STATE OF CALIFORNIA

STATE WATER RESOURCES CONTROL BOARD

---oOo---

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

---oOo---

HELD AT

901 P STREET
SACRAMENTO, CALIFORNIA
TUESDAY, JULY 15, 1997
9:00 A.M.

---oOo---

Reported by: MARY GALLAGHER, CSR #10749

APPEARANCES
---oOo---

BOARD MEMBERS:

JAMES STUBCHAER, HEARING OFFICER
JOHN CAFFREY
MARC DEL PIERO
MARY JANE FORSTER
JOHN BROWN

STAFF MEMBERS:

JAMES CANADAY
JAMES SUTTON
DAVID CORNELIUS

COUNSEL:

BARBARA LEIDIGH

DELTA WETLANDS PROPERTIES (APPLICANT):

ELLISON & SCHNEIDER
2015 H Street
Sacramento, California 95814
BY: ANNE J. SCHNEIDER, ESQ.
BARBARA BRENNER, ESQ.
and
JOSEPH NELSON, ESQ.

CENTRAL DELTA WATER AGENCY; RECLAMATION DISTRICTS 38, 2027, 2036, 2038, and 2072; M & T, INC.; CCRC Farms, LLC.; and Palm Tract Farms:

NOMELLINI, GRILLI & McDANIEL
235 East Weber Avenue
Stockton, California 95201
BY: DANTE JOHN NOMELLINI, ESQ.

NORTH DELTA WATER AGENCY:

DOWNEY BRAND SEYMOUR & ROHWER
555 Capitol Mall, 10th Floor
Sacramento, California 958114
BY: DAVID R. E. ALADJEM, ESQ.

APPEARANCES
---oOo---

PACIFIC GAS & ELECTRIC:

RICHARD MOSS, ESQ.
P.O. Box 7442
San Francisco, California 94120

CALIFORNIA WATER AGENCIES:

JAMES ROBERTS, ESQ.
357 South Grand Avenue
Los Angeles, California 90071

CONTRA COSTA WATER DISTRICT:

BOLD POLISNER, MADDOW, NELSON & JUDSON
500 Ygnacio Valley Road, Suite 325
Walnut Creek, California 94596
BY: ROBERT B. MADDOW, ESQ.

EAST BAY MUNICIPAL UTILITY DISTRICT:

FRED S. ETHERIDGE, ESQ.
375 Eleventh Street
Oakland, California 94607

DIABLO WATER DISTRICT:

FREDERICK BOLD, ESQ.
1201 California Street
San Francisco, California 94109

CITY OF STOCKTON:

McDONOUGH HOLLAND & ALLEN
555 Capitol Mall, Suite 950
Sacramento, California 95814
BY: VIRGINIA A. CAHILL, ESQ.

BUREAU OF RECLAMATION:

OFFICE OF REGIONAL SOLICITOR
PACIFIC SOUTHWEST REGION
2800 Cottage Way
Sacramento, California 9585
BY: JIM TURNER

APPEARANCES
---oOo---

DEPARTMENT OF WATER RESOURCES:

CATHY CROTHERS
1416 Ninth Street
Sacramento, California 95814

STATE WATER CONTRACTORS:

KRONICK, MOSKOVITZ, TIEDEMANN & GIRARD
400 Capitol Mall, 27th Floor
Sacramento, California 95814
BY: CLIFFORD W. SCHULZ, ESQ.
and
MARY DIGNAN, ESQ.

DEPARTMENT OF FISH AND GAME:

NANCEE MURRAY, ESQ.
1416 Ninth Street, 12th Floor
Sacramento, California 95814

BAY INSTITUTE OF SAN FRANCISCO:

GARY BOBKER
625 Grand Avenue, Suite 250
San Rafael, California 94901

CALIFORNIA SPORTFISHING PROTECTION ALLIANCE/COMMITTEE TO SAVE THE MOKELUMNE:

MICHAEL B. JACKSON, ESQ.
446 West Main Street
Quincy, California 95971

PETER M. MARGIOTTA:

PETER M. MARGIOTTA
122 Castle Crest Road
Walnut Creek, California 94595

AMADOR COUNTY:

BARTKIEWICZ, KRONICK & SHANAHAN
1011 Twenty-Second Street, Suite 100
Sacramento, California 95816
BY: ALAN B. LILLY, ESQ.

APPEARANCES

---oOo---

DEPARTMENT OF TRANSPORTATION:

DEPARTMENT OF TRANSPORTATION
DISTRICT 10
1976 East Charter Way
Stockton, California 95201
BY:: DANA COWELL

KYSER SHIMASAKI:

KYSER SHIMASKAKI
4412 Mala Creek Circle
Stockton, California 95207

NATIONAL HERITAGE INSTITUTE:

DAVID FULLERTON
114 Sansome Street
San Francisco, California 94101

KEVIN WOLF:

KEVIN WOLF
724 N Street
Davis, Califoria 95616

---oOo---

I N D E X

---oOo---

---oOo---

I N D E X

---oOo---

I N D E X

---oOo---

---oOo---

TUESDAY, JULY 15, 1997, 9:00 A.M.

SACRAMENTO, CALIFORNIA

---oOo---

HEARING OFFICER STUBCHAER: We'll resume the Delta Wetlands Water Rights Hearing.

Mr. Nomellini, you're in the middle of your direct testimony -- just a moment.

Mr. Schulz?

MR. SCHULZ: Mr. Stubchaer, before you start the testimony I wanted to request a ruling, or point of order from the Board if I might.

I talked to Barbara Leidigh about this before we started the hearing. I was not here on the first morning of the first day of the hearing. I had to be up in San Andreas working on Calaveras River Water Rights, but -- and it is my understanding that at that time Mr. Turner introduced a stipulation between the United States and Delta Wetlands with respect to the dismissal of their protest.

HEARING OFFICER STUBCHAER: Yes.

MR. SCHULZ: And it's my view that in particular one portion of the stipulation it's testimonial in nature. And there's a provision in the stipulation that says:

"Reclamation agrees to make a statement at the

State Water Resources Control Board hearing process that based on Reclamation's present understanding of the project, it will provide opportunity for additional water management, environmental benefits, and improvement in the Bay Delta water operations."

(Reading.)

That to me is almost a hundred-percent testimonial and factual in nature. And I think the Bureau needs to present a witness when their time comes in order to support that in order for it to be properly in the record. And I would request that they so provide a witness to be available for the cross-examination for questions from the party.

HEARING OFFICER STUBCHAER: We did ask at the time if there was any cross-examination. I believe your agency was represented. And there was no request for cross-examination, but we will consider your request and probably grant it.

MR. SCHULZ: Thank you. Appreciate it.

HEARING OFFICER STUBCHAER: Okay. Mr. Nomellini.

MR. NOMELLINI: We'll go back to Chris Neudeck.

And, Chris, why don't you put that -- can we have that screen?

HEARING OFFICER STUBCHAER: Sure.

---oOo---

DIRECT TESTIMONY OF CENTRAL DELTA WATER AGENCY

BY DANTE JOHN NOMELLINI

MR. NOMELLINI: Thanks. For the record, this is an attachment to Central Delta Water Agency Exhibit Number 8. This is a table that contains the recommendation of what we termed the Seepage Committee, sometimes referred to as the Technical Advisory Committee that was set up by the Delta Wetlands Project and Central Delta Water Agency.

