in a narrow band,  
17 a narrow width, there could be an impact to the neighboring  
18 island due to the inrush of water into the channel. If you  
19 have very low tide, say, a minus tide, and were to get a  
20 breach of the levee of plus six, you could have an impact on  
21 the neighboring island.

22 One of the concerns we have when we are working on  
23 rivering levees, and a levee may break upstream, and we cut  
24 the water back in downstream, the water flows downstream, is  
25 to do it in such a way that we do not impact neighboring

2731

01 islands by directing the flow directly across the levee.

02 So there is a chance that that could go both  
03 directions. If it is in a very wide area, you could  
04 dissipate a slow leak just raising the water surface.

05 MS. BRENNER: There is a variety of conditions that  
06 could occur during any kind of flooding in the Delta?

07 MR. NEUDECK: That is correct.

08 MS. BRENNER: Have you calculated how rapidly water in  
09 storage on Bacon Island would empty into adjacent islands if  
10 there were a levee failure on Bacon Island?

11 MR. NEUDECK: No, I have not.

12 MS. BRENNER: Have you estimated how much the water  
13 moving out of Bacon Island, if water was in storage, would  
14 move out into the adjacent islands in any particular  
15 direction?

16 MR. NEUDECK: No, I have not.

17 MS. BRENNER: You discussed a wind analysis used on  
18 Table 5.2 for that wave runup and wind analysis?

19 MR. NEUDECK: Yes, I did.

20 MS. BRENNER: Isn't it true that Stockton wind  
21 velocities are the most appropriate to use for Delta  
22 conditions?

23 MR. NEUDECK: The report is -- states, or the exhibit  
24 states -- if you don't mind, I can put it up. The exhibit  
25 states fastest wind speeds and directions over a period 1931  
2732

01 to 1970, and does cite Stockton. The text that supports  
02 this, that was citation through a U.S. Army Corps of  
03 Engineers' report, I don't recall, says the fastest over  
04 water wind speed was 70 to 73 miles an hour, and I believe  
05 that was the speed with which the wave runup analysis was  
06 done for the maximum wind speed.

07 MS. BRENNER: For Sacramento?

08 MR. NEUDECK: No. They actually said for Stockton.

09 MS. BRENNER: This doesn't say that.

10 MR. NEUDECK: This doesn't say that, but the text  
11 does.

12 MS. BRENNER: What text does?

13 MR. NEUDECK: The text of this report that I did not  
14 enter into as an exhibit.

15 MS. BRENNER: Can you give me the name of the text?

16 MR. NEUDECK: It's the report that this came out of.  
17 It is a Dames & Moore report that was prepared for PG&E,  
18 McDonald Island, on McDonald Island, for the restoration of  
19 McDonald Island levees. My prior testimony in rebuttal  
20 where these documents came out of.

21 MS. BRENNER: But we don't have the report; that is my  
22 problem.

23 MR. NEUDECK: No, you don't.

24 MS. BRENNER: You are indicating to me that this table,  
25 C2-0 was actually incorrect with regard to the highest wind  
2733

01 speeds for the Stockton area?

02 MR. NEUDECK: I am suggesting that the report stated 70  
03 to 73 miles an hour as the fastest speed. This report cites  
04 as high as 46. There is a contradiction there.

05 MS. BRENNER: Yes. It is difficult for me to  
06 understand your rebuttal testimony with such a contradiction  
07 without seeing the entire report or even knowing where this  
08 report is or what year this report was developed.

09 MR. NEUDECK: I understand.

10 HEARING OFFICER STUBCHAER: The question -- pardon the  
11 interruption.

12 MS. BRENNER: The question would be that I would move  
13 to strike this particular report or this portion of the  
14 report because I don't have the full thing, nor can I  
15 probably cross-examine this particular gentleman on the wind

16 speeds and the impact of this. 46 degrees, or 46 miles and  
17 per hour is much different from a 70-some odd mile per hour  
18 wind speed. The corresponding testimony that goes with that  
19 with regard to wave runup is that, also, significantly  
20 different.

21 HEARING OFFICER STUBCHAER: I have a question for the  
22 witness. Was that 70, 73 mile an hour wind speed, was  
23 supposedly observed or was that theoretical? Or do you  
24 know?

25 MR. NEUDECK: I am going to read the report, even  
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01 though it is not entered into testimony. It states as  
02 follows -- this is the text that supports this document.

03 MS. BRENNER: I don't necessarily want you to read the  
04 report.

05 MR. NEUDECK: I am answering Mr. Stubchaer's question.

06 MS. BRENNER: I understand that. The problem is that I  
07 don't have the report, and I can't read the report.

08 MS. LEIDIGH: Maybe I can ask a couple of questions for  
09 the witness.

10 HEARING OFFICER STUBCHAER: Go ahead.

11 MS. LEIDIGH: Mr. Neudeck, is your testimony based on  
12 the assumption that these wind speeds occurred, and then  
13 you're calculating the amount of waves, or is your testimony  
14 that this is the wind speed?

15 MR. NEUDECK: My testimony was simply to demonstrate  
16 that there has been a study done in the Delta for an island  
17 that was under water, which is Mildred Island, adjacent to  
18 McDonald Island, and was just simply referencing a document  
19 that was in existence that showed a study for wind-wave  
20 erosion.

21 I was bringing into testimony to show that here is an  
22 example where an island remained flooded and the adjoining  
23 reclamation district undertook a study to evaluate the  
24 parameters caused by that adjoining island being flooded.  
25 These were exhibits within that report that demonstrated

2735  
01 their findings.

02 MR. NOMESELLINI: I might add we didn't offer it to say  
03 that that is the criteria to be used in this project. But  
04 just as an example of the conditions that go into wind-wave  
05 analysis and those factors. I think it has been admitted by  
06 Mr. Hultgren that six-foot runup is a realistic runup for  
07 conditions that would be encountered with the fetches that  
08 we have. I don't know what the point of debate is.