Mr. Neudeck, are you familiar with the recommendations of the Seepage Committee?

MR. NEUDECK: Yes, I am.

MR. NOMELLINI: All right. Let me call your attention to the middle column first. And the recommendation of the Seepage Committee was to add a guaranteed remediation funding, fund representation of affected landowners, provide for an ongoing review of the interpretation of the methodology used to control seepage and those things, establish an independent arbitration board that would have the power to control the filling, require remediation, make independent performance evaluation.

Do you support those recommendations?

MR. NEUDECK: Yes, I do.

MR. NOMELLINI: All right. Now, why is it important to have the guaranteed remediation funding?

MR. NEUDECK: Well, I believe as much as the Seepage Committee believes as well that there's -- there needs to be a certain flexibility and security for the proposed improvements that are being designed as safeguards to the system.

We're talking about a very intricate system, interceptor wells that have not been proven on this large a scale. And the results of not having those work properly and not having the established security to go in and make -- and make the necessary adjustments concerns me. So I believe that the recommendations are sound.

MR. NOMELLINI: So, in other words, that there's a likelihood of having to put additional wells, or modify the wells. And then, of course, to operate those. And that's going to take money, is it not?

MR. NEUDECK: That's correct.

MR. NOMELLINI: And this recommendation of the Seepage Committee was to make sure that there was funding available for that type of a cost?

MR. NEUDECK: Right. I think that funding goes beyond the initial installation as to development

of ongoing problems as the system is operated.

MR. NOMELLINI: And what about if -- if the well system did not work and there was a need to go out and put in the cutoff walls. If you look on the right-hand column, the Seepage Committee has recommended the addition of cutoff walls, setback levees, and clay --

MR. NUEDECK: Right.

MR. NOMELLINI: I guess you support those recommendations?

MR. NEUDECK: Right. It was -- as my earlier testimony yesterday stated, the cost associated with the alternative repair schemes, or prevention methodologies cutoffs and setback levees, the costs associated with those are fairly sizable, some in excess of a hundred-million dollars, depending upon what method you choose.

So having the security -- a set aside security, cash security to effect these I think would, certainly, assist us in supporting this.

MR. NOMELLINI: Now, with regard to the monitoring program, the Seepage Committee recommended additional units. They were talking about additional piezometers. Is that your understanding?

MR. NEUDECK: Yes, it is.

MR. NOMELLINI: And modified locations. They were talking about, perhaps, having more intense measuring in certain points. Is that correct?

MR. NEUDECK: Yes, it is.

MR. NOMELLINI: And that visual identification investigation of problems. They were concerned about maybe the piezometers weren't picking up the seepage, they should be able to go out and look and see what's happening in the field?

MR. NEUDECK: Yes. I think as I testified to as well yesterday, piezometers in the location of a levee may not pick up seepage that goes underneath those and out into the field. So we want a provision such that visual identification of problems that develop within the field of the adjoining islands would, itself, also provide evidence that the seepage is occurring besides just increase in head in the design piezometers.

MR. NOMELLINI: All right. Now, with regards to the metering of sewage flows, that was related to the earlier proposal when they planned to make a reservoir out of Holland Tract, and they were worried about Bethel Island and Hotchkiss?

MR. NEUDECK: That's correct. There was -- there is sewage systems that are in the two adjoining

islands that were very sensitive to ground water infiltration. We're concerned that they would become ineffective if seepage were to occur. But since there's no longer a plan to flood Holland Tract those concerns have been removed.

MR. NOMELLINI: Okay. Calling your attention now to the exhibit that has the seepage -- the seepage mechanism, the triggering mechanism. Do you have that?

MR. NEUDECK: The performance standards?

MR. NOMELLINI: Right.

MR. NEUDECK: Is this the one you're speaking of?

MR. NOMELLINI: All right. This is Figure 3D4 out of the Delta Wetlands Project EIR/EIS. Calling your attention to your testimony with regard to the inadequacy of the trigger on the seepage, could you explain to us what your concern is with regard to that?

MR. NEUDECK: Certainly. Under the seepage performance standards it's my opinion that they allow seepage to be increased on adjoining islands during much of the year. Case three, which is shown here, shows that the elevation could be raised in August through January a foot and a half without exceeding the deviation line.

If you note, this lower line down here at

elevation 16, the difference between that and the standard deviation line up here at 15 and a half, before any effect has to occur there's a foot and a half -- 14 and a half, excuse me, I'm going in the wrong direction.

That foot and a half -- in addition to the foot and a half, if you add an additional foot for this deviation stated allowable for an individual piezometer, you could end up with a two-and-a-half foot difference in seepage before there'd have to be any effected change. That concerns me both from a levee stability standpoint as well as a farmability standpoint.

If we were to see a two-and-a-half foot difference in seepage on adjoining islands the increase effect of saturation of our levee as well as farmability could be rather significant. Particularly when we're looking at water levels of about 18 inches to 24 inches below existing farmland.

It's my opinion that the draft assumed that there will be no increase seepage and totally failed to analyze the potential effects of seepage as demonstrated in this case.

MR. NOMELLINI: All right. So, in other words, even though the draft talks about their being no

seepage impact on the adjoining islands, the triggering mechanism -- mechanism to control this seepage operation, these interceptor wells has a certain amount of flexibility in it that will allow for seepage to be increased in localized conditions.

MR. NEUDECK: That's correct.

MR. NOMELLINI: And that's what the Seepage Committee was worried about when they said you have to monitor this, and you have to have this arbitration board have the authority to go in and revise as appropriate the test for the triggering of the seepage mitigation requirement?

MR. NEUDECK: That's correct. And I think this example under case three clearly establishes that concern. We're talking about in this case with the standard deviation and room for error, you know, a case where we could see up to two-and-a-half feet more seepage than what's over our existing.

MR. NOMELLINI: All right. Now, calling your attention to the source of levee materials, the Seepage Committee's recommendation had recommended that there be a 2,000-foot setback of any borrow areas, upper right-hand corner. That was part of the project proposal. However, the draft indicates that in some cases it might be as close as 400 feet.

Do you have any opinion as to the adequacy of a 400-foot setback? Well, this borrow -- this borrow area is within the reservoir; is that correct?

MR. NEUDECK: That's correct. I think initially the draft states that a 2,000-foot setback would be applied in areas that are prone to seepage and possibly within 400 feet in those areas that are not prone to seepage.

I don't believe at this point it's been established where areas are potential for seep and not seep. And we would recommend that the 2,000-foot setback agreement for excavation be maintained throughout the reservoir islands.

MR. NOMELLINI: All right. Now, why's that important?

MR. NEUDECK: Why's that important?

MR. NOMELLINI: Yeah.

MR. NEUDECK: Well, for several reasons. One, the primary reason is to lengthen the seepage path by which the water has to travel to get to the adjoining islands. But more importantly, the concern of the stability of the Delta Wetlands islands as you start to raise and buttress the Delta Wetlands reservoir islands, there is going to be a tendency for the underlying materials to spread. These are soft soil

foundations. They have been characterized as "toothpaste" in many cases.

And as those levees are loaded they will tend to move laterally, spreading both towards land and water. Having an excavation near -- near the toe of that levee will further destabilize the wetland levees. And we would suggest for the sake of their stability that they be maintained at 2,000 feet.

MR. NOMELLINI: So in other words, if you went 400 feet from the levee on Webb Tract, for example, which is proposed as one of the reservoir islands, it is possible that that excavation by itself could destabilize the levee without any concern with regard to seepage, is that your testimony?

MR. NEUDECK: That's correct. We've had cases where lateral spread will actually push up portions of the farm fields. This is after loading the very soft levee. In particular, one case was on Bacon Island where a bubble actually occurred. In this case it was 600 to 800 feet out in the field where the underlying soft soil was spread and pushed up which reflected the movement out in the field some 800 feet away.

By removing that material you'll remove the lateral support that's helping support the levee foundation any closer than -- than the 2,000 feet

proposed.

MR. NOMELLINI: All right. So, in other words, as levees in the interior of the Delta are built up, in some cases the foundations are quite unstable. And as you add material to the levee, the subsurface conditions spread out and cause the fields to raise within the islands.

Is that your testimony?

MR. NEUDECK: That is correct.

MR. NOMELLINI: And then if you go over and you dig away this raised portion in the field that's helping to hold the levee, that you destabilized the field.

MR. NEUDECK: Yeah. That's providing some lateral support to that spread. And if you remove that lateral support that will continue and then -- then destabilize the foundation of the levee.

MR. NOMELLINI: All right. Now, with regard to the -- we're talking about two reservoirs. The reservoir on Webb Tract and the reservoir on Bacon Island as proposed by Delta Wetlands.

How are these proposed reservoirs different than, for example, Cliffton Court Forebay, which we know has been operated for some time with relatively little problems of seepage and flooding of adjoining

islands?

MR. NEUDECK: Well, there's several distinct differences. First of all, Webb Track and Bacon Island their location speaks to the Central Delta, which is underlying by very soft soils.

In the case of both these islands, the peat that underlays the foundation of the levees ranges anywhere from 10 to 30 plus feet. In the case of Cliffton Court Forebay you're into the sedimentary soils and the organics don't exist underlaying their levees.

Secondly, the water elevation proposed for the reservoir islands is a plus-six elevation, which is an artificially high elevation relative to the operating condition of the Delta. And, foremost, the operating condition of forebay.

The forebay is a title forebay. Water is allowed to move in on a title condition and will be on the level of probably -- not much higher than two, two-and-a-half feet at its highest point. So there's a three and a half foot difference there in just the title -- excuse me, the reservoir elevation.

And, thirdly, and most notably the forebay is actually constructed an interior levee engineered field constructed under the guidances and design criteria of

the Division of Dam Safety that is between the original levee of the Cliffton Court Reclamation District and the existing reservoir.

So there is an actual engineered levee which is actually a dam and is regulated a dam that holds back the water within a forebay.

MR. NOMELLINI: All right. Now, those three differences (the soil conditions, the elevation of the reservoir, and then the interior levee, or dam that's built within Cliffton Court Forebay) distinguish this proposal from the forebay operation?

MR. NEUDECK: That's correct.

MR. NOMELLINI: All right. Now, with regard to the proposal for interceptor wells, the Delta Wetlands Project engineers have indicated that they intend to install interceptor wells on the reservoir islands every 150 feet around the total perimeter of Bacon Island, and at specific locations on Webb Track, both the Bradford Island side and the Mandeville Island side.

Is that correct?

MR. NEUDECK: That's correct.

MR. NOMELLINI: Now, this installation of a hundred and -- of a well every 150 feet, does that have any adverse impact on the levee?

MR. NEUDECK: I believe it does, yes.

MR. NOMELLINI: What adverse impact could that have on the levee?

MR. NEUDECK: Well, namely from an operation as well as maybe a construction standpoint, having a well, piping, electrical service, you name it, it's related to the interceptor well. Every 150 feet it's going to be very complicated to work around those from the standpoint of either, one, rehabilitating a levee if they're putting it in in advance of the rehabilitation, or, two, maintaining that levee.

These levees will continue to subside. They will be required -- required maintenance will occur on every one of these levee systems that has wells in them. And that will then have to be an encroachment. They'll have to be worked around.

It's not clear that -- how the design of the wells will occur. The nature of the standard for levee construction is that all facilities are to be put in perpendicular to the levee. No parallel piping would be allowed. So that maybe that could be overcome by design.

But as far as the electrical service, we're talking about providing electrical service to all these. So you'll have to have some type of overhead

electrical service that will also complicate the future operation of that levee system.

MR. NOMELLINI: So the present guidelines that are used for levee maintenance and control of encroachments would not normally allow parallel lines, whether they be power lines, or water lines to be placed in the levee. Is that correct?

MR. NEUDECK: That's correct.

MR. NOMELLINI: So in order to conform to these guidelines, the project proponents would have to bury their cables, or put their electric transmission lines out into the reservoir and design them so they can sustain themselves with some submergence?

MR. NEUDECK: Right. Outside what would be known as the levee system itself. You can't put them within the levee section for those purposes, because ultimately you're going to work around those.

You're going to continue to have washouts. You're going to continue to have erosion on those levees that are going to require excavation and reconstruction and having those things buried in the levee section will complicate the maintenance of those levees.

MR. NOMELLINI: So that these people are going to have a real handicap if they actually put those

wells every 150 feet, or even closer in their levee system?

MR. NEUDECK: Yes. I believe so.

MR. NOMELLINI: Because of the interference of the ongoing work?

MR. NEUDECK: Yes.

MR. NOMELLINI: And they should have more on-going work than with a normal levee, because they have water on the inside as well as the outside. Is that correct?

MR. NEUDECK: They will have a challenge on their hands to maintain these levees.

MR. NOMELLINI: All right. Now, we have a set of exhibits that show the various Delta levee expenditures that Central Delta Water Agency 2, and the various pages there. Maybe you can put those up one at a time.

All right. This shows us what the Delta levee maintenance Subvention Program expenditures were from 1981 to 1991. Is that correct?

MR. NEUDECK: That's correct.

MR. NOMELLINI: All right. What's that show for Webb Tract?

HEARING OFFICER STUBCHAER: What's the source of this, Mr. Nomellini?

MR. NOMELLINI: The source of this is -- Chris, maybe you can tell me what the source is.

MR. NEUDECK: I testified earlier yesterday that there has been substantial expenditures on the Delta Wetlands levees to date. This is a demonstration of those expenditures on rehabilitating those levees.

MR. NOMELLINI: Isn't this from the Delta Atlas?

MR. NEUDECK: Yeah. This is from the Department of Water Resources's Delta Atlas.

HEARING OFFICER STUBCHAER: All right. Thank you.

MR. NOMELLINI: What does that show on Webb Tract?

MR. NEUDECK: The expenditures on Webb Track for the period '81 to '91 has been 4.1 million dollars. With an average cost per mile of $63,000.

MR. NOMELLINI: Okay. Let's put the next one up. And, again, the purpose of this is to establish the magnitude of numbers associated with levee maintenance and problems that could arise because of the operation of the Delta Wetlands Project.

Is that correct?

MR. NEUDECK: That's correct.

MR. NOMELLINI: All right. Now, what does

this show?

MR. NEUDECK: This shows Subvention Program amount expended from the fiscal years 91/92 through 95/96. And on Webb Track the total expenditure on Webb is approximately 1.4 million.

MR. NOMELLINI: All right. Let's put the next one up. All right. And what is this?

MR. NEUDECK: This is the expenditures that have been approved and undertaken by what is known as "The Special Projects Side of the Subvention's Programs" that is directed by the Department of Water Resources. Expenditures under this special project side on Webb Track alone over the years '91 through '96 has been another 1.3 million.