09 HEARING OFFICER STUBCHAER: Well, I think he said with  
10 a 70-mile an hour wind speed, and I don't know where he got  
11 the wind speed?

12 MS. BRENNER: That is the issue.

13 MR. NOMESELLINI: Mr. Hultgren --

14 HEARING OFFICER STUBCHAER: Anything more, Mr.  
15 Nomellini?

16 MR. NOMESELLINI: I believe you have Stockton and  
17 Sacramento. There is no wind measuring mechanisms or  
18 weather stations out in the middle of the Delta. We always  
19 have a variety of intermediate judgments. That is what I  
20 think happened from an engineering standpoint. I think all



21 the engineers kind of correlated.

22 HEARING OFFICER STUBCHAER: There are different ways of  
23 doing it. You can have 30 years -- like rainfall, you can  
24 have 30 years of wind speeds; you can do a statistical  
25 analysis and project out to the hundred year.

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01 MR. NEUDECK: That is what I think -- the report states  
02 that these are 50 and a hundred year return intervals that  
03 cause the 70 miles a hour. That was not testified to in my  
04 rebuttal.

05 MS. BRENNER: My suggestion is that Stockton is the  
06 more accurate depiction of actual wind speeds in the Delta,  
07 not Sacramento. I see the highest speed and I don't see  
08 anything that would give me a mean or average of 73. I  
09 don't even see a high of 73 or somewhere in the 70's. That  
10 is what I am suggesting is that, when I ask a question,  
11 isn't this more accurate, and you say, yes, then wind  
12 speeds that you should be basing the testimony on is that,  
13 not something that is higher than that.

14 MR. NEUDECK: I didn't suggest that this would be -- I  
15 suggested that the 70 was the fastest. I just clarified  
16 that was the 15 to hundred year return period. This is over  
17 a 40-year period. If you read -- the document speaks for  
18 itself. I did not go back and analyze this. So, I am  
19 speaking for --

20 MS. BRENNER: The document that I can look at, that  
21 they submitted into evidence indicates that the highest wind  
22 speed in Stockton is 46.

23 MR. NEUDECK: That is correct.

24 MS. BRENNER: With a lower maximum wind speed such as  
25 46, wouldn't the wave runup with riprapping also be

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01 substantially lower?

02 MR. NEUDECK: Yes. It would.

03 MS. BRENNER: Thank you. I have nothing further.

04 HEARING OFFICER STUBCHAER: Staff?

05 I have already asked my questions.

06 Mr. Nomellini.

07 MR. NOME LLINI: Clarification question.

08 HEARING OFFICER STUBCHAER: Wait a minute. Are you  
09 going to cross-examine your own witness?

10 MR. NOME LLINI: Clarification on the wind speed that  
11 came up on the cross-examination.

12 HEARING OFFICER STUBCHAER: I don't think we have.

13 MR. NOME LLINI: The document speaks for itself. The  
14 only question I have is whether or not you want to use  
15 Sacramento or Stockton as representative of these projects.  
16 We had testimony from the attorney for Delta Wetlands that  
17 she thought, and she is not under oath, that she thought  
18 Stockton was more representative.

19 HEARING OFFICER STUBCHAER: She was saying isn't it and  
20 you can't.

21 MR. NOME LLINI: That is good enough. The information  
22 is there for your use, to give it whatever weight you want  
23 to give it.

24 MS. LEIDIGH: Are there some exhibits that you want to  
25 offer?

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01 MR. NOMESELLINI: We would like to put them all into  
02 evidence with the questions as to weight going to these last  
03 two documents, or the one.

04 MS. LEIDIGH: What are your rebuttal exhibit numbers?

05 MR. NOMESELLINI: Well, we put the whole list together.  
06 Central Delta Water Agency's 1 through 25.

07 HEARING OFFICER STUBCHAER: Are there -- do you have  
08 that?

09 MR. NOMESELLINI: We submitted a corrected list.

10 MS. BRENNER: I still retain my objection with regard  
11 to the table that he had up. If that is not an accurate  
12 depiction or it is more complete, then I am going to object.

13 HEARING OFFICER STUBCHAER: It's hard to hear you.

14 MS. BRENNER: That one particular graph, it  
15 contradicts, and the others parts of the report, I still  
16 would like to raise my objection to that particular Table  
17 C2-0.

18 HEARING OFFICER STUBCHAER: Your objection is noted  
19 and, thinking like an engineer, I notice the difference  
20 between little data set and the calculation frequency of  
21 return.

22 Are there any other objections to receipt of these  
23 exhibits into evidence?

24 Hearing none, they are accepted.

25 Next is CUWA.

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01 HEARING OFFICER STUBCHAER: Can I have a show of hands  
02 of the parties who wish to examine the CUWA panel?

03 Delta Wetlands, Mr. Nomellini.

04 Mr. Nomellini, you are back up here again.

05 MR. NOMESELLINI: I can't leave. I have one simple  
06 question.

07

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08

REBUTTAL CROSS-EXAMINATION OF  
CALIFORNIA URBAN WATER AGENCIES  
BY CENTRAL DELTA WATER AGENCY  
BY MR. NOMESELLINI

11

12 MR. NOMESELLINI: With regard to the operation of the  
13 Delta Wetlands' reservoir projects, so as not to cause any  
14 degradation of water quality, do you agree that it would be  
15 possible to modify the operation slightly, or whatever is  
16 required, so that there would be no degradation of  
17 in-channel water quality from the Delta?

18 MR. KRASNER: That question's for me?

19 MR. NOMESELLINI: You.

20 MR. KRASNER: I think it depends on whose expert  
21 evidence you accept, as to how much organic carbon loading  
22 there will be. According to the evidence we saw earlier  
23 today from Dr. Horne, it would suggest that operations  
24 wouldn't result in any degradation. And so that would  
25 suggest it could be done.

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01 I think if, on the other hand, you look at some of the  
02 data that we have presented, the CUWA panel, while we  
03 suggest there will be higher organic carbon loading, I  
04 imagine one could set up a discharge where it, wouldn't be

05 all discharged in a short period of time, but over a longer  
06 period of time. That would result in, at least, less  
07 degradation.

08 MR. NOMEILLINI: It would affect the yield of the  
09 project, perhaps --

10 MR. KRASNER: Or maybe just the timing. But, again, I  
11 think that one would have to have some better values. But  
12 depending on which values you accept, you could come up with  
13 potentially a formula to result in no degradation.

14 MR. NOMEILLINI: Thank you.

15 HEARING OFFICER STUBCHAER: Delta Wetlands.

16 ----oOo----

17 REBUTTAL CROSS-EXAMINATION OF  
18 CALIFORNIA URBAN WATER AGENCIES  
19 BY DELTA WETLANDS PROPERTIES  
20 BY MS. BRENNER

21 MS. BRENNER: Good afternoon, Dr. Shum, Dr. Krasner.

22 I am going to hand back difficult Dr. Krasner's  
23 original article on degradation.

24 MR. KRASNER: I have my own copy, as well.

25 MS. BRENNER: Mr. Krasner, in your rebuttal testimony  
2741

01 you mentioned an 80 percent number, which you referred as  
02 level which EPA has established as a level or a safety  
03 factor that utilities need to be using to develop reliable  
04 compliance.

05 Is that correct?

06 MR. KRASNER: Yes.

07 MS. BRENNER: Your reference Section 2.3 of the  
08 Agreement in Principal, CUWA Exhibit 15, as an example of  
09 EPA's adoption of this 80 percent safety factor, correct?

10 MR. KRASNER: Yes. That is one of the examples.

11 MS. BRENNER: CUWA Exhibit 15 is not an agreement  
12 between the EPA and other parties, is it?

13 MR. KRASNER: It is an agreement between the EPA and  
14 all the parties.

15 MS. BRENNER: It is?

16 MR. KRASNER: Yes, it is. The other parties include  
17 the other drinking water representatives that were in the  
18 negotiations, the different environmental groups, such as  
19 the National Resources Defense Council, and the health  
20 community, state and public agencies. So all of the parties  
21 that were stakeholders in process were all agreeing to that.

22 MS. BRENNER: Isn't it actually an agreement between  
23 an advisory committee and not EPA and other parties?

24 MR. KRASNER: Say that again.

25 MS. BRENNER: Isn't it actually an agreement in  
2742

01 principle between an advisory committee, but not the EPA,  
02 and other parties?

03 MR. KRASNER: EPA is one of the parties that was  
04 involved in crafting and signing it.

05 MS. BRENNER: It's the advisory committee; they are not  
06 signing on behalf of the EPA; they are signing on behalf of  
07 the advisory committee, correct?

08 MR. KRASNER: Each party to the negotiations signed on  
09 behalf of the group that they represented, and there were

10 different stakeholders.

11 MS. BRENNER: This indicates on Page 1 of this  
12 particular document, Agreement in Principle, and I was  
13 provided a full copy of this particular document, that this  
14 document is between a committee made up of organizational  
15 members named by EPA. That doesn't indicate anywhere on  
16 this document that EPA is a signatory to this particular  
17 agreement.

18 MR. KRASNER: EPA is part of that committee. I think  
19 --

20 MS. BRENNER: That's okay. We can move forward.

21 MR. KRASNER: No, I would like to finish answering the  
22 question for you.

23 MS. BRENNER: You have. You are indicating that EPA is  
24 a party to this agreement, and I am saying how I read it,  
25 was that --

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01 MR. KRASNER: I was just trying to clarify.

02 HEARING OFFICER STUBCHAER: Wait. One at a time.

03 MR. KRASNER: I would like to clarify since I am  
04 somebody who has participated at the Federal Advisory  
05 Committee. EPA is a full member of that committee. The  
06 members are people, who are stakeholders, include not only  
07 the regulated community, but the regulators and other  
08 stakeholders in the process. EPA was a full partner on  
09 this, and the Federal Advisory Committee Act only works if  
10 the regulatory agency is an equal partner in the process.  
11 So they were a member of the Federal Advisory Committee  
12 Act.

13 MS. BRENNER: The parties to this agreement only  
14 agreeing not to oppose a rule that the EPA may adopt  
15 pursuant to the Safe Drinking Water Act. Were these  
16 particular parameters or measures within that rule?

17 MR. KRASNER: Where are you reading from?

18 MS. BRENNER: I am not reading from anywhere.

19 MR. KRASNER: What was the question again?

20 MS. BRENNER: Are the parties to this agreement only  
21 agreeing to not oppose a rule that EPA may adopt pursuant to  
22 the Safe Drinking Water Act if that rule that they may adopt  
23 contains particular provisions which are set forth in this  
24 Agreement in Principle?

25  
2744

01 that the Federal Advisory Committee Act works is the EPA and  
02 other parties develop a number of things. And in this  
03 particular case that I developed regulatory requirements,  
04 regulatory language, and the parties agree, one, to not sue  
05 over adoption of the regulation that they helped construct.  
06 And they also agree to, in fact, even help support this  
07 regulation which they helped develop, since it was developed  
08 as a joint effort. So, EPA is a member of the committee  
09 that helped develop the regulation.

10 MS. BRENNER: This isn't any development of any  
11 particular regulation now, is it?

12 MR. KRASNER: Yes.

13 MS. BRENNER: This is development of a proposal for a  
14 regulations in the Safe Drinking Water Act, correct?

15 MR. KRASNER: It was a development of the expedited  
16 Stage I disinfection byproduct rules and the expedited  
17 interim inland surface treatment rule. And that material is  
18 going into, I notice date of availability and a proposed,  
19 but it is amending the proposed regulation for '94.

20 MS. BRENNER: So the agreement is that these parties  
21 won't oppose the adoption of those particular rules,  
22 correct?