MR. NOMELLINI: On Webb --

MR. NEUDECK: On Webb.

MR. NOMELLINI: -- 3,970,340. And then on Holland, three million and eight. And these are State fund monies that went into those levees during --

MR. NEUDECK: Right. These are directed by the Department of Water Resources. Whereas the prior programs are on a cost-sharing basis throughout the Delta.

MR. NOMELLINI: Okay. So there's two levee programs. One administered by the Department of Water

Resources, which is this one, direct funding.

MR. NUEDECK: Correct.

MR. NOMELLINI: And the other one is a Subvention Program, or cost-share program with the local district?

MR. NEUDECK: That's correct.

HEARING OFFICER STUBCHAER: All right. Mr. Nomellini, just for the record that's CDWA 2?

MR. NOMELLINI: Right. Thank you. It's a part of CDWA 2.

HEARING OFFICER STUBCHAER: Right. The last three exhibits are all part of the same exhibit?

MR. NOMELLINI: Right.

MR. NEUDECK: Did you want 4, too?

MR. NOMELLINI: Yeah. Put that -- all right. This exhibit shows the emergency expenditures for the various districts including, I think, Webb is on there -- yeah.

MR. NEUDECK: Webb is on the top. Bacon is down here.

MR. NOMELLINI: What's this show? The numbers are hard to read.

MR. NUEDECK: Okay.

MS. LEIDIGH: Could you identify this for the record, just briefly.

MR. NEUDECK: Certainly. What this is is a table, again, out of the Department of Water Resources Delta Atlas. It is listing the emergency expenditures for Federally declared disasters. In this case there was several disasters during this time frame.

MS. LEIDIGH: But the point is it's Table 1 entitled "Emergency Expenditures from 1980 to 1996." And it's part of CDWA exhibits?

MR. NEUDECK: That's correct.

MS. LEIDIGH: Thanks.

MR. NOMELLINI: All right. So the number for Webb Track is 21,965,000?

MR. NEUDECK: That's correct.

MR. NOMELLINI: And that means in addition to those other expenditures of State funds that we talked about, that the disaster agencies have invested this much money in the levee on one track; is that correct?

MR. NUEDECK: That's correct. This includes the rehabilitation of Webb Track from its 1980 flood.

MR. NOMELLINI: Okay. And, again, this testimony is to show the magnitude of the numbers. I guess it also shows the amount of money that's already been put into the -- the levee system that exists out there today. Is that correct?

MR. NEUDECK: That's correct.

MR. NOMELLINI: Now, going back to the consideration of the Delta Wetlands Project as set forth in their proposal that by flooding these islands it is going to arrest subsidence of peat soil. And, therefore, provide a benefit that would not otherwise be provided.

You indicated that could be provided by shallow flooding rather than raising the water level to plus six feet. Is that correct?

MR. NEUDECK: That's correct.

MR. NOMELLINI: All right. Now, there's many islands out in the lower Delta area where we have these unstable foundations that are not flooding their islands or reservoirs, and not flooding for habitat purposes.

What are they doing with regard to dealing with the subsidence of peat soils?

MR. NEUDECK: As I testified here earlier this morning, one of our concerns is as we load these levees the lateral spreading occurs and then the subsidence occurs.

So what we commenced over the last 15 to 20 years in doing on most of these islands is a substantial toe berm operation where we're actually constructing a stabilizing toe berm with the toe of the

levee, constructing that in a sense of a 50-foot to 100-foot toe berm. Stabilizing the toe of the levee and then getting back on the levee structure itself and raising and flattening those slopes. These is a common occurrence throughout the Delta.

MR. NOMELLINI: So the islands that do not want to go to a reservoir, or habitat are adequately addressing the safety and stability problems of their levee by adding materials on the land side toe in those areas where peat soils exist and would be eroding, or oxidizing and subsiding; is that correct?

MR. NEUDECK: Yes. That's the methodology that's being used.

MR. NOMELLINI: So without projects of this type, is it your opinion that the delta levees can be maintained adequately with the programs, or financial assistance that are in place?

MR. NEUDECK: Yes. I mean we have not turned, in any situation, to flooding the islands to stabilize our levees. We have used the methodology of stabilizing them with the toe berm and flattening the slopes.

MR. NOMELLINI: All right. Now, there's one area I don't think we covered yet, and that is with regard to the project actually contributing, or causing

erosion in the channels.

Is it your opinion that this project could cause channel erosion in certain locations in the Delta?

MR. NEUDECK: In so much as I don't think the draft has adequately addressed that, I would say there's a potential for it. It's not clear as to the timing of the dewatering, or discharge. And there could be localized effects under certain tide conditions on some of the areas that are presently susceptible for erosion. And I don't think the draft addresses those areas as the potential for increased erosion on those areas that are presently susceptible in all stages, in all tide stages in other words.

MR. NOMELLINI: So you disagree with the draft -- the statement in the draft that says there will be no detrimental impact caused by the project?

MR. NEUDECK: There's been no proof to provide me with that.

MR. NOMELLINI: In other words, they haven't analyzed the local conditions?

MR. NEUDECK: That's correct.

MR. NOMELLINI: All right. Let's go to our next witness, Alfred Zuckerman.

Al, please state for the record your name.

MR. A. ZUCKERMAN: My name is Alfred Zuckerman.

MR. NOMELLINI: Al is Tom's cousin, not his brother. I explained that for the other Board Members who are present.

And your present address, Al.

MR. A. ZUCKERMAN: My present address is 2626 Virginia Lane, Stockton, 95204.

MR. NOMELLINI: All right. We've given your testimony Central Delta Water Agency Exhibit 14. Is that testimony which you prepared?

MR. A. ZUCKERMAN: Yes.

MR. NOMELLINI: All right. Could you, please, give us a little bit of your background as to your experience in the Delta?

MR. A. ZUCKERMAN: Yes. I kind of like to go back a little further than that. My family's farming started in the Delta in 1914. And since that time we've farmed on the following islands: Byron Tract, Bacon, Mandeville, McDonald, Terminous, Upper Jones Tract, Lower Roberts, and Rindge Tract. And we've had 80-some odd years experience in farming Delta islands.

I myself started farming in 1938 shortly after the Mandeville Island levee broke, and was engaged in that reclamation. I'd just graduated from Stanford

University with a BS in chemistry, but I became a farmer at that time.

I'm a director of the Central Delta Water Agency and on the Reclamation Board of 2030. So I've served with the Delta Water Agency since 1968. And have been engaged in -- in the water propositions since that time when the Delta Water Agency first started, and then later split up into the North Central and Southern agencies.

MR. NOMELLINI: All right. Now, I'd like to have you explain to the Board your experience on Mandeville Island, because when Mandeville flooded in 1938, Franks Tract also flooded, did it not?

MR. A. ZUCKERMAN: That's true. They flooded -- there were four islands that flooded within an hour of each other. And I believe they were Mandeville, Webb, Venice, and Franks Tract.

MR. NOMELLINI: All right. And Franks Tract was never reclaimed, was it?

MR. A. ZUCKERMAN: No, Franks Tract was never reclaimed. The depth of that water at that time was about ten feet below sea level, the depth of the land as opposed to what it is now on other islands.

MR. NOMELLINI: So, in other words, Franks Tract is about ten feet deep on the average you think?