23 MR. KRASNER: Correct. And also EPA will move forward  
24 with what they helped agree to as a member.

25 MS. BRENNER: That is not set forth in this agreement,  
2745  
01 is it?

02 MR. KRASNER: I haven't recently looked at the exact  
03 language. I was trying to explain how the Federal Advisory  
04 Committee works. EPA will go forward. As an example, in  
05 1992, 1993 a previous Federal Advisory Committee, with the  
06 EPA's participant, developed a set of regulatory  
07 requirements and that all went forward into the Federal  
08 Register, and many of those elements, a majority of them are  
09 still being implemented in the final rule.

10 MS. BRENNER: You indicated Paragraph 2.3 was the  
11 particular provision which you said is adopted by EPA with  
12 80 percent criteria, correct?

13 MR. KRASNER: That is one example.

14 MS. BRENNER: Right. That 2.3, as it mentions, is that  
15 a public water systems or utilities will be required to do a  
16 profile and a benchmark of their current disinfection  
17 requirement if they produce THMs at a particular level,  
18 correct?

19 MR. KRASNER: Correct.

20 MS. BRENNER: If they have -- if a public water system  
21 has measurements of THM levels of at least 80 percent of the  
22 MCL as an annual average -- correct?

23 MR. KRASNER: Correct.

24 MS. BRENNER: -- then that public water system must  
25 prepare a disinfection profile, correct?  
2746

01 MR. KRASNER: Yes.

02 MS. BRENNER: That is all that this particular section  
03 is contemplating, correct?

04 MR. KRASNER: No, that is not correct. If you read  
05 further, the profile, basically, sets up a benchmarking as  
06 to the utility's current disinfection practices. And that  
07 benchmarking then becomes their new disinfection requirement  
08 that they have to meet. They cannot, to get to a lower  
09 trihalomethane level, go under those disinfection  
10 requirements.

11 MS. LEIDIGH: Excuse me, what exhibit are we looking at?

12 MS. BRENNER: CUWA's Exhibit, I think it is, 15.

13 MS. LEIDIGH: Exhibit 15.

14 MS. BRENNER: Correct. I got a full copy of the  
15 particular exhibit. They submitted one page or two pages of  
16 it originally. We agreed that they would provide full  
17 copies.

18 MS. LEIDIGH: Mr. Sutton has copies.

19 MS. BRENNER: Section 2.3 indicates that the particular

20 public water system that has these measurements based on an  
21 annual average of a prior year's data, that they will then  
22 have to collect additional information pursuant to the  
23 Information Collection Rule, correct?  
24 MR. KRASNER: I don't offhand see any reference to the  
25 Information Collection Rule.

2747  
01 MS. BRENNER: This rule has not yet been adopted by the  
02 EPA?  
03 MR. KRASNER: Which rule?  
04 MS. BRENNER: 2.3 Benchmark Profile Rule.  
05 MR. KRASNER: Are you talking about, has the expedited  
06 State Board disinfection byproduct rule been adopted?  
07 MS. BRENNER: No. I am talking about this particular  
08 benchmarking profile and section of the Agreement in  
09 Principle.  
10 MR. KRASNER: To answer your question, none of the  
11 expedited Stage I rules has been adopted; rather it has been  
12 agreed upon, and that is the rule that EPA is going forward  
13 with.  
14 MS. BRENNER: This benchmarking suggestion utilized  
15 annual averages, right?  
16 MR. KRASNER: For this particular requirement, yes.  
17 MS. BRENNER: You also indicated in your rebuttal  
18 testimony some information regarding sulfuric acid?  
19 MR. KRASNER: Yes.  
20 MS. BRENNER: You indicated that the use of sulfuric  
21 acid along with coagulant chemicals will be required for  
22 MWD's treatment plants to achieve the proposed enhanced  
23 coagulation TOC removal requirements defined in the proposed  
24 D/DBP rule, Stage I?  
25 MR. KRASNER: I suggested that many people who use  
2748  
01 Delta water who have high enough alkalinity will need a  
02 combination of acid and coagulants.  
03 MS. BRENNER: Including MWD?  
04 MR. KRASNER: Any utility that needs to meet these  
05 requirements and has high alkalinity would need both.  
06 MS. BRENNER: Including MWD?  
07 MR. KRASNER: Or its member agencies.  
08 MS. BRENNER: I just want to know if MWD needs to do  
09 that.  
10 MR. KRASNER: Does MWD need what?  
11 MS. BRENNER: To add sulfuric acid.  
12 MR. KRASNER: I told you before we have already worked  
13 on design sulfuric acid to the system.  
14 HEARING OFFICER STUBCHAER: That doesn't answer the  
15 question.  
16 MR. KRASNER: She's asking --  
17 HEARING OFFICER STUBCHAER: Does MWD have to add  
18 sulfuric acid or not?  
19 MR. KRASNER: Yes.  
20 MS. BRENNER: Thank you.  
21 Does the addition of sulfuric acid required in the  
22 treatment plants for both the treatment of state project  
23 water and Colorado River in order to meet the proposed  
24 enhanced coagulation TOC removal requirements?

25 MR. KRASNER: No.  
2749

01 MS. BRENNER: No?  
02 MR. KRASNER: No.  
03 MS. BRENNER: Do you recall drafting an article in  
04 1995 for AWWA or participate and co-authoring an article in  
05 February of 1995 that indicated that treatment plants  
06 treating both state project water and Colorado River water  
07 would have to add sulfuric acid to meet the proposed  
08 enhanced coagulation TOC requirements?  
09 MR. KRASNER: Are we talking about the '97 proposed  
10 requirements or the '94 proposed requirements? I am sorry I  
11 misunderstood.  
12 MS. BRENNER: I have to pull the article out. It says  
13 that --  
14 MR. KRASNER: Let me answer your question. I think I  
15 can cut to the chase easy. That article was written prior  
16 to the recent negotiations. And according to the recent  
17 negotiations, which is in the material we were just  
18 discussing, CUWA Exhibit 15, if a water has a specific  
19 ultraviolet absorbance, which has the acronym SUBA, I  
20 apologize for another acronym, but that is the term they  
21 used in the principle agreement, less than 2.0 liters per  
22 milligram meter, they are not required to do enhanced  
23 coagulation.  
24 To go back to the '95 article, to the calculation on  
25 the Colorado River water, you will find that specific UV of  
2750  
01 the Colorado River water is less than 2.0. So, according to  
02 the '97 requirements, there is no requirement to add acid  
03 for Colorado River water.  
04 MS. BRENNER: So that is changing; you negotiated that  
05 back out?  
06 MR. KRASNER: No. Actually, I will refer you to  
07 another article by Krasner and Amy that appeared in the  
08 Journal of the American Water Works Association. That was  
09 in the October '95 issue of the journal. It is not a CUWA  
10 exhibit, but, briefly, in that article we presented data on  
11 Colorado River water that showed that when you add high  
12 amounts of coagulant and you look at what is referred to as  
13 a point of diminishing return, which is another aspect of  
14 the '94 proposed rule, Colorado River water was deemed, even  
15 as of the '94 proposed rule, unamenable to enhanced  
16 coagulation.  
17 But this was an analysis, if one wanted to do enhanced  
18 coagulation for Colorado River water for disinfected  
19 byproduct control, it would take a combination of coagulant  
20 and acid.  
21 MS. BRENNER: A combination of coagulant and acid would  
22 have to occur whether or not the Delta Wetlands Project is  
23 permitted?  
24 M````````R. KRASNER: No.  
25 MS. BRENNER: You would have to treat the Colorado  
2751  
01 River water because of Delta Wetlands Project?  
02 MR. KRASNER: Wait. I thought you were talking about  
03 the state project. You're asking about Colorado River water?

04 MS. BRENNER: Treatment plants are going to have to  
05 comply with these rules and are going to have to add either  
06 sulfuric acid or do other, take other particular steps to  
07 meet these particular rules, whether the Delta Wetlands  
08 Project comes on board or not?

09 MR. KRASNER: That is not true. What I tried to  
10 explain in my rebuttal testimony is that the disinfection  
11 byproduct rule is quite complex. So I understand where you  
12 getting a little confused about the different requirements.

13 Basically, there are different requirements; it is not  
14 one set of requirements for everybody, and these are based  
15 upon your influent water quality and a lot of other  
16 issues. And as I explained before, one of the things that  
17 is in the proposed rule is, if a system has -- and this is  
18 in the '94 Federal Register. If a system has an influent  
19 TOC, total organic carbon level, less than 4 milligrams per  
20 liter and influent alkalinity greater than 60 milligrams per  
21 liter, and they can achieve trihalomethane levels less than  
22 40 micrograms per liter, which is half of the proposed  
23 maximum contaminant level of 80, that they can use this  
24 alternative performance of producing significantly lower  
25 trihalomethane levels as an alternative performance to  
2752

01 having to meet the TOC removal requirement for systems that  
02 treat less than 4 parts, 4 milligrams per liter of total  
03 organic carbon.

04 On the other hand, if the Delta Wetlands Project would  
05 result in that same utility having, let's say, a few tenths  
06 of milligrams per liter more total organic carbon so that  
07 they now treated water that had greater than 4 milligrams of  
08 TOC, they would then have to remove the total organic carbon  
09 and that would put them into a different set of  
10 requirements.

11 MS. BRENNER: A different set of requirements?

12 MR. KRASNER: Exactly.

13 MS. BRENNER: But in 1995, when you co-authored this  
14 particular article, you were talking about the state project  
15 water, you indicated that certain activities would have to  
16 take place, specifically the addition the sulfuric acid to  
17 meet Stage I, Stage II, or the new D/DBP rules.

18 At that time were you contemplating the Delta Wetlands  
19 Project would be placing water into the channels and be part  
20 of a state project water?

21 MR. KRASNER: No. As I tried to explain --

22 MS. BRENNER: No, right; the answer was no, correct?

23 MR. KRASNER: Ask your question again.

24 MS. BRENNER: In 1995 when you wrote this particular  
25 article, you indicated that the treatment plant would have  
2753

01 to add sulfuric acid in order to treat state project water.  
02 My question: When you contemplated that particular  
03 situation, were you also contemplating Delta Wetlands  
04 Project would be part of the state project water that you  
05 would be treating?

06 MR. KRASNER: I thought it was possible because I had  
07 participated in meetings with Delta Wetlands in the early  
08 '90s and knew that this project was potentially there.



09 MS. BRENNER: And that was part of why you would have  
10 to add this acid?

11 MR. KRASNER: No. If you are in the group that has to  
12 meet -- if you have to meet and remove a certain amount of  
13 total organic carbon from Delta water and you have certain  
14 alkalinity, you need also to remove a certain amount of  
15 total organic carbon, you need a combination of coagulant  
16 and acid.

17 The reason I am having a little problem in answering  
18 the question is that article was written prior to the  
19 adoption of the new --

20 HEARING OFFICER STUBCHAER: The question was when you  
21 wrote the article in 1995, not what you know today. And it  
22 could be answered yes or no. I think you said, no. But  
23 trying to distill it.

24 MR. KRASNER: I guess what I am briefly trying to say  
25 is the requirements have changed.

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01 HEARING OFFICER STUBCHAER: That wasn't the question.

02 MS. BRENNER: No, it wasn't.

03 I would like to move on to Dr. Shum.

04 Thank you, Mr. Krasner.

05 Good afternoon, Dr. Shum.

06 DR. SHUM: Good afternoon.

07 MS. BRENNER: Dr. Shum has testimony for both CUWA and  
08 CCWD, and these particular questions are limited to what I  
09 understand is the CUWA part of Dr. Shum's testimony. I want  
10 to make that clarification because there are additional  
11 questions I have when he comes back up for CCWD.

12 With regard to CUWA Exhibit 14, Figures 1 and 2, are  
13 you intending to show combined storage on reservoir islands?