MR. A. ZUCKERMAN: Thereabout, there are shallow places on it.

MR. NOMELLINI: All right. And you people reclaimed Mandeville Island. And then somebody reclaimed Webb Track; is that correct? All the other islands were put back together except for Franks Tract?

MR. A. ZUCKERMAN: Yes.

MR. NOMELLINI: All right. And by having Franks Tract flooded out there what did that do in terms of problems for Mandeville Island?

MR. A. ZUCKERMAN: Well, after the break in Franks Tract the northern tip of Mandeville from Old River out to the San Joaquin on the northern tip --

MR. NOMELLINI: Maybe, we can put a map up. Let's put that map up on the viewer, the first exhibit.

MR. NEUDECK: I can do that.

MR. NOMELLINI: All right.

MR. A. ZUCKERMAN: If you'll look at --

MR. NOMELLINI: Okay. Chris --

MS. LEIDIGH: This exhibit is Figure 3D3. Is it from the EIR?

MR. NOMELLINI: That's correct.

MS. LEIDIGH: Thank you.

MR. NOMELLINI: All right. Chris, if you could point to Franks Tract and then point to

Mandeville Island, the tip of Mandeville. All right. Thank you.

MR. A. ZUCKERMAN: All the distances across the northern tip of Mandeville became more or less loaded with springs. And --

MR. NOMELLINI: When you say springs, you mean seepage, water type --

MR. A. ZUCKERMAN: Water -- water was coming in on --

HEARING OFFICER STUBCHAER: Excuse me. One at a time.

MR. A. ZUCKERMAN: Water came into the islands after the break of Franks Tract. And there were artesian -- what I call artesian springs in many places making it a very difficult place to farm.

We would put pipes and four-foot ditches into those springs. And we lost a lot of our farmland due to the fact that it became soft and couldn't -- we couldn't do our regular farming properly on that -- on that 400 acres up there.

MR. NOMELLINI: Did you have any problem with wind waves coming across Franks Tract?

MR. A. ZUCKERMAN: Initially there was a levee on Franks Tract opposite Mandeville and also a fairly large tule berm, which was a result of the original

reclamations.

MR. NOMELLINI: Okay. When we say "tule berm" we're talking about what people refer to sometimes as channel islands?

MR. A. ZUCKERMAN: Yes. This was a long narrow strip probably a hundred and fifty feet wide and a mile and a half long between Mandeville and Franks Tract.

But as the years went by due to the heavy westerly winds, the levee first eroded on Franks Tract. And then as the wind and waves hit that tule berm they utterly destroyed it. And the full force of the westerly winds going across probably two and a half to three miles of open water on Franks Tract would cause giant waves to hit the levee of Mandeville. And it took many, many thousands of tons of rock and dredger work to stabilize that levee so it could withstand that pounding.

I recall one July morning when we had a westerly wind of some 40 knots. And the waves were breaking over the top of that levee. We immediately got crews to try to save the erosion of that levee and the flooding, again, at Mandeville.

We put out a call to the Army Engineers and luckily they had two rock barges working just north of

Bouldin. And they moved those barges down. And that four thousand tons of rock were placed in that stretch and saved the island. But it was touch and go there for many minutes.

MR. NOMELLINI: And this is the same kind of problem that you fear could occur if a Webb Track reservoir, or a Bacon Island reservoir was not carefully maintained?

MR. A. ZUCKERMAN: It's not -- it's not a fear, it's a certainty that the wind is going to occur and high water is going to occur.

MR. NOMELLINI: And if those levees wash out then the wave action could hit the adjoining islands just like it hit Mandeville from Franks Tract; is that correct?

MR. A. ZUCKERMAN: That's correct.

MR. NOMELLINI: All right. You presently farm on McDonald Island; is that correct?

MR. A. ZUCKERMAN: Yes. Our activities are presently centered on McDonald of about 3500 acres, and also on Terminous Tract of about 1500 acres.

MR. NOMELLINI: Now, with regard to McDonald Island you're right next to Mildred Island, are you not?

MR. A. ZUCKERMAN: Yes, right directly east of

Mildred.

MR. NOMELLINI: And you have the good fortune of, again, being a farmer next to a flooded island only now you have Mildred; is that correct?

MR. A. ZUCKERMAN: Yes.

MR. NOMELLINI: Have there been any problems associated with the flooding of Mildred Island on your land on McDonald Island?

MR. A. ZUCKERMAN: Problems in the form of seepage from the flooded Mildred Island have been very severe on our land on Hennig Tract and McDonald Tract.

MR. NOMELLINI: All right. When you say Henning Tract looking at Figure 3D3, Hennning Tract is just part of McDonald Island, is it not?

MR. A. ZUCKERMAN: Yeah. Henning Tract is just -- yeah, just south third of McDonald Island.

MR. NOMELLINI: Now, with regard to this seepage on Mildred -- from Mildred, that was similar to the seepage that you experienced when you were on Mandeville when Franks Tract flooded, was it not?

MR. A. ZUCKERMAN: I would say it was similar, but much more severe.

MR. NOMELLINI: In other words, the Mildred Island seepage is much more severe than what was experienced on Mandeville?

MR. A. ZUCKERMAN: Right.

MR. NOMELLINI: And you believe that's related to the depth of water in the flooded islands?

MR. A. ZUCKERMAN: I think so. That's my belief.

MR. NOMELLINI: Now, your land on McDonald Island was the place where the Delta Wetlands Projects conducted their relief well experience was it not -- or experiment, was it not?

MR. A. ZUCKERMAN: It was.

MR. NOMELLINI: And what were your observations with regard to this relief well experiment? Did it work?

MR. A. ZUCKERMAN: In my opinion, it did not alleviate the problem of seepage on our island.

MR. NOMELLINI: All right. Now, did you notice any beneficial impact from the relief wells?

MR. A. ZUCKERMAN: Locally, yes. There were -- the piezometers showed a -- a drawdown on the water around the piezometer some four feet. And that was fairly constant. We saw that and that was our observation.

MR. NOMELLINI: What about the field, there was a wet field and the relief well experiment was put in to intercept the water flow from Mildred. Did the

field dry up?

MR. A. ZUCKERMAN: Field did not dry up. The reclamation of any land that previously had been subject to seepage was not alleviated. And I -- I have did not think the experiment was successful in a farmer's viewpoint.

And also I'm not certain that it's the type of experiment that was conducted in the manner in which it could have been successful. And, see, I say that, because all the wells were manifolded together with a single vacuum pump in one location. And the vacuum pump did not work all the time and it was neglected. And it was very hard to correlate the readings when the pumping stopped for days, or weeks at a time, and then continued. So we really did not get a -- a -- what I call a "workman-like job" to analyze.

MR. NOMELLINI: So to sum that up, you don't think it worked to dry the field. And, secondly, you don't think it was a very good test, because it didn't look like they did a very good workman-like job on the experiment?

MR. A. ZUCKERMAN: That's my opinion.

MR. NOMELLINI: All right. Now, you weren't here but it was testified to that after the relief wells were installed that the farmer, which is you,

your son, was able to run a tractor across the wet field where it couldn't run the tractor before.

Is that true?

MR. A. ZUCKERMAN: I'm not aware of that. Of course, you can run a tractor across a wet field if it isn't pulling an instrument. We have tractors now that have very low loading per square inch. And we can take a very light disc and run across those fields at the present time, but you can't grow a crop on them.