14 DR. SHUM: Yes, those are combined storage.

15 MS. BRENNER: Combined storage.

16 Isn't it true that total exports in a year very closely  
17 approximate the amounts of what there is in storage for the  
18 Delta Wetlands Project?

19 DR. SHUM: Are you referring to the amount of water in  
20 the reservoir in a given year?

21 MS. BRENNER: Right.

22 DR. SHUM: Equals the amount that is exported?

23 MS. BRENNER: Right.

24 DR. SHUM: I think that there are times when the water  
25 is stored for over a year and if you look at the, I believe

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01 it is the, frequency distribution, it might be one of CCWD  
02 exhibit figures, there are times when the storage duration  
03 is over 12 months. And under those circumstances, the  
04 numbers would be different.

05 MS. BRENNER: Fairly closely approximate each other?

06 DR. SHUM: Not in those times when the storage times is  
07 over one year.

08 MS. BRENNER: When it is -- okay.

09 DR. SHUM: I believe there are times when you divert  
10 and discharge more than once in the same year.

11 MS. BRENNER: Right. So, Figures 1 and 2 reflect total  
12 storage capacity in both islands, correct?

13 DR. SHUM: Yes.

14 MS. BRENNER: If water was stored on only one of the  
15 islands, isn't it true that what appears to be a 50 percent  
16 full for both islands would be a hundred percent full for  
17 one island?

18 DR. SHUM: That would depend on the operation schedule  
19 for Delta Wetlands. I don't believe that any of modeling  
20 has been gone into with sufficient detail to tell the  
21 difference.

22 MS. BRENNER: Isn't it true that the project has the  
23 operational flexibility to fill one island versus the  
24 other?

25 DR. SHUM: In a general sense, yes. But because of the  
2756

01 different locations, I believe the locations of the  
02 diversion could have -- would make a difference in the water  
03 quality impacts of the Delta. That could be taken into  
04 consideration in addition to the biological opinions.

05 MS. BRENNER: I have nothing further. Thank you.

06 HEARING OFFICER STUBCHAER: There was no one else other  
07 than staff remaining, as I recall.

08 Staff?

09 MR. SUTTON: No questions.

10 HEARING OFFICER STUBCHAER: That concludes the  
11 cross-examination of this panel. Thank you.

12 MR. SUTTON: Mr. Stubchaer, do we want to have them  
13 enter their rebuttal exhibits?

14 HEARING OFFICER STUBCHAER: Yes. Thank you, Mr.  
15 Sutton.

16 MR. ROBERTS: I would like CUWA 14 through 17. We gave  
17 13 copies to the Board staff, and the revised exhibit list,  
18 and copies will be made or mailed to all the parties.

19 HEARING OFFICER STUBCHAER: Any objections to receipt  
20 of these exhibits for the record?

21 MR. ROBERTS: By the way, when we testified, I think we  
22 had excerpts of 15, 16, and 17.

23 HEARING OFFICER STUBCHAER: Use the microphone, please.

24 MR. ROBERTS: During the rebuttal testimony, we used  
25 excerpts from 15, 16, and 17. We have submitted the entire  
2757

01 documents.

02 HEARING OFFICER STUBCHAER: All right. Thank you.

03 Hearing no objections, they are accepted into the  
04 record.

05 Thank you.

06 Let's see. Cross-examination of Contra Costa Water  
07 District.

08 (Reporter adjusts computer.)

09 REBUTTAL CROSS-EXAMINATION OF CONTRA COSTA WATER DISTRICT  
10 BY DELTA WETLANDS PROPERTIES

11 BY MS. BRENNER

12 HEARING OFFICER STUBCHAER: Delta Wetlands, I don't  
13 know who is going to be cross-examiner. Ms. Brenner?

14 MS. BRENNER: Just rearranging a couple of things  
15 from Dr. Gartrell's questioning.

16 Dr. Shum, on Page 5-5 of your rebuttal testimony --

17 DR. SHUM: You are referring to CCWD Exhibit 10?

18 MS. BRENNER: Yes.

19 DR. SHUM: Go ahead.  
20 MS. BRENNER: You present your analysis of the  
21 potential amount of organic carbon that could be released  
22 from the sediments to the overlying water due to molecular  
23 diffusion. Is that correct?  
24 DR. SHUM: That is correct.  
25 MS. BRENNER: And you used an equation that you call  
2758  
01 the diffusion equation?  
02 DR. SHUM: That's correct.  
03 MS. BRENNER: Do you have a reference for this  
04 particular equation?  
05 DR. SHUM: It's in just about all standard textbooks  
06 for transporting aquatic environment. An example is a book  
07 by Professor John List. He was one of the co-authors. I  
08 believe the title of that book is Transport in the Estuarine  
09 Environment. I can get you the exact reference and page  
10 number.  
11 This is an equation for the Fickian or random walk type  
12 of molecular diffusion.  
13 MS. BRENNER: Does this equation provide an estimate  
14 of the rate of DOC flux at the moment that the water is  
15 diverted onto the reservoir island?  
16 DR. SHUM: Given that at any one time, as long as there  
17 is a concentration gradient --  
18 HEARING OFFICER STUBCHAER: Maybe if you could speak a  
19 little more directly into the microphone.  
20 DR. SHUM: Given at any one time there is a  
21 concentration gradient and there is -- the sediment is  
22 submerged, this equation would be governing.  
23 MS. BRENNER: What happens to the flux rate after that  
24 moment, given that point in time?  
25 DR. SHUM: That depends on the variation of the  
2759  
01 concentration at that particular point and concentration  
02 gradient given by at ECDY, that particular term in the  
03 equation.  
04 MS. BRENNER: Does your equation only provide an  
05 estimate at the inception of the reservoir filling?  
06 DR. SHUM: It is, as I said earlier, it is for any time  
07 when the pore water fills the pore important space in the  
08 sediment.  
09 MS. BRENNER: I would like to go through each step of  
10 your equation and the DOC process for the formation of the  
11 DOC molecule.  
12 My understanding, and we go based on what I have  
13 learned in the last week about these equations, that the  
14 first step of this process is the formation of DOC molecules  
15 on the saturated soils as discussed by Dr. Kavanaugh in his  
16 testimony.  
17 DR. SHUM: From natural organic matter in the peat  
18 soil.  
19 MS. BRENNER: The organic matter has to first be  
20 converted to a DOC molecule, correct?  
21 DR. SHUM: Or in a form that can be mobilized.  
22 MS. BRENNER: Does your equation account for that  
23 particular process?

24 DR. SHUM: No. It does not look at that process.  
25 MS. BRENNER: But you are discussing a formation of  
2760  
01 dissolved organic carbon from organic matter or carbon,  
02 correct?  
03 DR. SHUM: That is not correct. I did not address the  
04 problem of the formation of DOC. I am addressing once it is  
05 formed and it becomes part of the constituent in the pore  
06 water, how it is transported into the water column above.  
07 MS. BRENNER: So, you are only addressing how it moves  
08 from the soil sediment into the water column?  
09 DR. SHUM: That's correct. And I base those estimates  
10 on some of the typical pore water/DOC concentrations I find  
11 in the literature.  
12 MS. BRENNER: You don't determine the release of the  
13 DOC molecule from the soil surface into the pore water?  
14 DR. SHUM: No, I do not.  
15 MS. BRENNER: You only deal with the molecular  
16 diffusion of the DOC through the saturated soil upwards and  
17 it reaches the soil water interface?  
18 DR. SHUM: That's correct.  
19 MS. BRENNER: Is there any reason why you didn't  
20 determine the prior steps in this process?  
21 DR. SHUM: Yeah, couple of reasons. The major reason  
22 is on the uncertainty and the lack of data that I am aware  
23 of. For example, many of the references I see are not  
24 addressing, specifically, peat soil. And when you are  
25 looking at different systems, you may get some numbers, but  
2761  
01 you may not have confidence in what that -- how those  
02 numbers can accurately reflect what you are going to see in  
03 the Delta Wetlands' islands.  
04 MS. BRENNER: Did you address the movement of the DOC  
05 across the boundary between the sediment and water column?  
06 DR. SHUM: It addresses the flux through the top layer  
07 of the sediment. And as we heard earlier today and also in  
08 the previous testimonies by different people, wind mixing  
09 causes a pretty effective mixing mechanism in the water  
10 column. As soon as the DOC reaches the water sediment  
11 interface, it can get into the water column and get  
12 transported away from the sediments.  
13 MS. BRENNER: Isn't that molecular diffusion of DOC  
14 through saturated soil upwards to the soil water interface  
15 one step and the movement of the DOC across the boundary  
16 between the sediment and the water column a separate step?  
17 DR. SHUM: If you look at a microscopic view, the  
18 sediment is just a collection of sediment particles. And  
19 once it gets to the surface, then it interacts with the  
20 water in the water column.  
21 There was -- I don't know if you are specifically  
22 referring to one concept called the diffusive boundary  
23 sublayer. If that is what you are addressing, I can go into  
24 some details.  
25 MS. BRENNER: I am trying to determine what you  
2762  
01 calculated and what you didn't. That is all I am trying to  
02 do. I think if we can get into that discussion, we will

03 lose many people in the room.

04 DR. SHUM: I think we already did.

05 HEARING OFFICER STUBCHAER: I find this fascinating.

06 DR. SHUM: Okay. Let me tell you about --

07 MS. BRENNER: You used a depth of .3 meters to  
08 determine your gradient?

09 DR. SHUM: That's correct.

10 MS. BRENNER: What is the basis for that selection?

11 DR. SHUM: That is, in a sense, arbitrary. I can  
12 choose any other depth with the corresponding concentration  
13 at that particular depth.

14 The reason I chose that was on April 2nd I was  
15 attending a meeting of the MWQI, the Municipal Water Quality  
16 Investigation, program steering committee meeting. In that  
17 particular meeting there was a progress report, a report of  
18 the U.S.G.S. study on Twitchell Island, total soil TOC  
19 study. There they measured DOC concentration at one foot  
20 and three foot below the sediment surface. And so I just  
21 used that as an example.

22 MS. BRENNER: So that DOC at 70 milligrams per liter is  
23 actually 3 centimeters below the sediment interface?

24 HEARING OFFICER STUBCHAER: Thirty.

25 DR. SHUM: I wrote 30.

2763

01 MS. BRENNER: You wrote 30?

02 DR. SHUM: It should be 30. Which line are you  
03 referring to? 0.3 meters, that is 30 centimeters.

04 MS. BRENNER: If you use the 30 centimeters, instead of  
05 the -- well, okay.

06 Are you indicating that DOC in the top layer would  
07 quickly be depleted?

08 DR. SHUM: If you look at the flux estimate from this  
09 and consider that up to anywhere from 60, 70, 80 percent of  
10 the soil mass is organic carbon in the sediments, it will  
11 take a long time to deplete those, the peat or the organic  
12 carbon in the soil.

13 I believe in CCWD Exhibit 11 I had a table showing the  
14 amount of carbon that would be released as DOC as a function  
15 or as a percentage of the soil mass in just the top one foot  
16 of the sediment layer. That is a very small percentage.

17 MS. BRENNER: Very small percentage?

18 DR. SHUM: Yes.

19 MS. BRENNER: Did your calculations take into account  
20 that time element of release?

21 DR. SHUM: It is a continuous process.

22 MS. BRENNER: A continuous process at the same rate?

23 DR. SHUM: For this particular simulation, yes.

24 Apparently, as the concentration varies, there will be  
25 changes in the flux. It goes higher or it can go lower.

2764

01 Once again, if you like, I have some overheads that I can  
02 show on this.

03 MS. BRENNER: I am just trying to understand exactly  
04 what went into your parameters, what were the parameters  
05 that you looked at?