MR. NOMELLINI: So even though you could run a tractor on it you could run a tractor before the relief well experiment -- experiment; is that right?

MR. A. ZUCKERMAN: That's my observation.

MR. NOMELLINI: All right. Now, with regard to the interceptor well system that's proposed by Delta Wetlands, they propose to go all the way around Bacon Island on 150-foot intervals. And they're going to pump the water out and keep the water from going across into the adjoining islands.

Do you think that's going to work?

MR. A. ZUCKERMAN: No. I have very grave reservations that it can ever be effective.

MR. NOMELLINI: All right. Now, we have a couple of exhibits that I think, perhaps, you ought to testify to. They're both maps of McDonald Island,

Central Delta Water Agency Number 10. And I don't know if they're big enough for everybody to see, but maybe you can go up there, Al, and point to the portion of the property on McDonald Island that you farm and where Mildred Island is. Just point with your finger. We don't have a pointer.

MR. A. ZUCKERMAN: This is -- this is Mildred Island in 1963 before the flood. And this is the portion of McDonald Island opposite Mildred Island in 1963. You can see that the fields were farmed right up to the District boarders of the levee. The next photo is McDonald Island --

MR. NOMELLINI: That's Central Delta Water Agency 11?

MR. A. ZUCKERMAN: CDWA 11 in 1994 after reclamation and rebuilding of the levee. You can see that there's a strip of land varying from 200 to 1500 feet in -- in the -- on the levee side of the island opposite Mildred, which is shown as a big lake here, which goes all the way up until the end of Mildred Island opposite Mandeville, which shows land that's been lost to farming due to seepage.

MR. NOMELLINI: In other words, that's an area that you believe is -- is -- is rendered unfarmable due to the flooding of Mildred Island?

MR. A. ZUCKERMAN: In great part, yes.

MR. NOMELLININ: All right. And when you said rebuilding, McDonald had flooded before Mildred and then was in the reclamation process when Mildred flooded; is that correct?

MR. A. ZUCKERMAN: That's correct.

MR. NOMELLINI: But this seepage condition you believe is due solely to Mildred Island flooding; is that correct?

MR. A. ZUCKERMAN: Yes.

MR. NOMELLINI: Okay. Point roughly to where the relief wells -- the Delta Wetlands relief well experiment was conducted.

MR. A. ZUCKERMAN: The relief wells were placed in this area here on Camp 22. We call them checks -- check E, F, G, and H, which are approximately 1600 to 2,000 feet along the strip of that levee.

MR. NOMELLINI: So that's kind of the southwest corner of McDonald Island?

MR. A. ZUCKERMAN: Yes.

MR. NOMELLINI: All right. Thank you.

HEARING OFFICER STUBCHAER: Mr. Nomellini --

MR. NOMELLINI: May I have a little more time?

HEARING OFFICER STUBCHAER: That's what I was going to ask you. Your 60 minutes for direct has

elapsed. How much more additional time do you expect?

MR. NOMELLINI: I think I need about 20 minutes more.

HEARING OFFICER STUBCHAER: Okay.

MR. NOMELLINI: If permissible.

HEARING OFFICER STUBCHAER: All right. Stipulated.

MR. NOMELLINI: Okay. I'd like to call upon Rudy Mussi next.

Rudy, could you please state for the record your name.

MR. MUSSI: I'm Rudy Mussi, 3580 West Polar Road, Stockton, California.

MR. NOMELLINI: And could you state your background briefly.

MR. MUSSI: I'm a farmer. I'm a director on the Central Delta Water Agency. I run a family farm partnership which farms 6,000 acres on three different islands and one happens to be the Lower Jones Tract which we have owned for 20 years now.

MR. NOMELLINI: All right. Now, with regard to -- we've given your testimony Central Delta Water Agency Exhibit Number 15. Is that testimony which you prepared?

MR. MUSSI: Yes, it is.

MR. NOMELLINI: All right. Could you, please, summarize your testimony.

MR. MUSSI: Basically one of my concerns with the Delta Wetlands Project is the -- is the seepage that will result from it. The flooding of McDonald Island and Mildred Island has provided us with some insight of what we will be facing.

As a result of the flooding on Mildred Island we can no longer farm in Stockton 60 acres. And there's an additional 50 to 60 acres, depending on the farm periods, that we can farm sometimes. Sometimes we can't.

I'm concerned that Bacon Island will mirror the problem that we have from Mildred except in a larger scale because Bacon happens to be a lot larger.

MR. NOMELLINI: So your fear is what you've experienced from Mildred Island is just going to be replicated on Bacon Island with the Delta Wetlands?

MR. MUSSI: Yes, except to a larger scale, because of the frontage that we have with Bacon Island.

MR. NOMELLINI: You refer to a flooding of McDonald Island. Are you just telling us that when McDonald flooded you experienced seepage in areas that there was no seepage before?

MR. MUSSI: Yeah. When McDonald Island

flooded, oh, shortly I guess within a week, or two-weeks time we noticed our -- our drainage ditches were running and we had wet spots in the fields that we never had before.

MR. NOMELLINI: Now, you're familiar, like Al, with the proposed interceptor well system that Delta Wetlands Project contends to put in on Bacon Island.

Do you think that's going to stop the seepage?

MR. MUSSI: I don't think so. No. I'm not an engineer. So I can't truly evaluate the system, but in my experience with tile drain systems and stuff like that, I don't think it will work.

Number one, even if you can get a system that can handle that, just the cost of running it would overwhelm most people.

MR. NOMELLINI: So you think that even if the system worked that they wouldn't run it?

MR. MUSSI: I don't think so. I have experience with tile drainage. You can throw a lot of horsepower into a system, but it just becomes economically unfeasible to run it.

MR. NOMELLINI: Okay. Basically you fear that the rest of your property, or a lot more of your property is going to be adversely affected with seepage like you had from Mildred?

MR. MUSSI: I think so.

MR. NOMELLINI: Are there any levee related problems that you have experienced from the Mildred flooding?

MR. MUSSI: Yeah. We had to raise, we had to widen, we had to rock the levee on that portion.

MR. NOMELLINI: When you say on that portion, you're referring to -- can you please point to it on Central Delta Water Ageny 11?

MR. MUSSI: It would be the northern -- the north western corner of Lower Jones Tract.

We've also -- we've also had to go on the Mildred Island levee and place -- and place rock along their levee in order to -- to subside the wave bashing that comes from winds there.

MR. NOMELLINI: When you say "we," you mean the Corp of Engineers went over there after Mildred flooded in order to keep Jones Tract from being hit by a wave action; is that correct?

MR. MUSSI: Yeah.

MR. NOMELLINI: All right. Anything else you want to comment on? I think we covered it.

MR. MUSSI: No. It's just I know John has some big pockets over there.

MR. NOMELLINI: You mean Farmer John?

MR. MUSSI: Yeah, Farmer John. I would sleep better and I'm sure the taxpayers would sleep better knowing that there's a nest egg stashed away someplace should problems arise that are unforeseen to take care of those problems and not have to rely on me having to take care of the problems.

MR. NOMELLINI: In other words, you would feel much better and your position has been that there needs to be security for performance provided the guarantee that these mitigation measures will be carried out in the future?

MR. MUSSI: Yeah, just because of the experiences that we've had with other people before that they end up leaving and I end up paying the bill.

MR. NOMELLINI: They forget. All right. Our next witness is Thomas M. Zuckerman.