06 DR. SHUM: You can look at this as a snapshot of one  
07 possible scenario.

08 MS. BRENNER: One snapshot in time, also?  
09 DR. SHUM: Yes.  
10 MS. BRENNER: That is what I am trying to understand.  
11 You recall Dr. Horne's testimony, that he said  
12 initially the rate of DOC release would be rapid, as soon as  
13 the DOC is exhausted in the top few centimeters, the only  
14 source would be from the deeper sediments?  
15 DR. SHUM: Yes. I am pretty puzzled by that  
16 testimony. For example, you compare that with Dr.  
17 Kavanaugh's rebuttal testimony which assumes a 20-year  
18 period when the organic matter in the top, I believe it was,  
19 six inches of the sediment gets into the water. He assumes,  
20 even over 20 years, the increase would be 1.5 milligrams per  
21 liter. And if that is cut down to five years instead of 20  
22 years, that would be an increase by a factor of four, which  
23 would be 6 milligrams per liter. And if you further reduce  
24 it to two and a half years, that would be 12.  
25 So, I'm puzzled on how Dr. Horne can make the argument  
2765  
01 that if it leaches in the first three or five years, there  
02 won't be impacts. I think if you leach that, in that amount  
03 of time, the impact would be even higher.  
04 MS. BRENNER: During those particular years?  
05 DR. SHUM: That's right.  
06 MS. BRENNER: After that, it would be dissipate or get  
07 lower?  
08 DR. SHUM: If you consider up to 60, 70, 80 percent of  
09 the sediment is carbon. Once that is burned off, as either  
10 CO2 or DOC, the sediment would be -- most of it would be  
11 gone and all you're left is, in the case of not flooded, it  
12 would be subsidence. In the case of inundated island, you  
13 will just have the surface being lower than the peat soil  
14 further down would come into play, would generate more DOC  
15 and the process keeps on going. I don't know how that could  
16 lead to the conclusion of reducing DOC impacts.  
17 MS. BRENNER: You indicate on Page 4 of your rebuttal  
18 that even a tenfold increase in the 1.27 million kilograms  
19 per year estimate would represent a removal of only .1  
20 percent of carbon in the top one foot of the soil?  
21 DR. SHUM: That's correct.  
22 MS. BRENNER: For many years, two to three inches of  
23 soil subsidence has been documented, due to ag use,  
24 correct?  
25 DR. SHUM: Or higher.  
2766  
01 MS. BRENNER: So, that represents a large annual loss  
02 of carbon from the soil?  
03 DR. SHUM: That's correct.  
04 MS. BRENNER: By your calculations a two to three inch  
05 rate on annual soil subsidence will mean a carbon loss  
06 annually of about 50,000,000 kilograms from that peat soil?  
07 DR. SHUM: I did not address soil subsidence. So, you  
08 are throwing numbers at me that I need to write it down and  
09 double check.  
10 MS. BRENNER: I just got into these questions because  
11 you brought up sub soil subsidence.  
12 Based on your calculations, you have just stated that

13 the DOC release from the four islands could be as high as  
14 6,000,000, maybe 12,000,000 kilograms per year, correct?

15 DR. SHUM: I believe that is correct.

16 MS. BRENNER: You may recall that Dr. Kavanaugh on his  
17 direct written testimony estimated on DWR data that the  
18 total annual DOC release due to ag drains is a minimum of  
19 14,000,000 kilograms.

20 Do you recall that?

21 DR. SHUM: Not specifically.

22 MS. BRENNER: Do you have your own estimate of the  
23 total DOC release due to ag drainage in the Delta?

24 DR. SHUM: No, I don't.

25 MS. BRENNER: Are you saying that it is realistic to  
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01 think that 20,000 acres of the soils, representing less than  
02 six percent of the total area in the Delta lowlands, that  
03 would be 20,000 acres compared to 340,000 acres, could  
04 generate a quantity of organic carbon equivalent to about 40  
05 percent of the current discharge from all the lowlands?

06 DR. SHUM: If we flood the entire Delta, I think the  
07 percentage would be correspondingly lower. So you are  
08 comparing apples and oranges. When you are irrigating part  
09 of the Delta or most of the Delta, the TOC or DOC coming out  
10 is because of one set of physical processes. And when you  
11 flood the four Delta islands, you have a different set of  
12 physical processes acting. So whether it could be 40  
13 percent of the TOC, I think it is a possibility.

14 MS. BRENNER: That is based on your calculation of a  
15 snapshot in time?

16 DR. SHUM: That's correct.

17 MS. BRENNER: I have nothing further.

18 HEARING OFFICER STUBCHAER: Staff have any questions?  
19 That concludes cross-examination.

20 Mr. Maddow.

21 MR. MADDOW: We would offer into evidence the balance  
22 of the CCWD exhibits; that is, Exhibits 6 through 11. And  
23 if the Board should accept those, that would mean that all  
24 eleven of CCWD's exhibits would be accepted into evidence.

25 HEARING OFFICER STUBCHAER: Any objection?

2768

01 Seeing none, they are accepted.

02 Thank you.

03 MR. MADDOW: Thank you.

04 HEARING OFFICER STUBCHAER: That leaves the rebuttal  
05 testimony of the Department of Fish and Game for  
06 cross-examination. Since we are going to be here tomorrow,  
07 I think we will defer that until tomorrow.

08 Any questions or comments on procedures?

09 Staff?

10 Okay. We will see you here at nine tomorrow. We are  
11 in recess.

12 (Hearing adjourned at 4:50 p.m.)

13 ---oOo---

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REPORTER'S CERTIFICATE

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I, ESTHER F. WIATRE, certify that I was the official Court Reporter for the proceedings named herein, and that as such reporter, I reported in verbatim shorthand writing those proceedings;  
That I thereafter caused my shorthand writing to be reduced to typewriting, and the pages numbered 2521 through 2768 herein constitute a complete, true and correct record of the proceedings.

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ESTHER F. WIATRE  
CSR NO. 1564