And, again, you all thought he was a water lawyer, but he's a venture capitalist. And he also is a developer. With all the evil commentations that go along with it --

HEARING OFFICER STUBCHAER: Does he agree with that description?

MR. T. ZUCKERMAN: Some version of it.

MR. NOMELLINI: All right. Tom, can you state for the record your name.

MR. T. ZUCKERMAN: I'm Thomas Zuckerman. And my office address is 146 West Weber Avenue in Stockton, 95202.

MR. NOMELLINI: Is Central Delta Water Agency Exhibit Number 12 a statement of your qualifications?

MR. T. ZUCKERMAN: Yes, it is.

MR. NOMELLINI: All right. And we've given your testimony Central Delta Water Agency Exhibit 16.

Is that testimony which you prepared?

MR. T. ZUCKERMAN: Yes, it is.

MR. NOMELLINI: All right. Could you, please first give us a little summary of your qualifications.

MR. T. ZUCKERMAN: I'm an active practitioner in California in law. I've been involved in the water law area for about 30 years now, but for the last 10 years I've been -- I resigned from my law firm. My only client, legal client anymore is the Central Delta Water Agency.

The rest of my time I spend actually as an investment banker in a small investment company that I helped found ten years ago. And I serve as an outside director in several other privately held corporations in the Western United States.

MR. NOMELLINI: All right. Now, could you, please, summarize your testimony with regards to the

Delta Wetlands Project.

MR. T. ZUCKERMAN: I'm going to try to do it hurriedly given the time constraints, but basically what I'm here to say today is that we set up a procedure with Delta Wetlands, which they were very cooperative in appointing what we both thought were qualified technical people to advise us as to what needed to be done to alleviate the concerns that our agency and our farmers had about levee problems and seepage problems.

And after they reported to us we -- Mr. Nomellini and I set about to try to draft a contract to reflect those provisions that we could enter into with Delta Wetlands as a condition of withdrawing our protest to their application.

And we have realized that this is somewhat unusual, but there was a substantial agreement on most of the provisions that were in that contract. And we have submitted the last draft of it, our last draft of it that we had submitted to them prior to those negotiations failing to succeed, to give you an idea as to where we were in that process at that point.

MR. NOMELLINI: Is that Central Delta Water Agency Exhibit Number 9?

MR. T. ZUCKERMAN: Yes, I believe it is. And

without -- what we are really asking for here is a condition that the Board direct the parties to enter into that agreement, if you are inclined to grant these permits.

Or if you don't feel that you can do that to impose conditions that are substantially similar to those contained in the contract as conditions on the permit.

They go beyond the mitigation proposal of the Delta Wetlands, because of our concern. And I think a well-founded concern is that due to the experimental nature of the type of seepage wells and so forth that they have proposed, we're not sure that those will work. There hasn't been a scale demonstration of it.

The one that was talked about really just took advantage of the fact that the Mildred Island flooding really wasn't dealing with an island that was going to be maintained several feet above sea level. And the well system that was installed in that was on the McDonald Island, it wasn't on Mildred Island, as opposed to the one that is proposed in this arrangement.

So the experts we relied upon at that time had made several recommendations as you see outlined here to have backup in any event that that system wouldn't

work. And that there be a readily available reliable method of resolving the levee and seepage dangers that we feel are posed by this project on a timely basis.

I'd like to highlight a couple of those, because I think they are important. As you know I've spent most of my career practicing in front of this Board. And I have a healthy respect for the agenda that -- that -- the wide variety of issues that you are trying to deal with.

This is a very complicated subject. We feel and -- felt and feel that the types of problems that could be posed by the inefficacy, if you will, of the seepage control program, or the levee maintenance program are complicated. They need to have a remedy designed specifically to address problems that arise that doesn't rely upon finding an open time in your schedule, or developing expertise in your staff which may have turned over two or three times since it has happened.

So we had designed a process for an independent arbitration board with people mutually selected by the parties who are deemed to be experts in the area to deal with problems as they arose during the performance of this project, if it goes forward.

And we wrote provisions in the contract. And

it specifically outlined that procedure, what it would take to institute the procedure, would provide for access on the islands for inspections so that you wouldn't have to go through lengthy legal discovery proceedings and that sort of thing. It really allowed to get the work done on a timely basis before calamitous events had been allowed to occur.

We also believe -- and I will resort to some degree to my business experience at this point, that there are a lot of things that can go wrong with this type of a project. They're -- they're either within, or without the control of the owner of the project themselves.

We've all witnessed some of the things that have happened with endangered species problems in the Delta, hydrologic problems, and so forth. I mean just to mention what could happen here, you could have a series of years that didn't allow the project to store water.

Once an enormous amount of money, which has been proposed, is invested in this project if it doesn't have the ability to produce revenues on a regular basis you can envision that economic failure of the project would occur.

If it sold to another party, and the figures

that we've heard discussed are in the 700-million-dollar range, those needs become even more intense, because the amount of money that you need to be able to return on an annual basis from the sale of water in order to support that kind of investment are, indeed, enormous.

The calculations that I've done would indicate that the water has to be available, has to be sold in the range of 4 to $500 an acre foot just to support the types of investment that a buyer of this project, apparently, would be expected to incur.

If the same type of thing happened because of some problem that developed with the water quality on the inside of the islands that prevents it -- them from selling it, or they couldn't take water into the islands because of some endangered species problem, or something, the same type of events would occur.

We feel it's prudent and necessary under those circumstances to make sure that there is a security for performance. The only measure that I noticed in the environmental documents themselves, the only assurance was that if these problems that we fear of seepage, levee problems, and so forth occurred that they would operate the project in such a way as to diminish those.

The problem is -- and my experience would

reflect this, is sometimes there isn't the capability of operating the project at that time to cure the problem, because of either regulation problems that prevent the emptying of the reservoir, or economic problems that have put the operator into a situation where they can't -- they don't have the money to do it.

So we took a figure which is suggested by the costs of the repairs that would be needed to be performed at that time, we rattled that around for six months or so between the two of us, two groups. The figure that we finally decided was the least that we could support was a 35-million-dollar bond that has been suggested, which after some period of successful operation could be reduced back down as low as 25 million dollars.

And the economic support for that, if you go back and review Mr. Neudeck's testimony is found in those figures. We think that those are necessary protections for the people on the adjacent islands and eventually for the people who are going to be relying upon the Delta water supply as a whole to insist upon in this situation.

Just one other footnote that we had been asked and this we can't really lay at the feet of Delta Wetlands, but the Bay Area -- what's it called, the Bay

Area Recycled Water Program at some point recently came out and suggested that these reservoir sites be used as potential storage for wastewater -- treated wastewater from the Bay Area.

And you've heard from us before on the subject of biosolids and one thing, or another on Delta islands on why we don't think that's appropriate. And we would also like to see that if you're inclined to support this permit that you condition it in such a way that wastewater biosolids, these types of things not be allowed to be stored within the confines of these reservoir projects.

We had also included a provision like that in our draft of the contract so that should you approve that that would be provided for as well.

MR. NOMELLINI: All right. Tom, calling your attention to Central Delta Water Agency Number 8, the recommendations of the Seepage Committee, basically the draft, the contract paralleled the recommendations of the Seepage Committee, did it not?

MR. T. ZUCKERMAN: Yes, it did.

MR. NOMELLINI: And with regard to getting access to the islands to do the work, for example, the arbitration board had the power of fulfilling the contract provided for the grant of easements to the

adjoining districts, or to the arbitration board so that they could go on -- from a property rights standpoint on to the Delta Wetlands Project islands, did it not?

MR. T. ZUCKERMAN: Right. With appropriate notification and stuff to the project operator we would be allowed to go on and conduct inspections on a periodic basis.

MR. NOMELLINI: And also to perform repairs, if necessary, if it wasn't done by the project operators?

MR. T. ZUCKERMAN: Right. Once we had an order from the arbitrator we could proceed to do the work on our own tapping into the monies in the security fund in order to do that if necessary.

MR. NOMELLINI: And the arbitrator would control the security --

MR. T. ZUCKERMAN: Yes.

MR. NOMELLINI: -- as well?

MR. T. ZUCKERMAN: Yes.

MR. NOMELLINI: All right. With that, Mr. Hearing Officer, we conclude our testimony. I didn't hear the beep. I think I made it.

HEARING OFFICER STUBCHAER: You did make it. Thank you, Mr. Nomellini.

MR. NOMELLINI: I would offer our exhibits at the end of cross-examination, if that's permitted.

HEARING OFFICER STUBCHAER: You bet. Could I have a show of hands from the parties who wish to cross-examine this panel.

All right. There's enough of you, I'm just going to go down the list then. Pacific Gas and Electric.

---oOo---

CROSS-EXAMINATION OF CENTRAL DELTA WATER AGENCY

BY PACIFIC GAS & ELECTRIC

BY RICHARD MOSS

MR. MOSS: Richard Moss for Pacific Gas and Electric. Question for Alfred Zuckerman.

Al, at the beginning of these hearings Kyser Shimasaki told this Board that in his opinion farming in the Delta will become more and more infeasible due to subsidence and other issues and that's what brought him to, fortunately, want to see the Delta Wetlands Project.

Do you agree with his opinion?

MR. A. ZUCKERMAN: No, I don't.

MR. MOSS: Could you briefly explain?

MR. A. ZUCKERMAN: Well, I think we proved that an effective levee program with a toe berm on

McDonald Island has stabilized that levee. And that can be applied to every island in the Delta eventually and strengthen the levee and stop subsidence near the levee by virtue of an expanded district easement.

MR. MOSS: Okay. I have a few questions for Mr. Neudeck. These are questions that I posed earlier to Mr. Hultgren. So I'd like to basically go over the same questions with you, sir.

MR. NEUDECK: Uh-huh.

MR. MOSS: Does DWR Bulletin 192-82, does that levee standard represent the best most productive standard presently in use, or planned in the Delta?

MR. NEUDECK: It is a standard that has been aimed at for purposes of financial reimbursements. I think it's applicable from the standpoint from something that we're aiming for. There are other standards in place which is also PLA 499, it's the Corp of Engineers's standards.

With regards to this particular project I don't know that it takes into account a flooded reservoir. And I don't know that Bulletin 192-82 would be applicable in the case of having water on both sides of it.

But it is a standard that levees throughout the Delta are attempting to achieve as an interim

standard for purposes of achieving certain levels and priorities within the funding Subventions Program.

MR. MOSS: Do you know if any islands have been constructed to this standard?

MR. NEUDECK: There are portions of islands that have been constructed to it. It's not necessarily been measured throughout. The standard is the standard that's been put together by the Department of Water Resources setting forth some general parameters dependent upon the depth of the peat which relates to the slope ratios and so forth.

I don't know that anyone has gone forward and evaluated the entire levee system to see whether it needs that standard. I know that there has been an exercise on several islands to verify whether they have met the PLA 499 standard which is a Corp standard though.

MR. MOSS: As far as you know does the Department of Water Resources advocate the use of Bulletin 192-82 for a Delta levee that would need to contain the plus six feet of water on the long-term standing basis?

MR. NEUDECK: No, I'm not aware of that.

MR. MOSS: To the best of your knowledge, has anyone tried before to build a similar water storage

reservoir in the Delta, or for that matter, anywhere else that you're familiar with similar soil conditions?

MR. NEUDECK: None that I'm aware of.

MR. MOSS: I think you may have answered this but, Mr. Hultgren suggested that possibly Cliffton Court Forebay was such an example.

Do you agree?

MR. NEUDECK: I disagree.

MR. MOSS: Thank you. Those are all my questions.

HEARING OFFICER STUBCHAER: Thank you, Mr. Moss.

Mr. Roberts, CUWA?

MR. ROBERTS: No questions.

HEARING OFFICER STUBCHAER: Mr. Maddow?

MR. MADDOW: Just a couple questions, Mr. Chairman.

---oOo---

CROSS-EXAMINATION OF CENTRAL DELTA WATER AGENCY

BY CONTRA COSTA WATER DISTRICT

BY ROBERT MADDOW

MR. MADDOW: I'm Robert Maddow appearing for the Contra Costa Water District.

Mr. Alfred Zuckerman, you said briefly in your testimony that you didn't think that the interceptor

well system would work. And based upon your years of experience in farming, I wonder if I could ask you to elaborate on that for just a moment.

Why do you think that system would not work?

MR. A. ZUCKERMAN: Mainly because of the experience we had on McDonald Island with what they installed there. I see -- I think they underestimated the amount of water they have to remove, and where it might come from. And my experience with trying to remove seepage water such as they had when East Bay MUD repaired their pipeline at Middle River, they had a series of well points that were eight or ten feet apart and pumping hundreds of gallons a minute in order to effect that repair of that pipe.

And I think the enormity of what Delta Wetlands is facing with miles and miles of levees and not knowing how close these well points are going to have to be placed to be effective, that's what I base my opinion on.

MR. MADDOW: Mr. Zuckerman, the East Bay MUD pipeline work that you just described, could you tell us when that occurred?

MR. A. ZUCKERMAN: That occurred I think sometime in the 1980s at Middle River.

MR. MADDOW: Okay. And, Mr. Mussi, in regards

to your comments about the interceptor well system, I want to explore one thing you said to make sure I understand the import of your testimony.

If the Delta Wetlands Project is permitted and is implemented, did I understand the thrust of your testimony to be that you would prefer to see a seepage system that isn't quite so operation and maintenance intensive, if you'll allow me to use that expression?

MR. MUSSI: No. The only -- what I meant by that comment was that I fear whatever system they put in is going to require a lot of maintenance and operation intensiveness that I'm afraid will overwhelm everybody. Plus you have the problem -- on McDonald you had the well points on the neighboring island. On that system you're going to have the well points on the reservoir island. So I think you compound the problem there.

MR. MADDOW: And finally just a couple brief questions for Mr. Neudeck, again, regarding the interceptor wells and the seepage mitigation.

As I understood your testimony you do see this as a potential operations and maintenance issue in addition to a construction issue; is that correct?

MR. NEUDECK: That is correct, yes.

MR. MADDOW: You have considerable experience

with design and construction I take it also with regard to operation and maintenance of levees and seepage control systems.

And based upon that experience, I wondered if you could tell us whether it's your opinion -- or tell us your opinion regarding whether the interceptor well system will adequately mitigate for seepage which would be caused by the Delta Wetlands reservoir islands.

MR. NEUDECK: Well, initially to establish the background, I guess, on this is I think it's going to be a significant design challenge. As I testified to yesterday the variability of Delta soils do not lend themselves towards an uniform design for dewatering.

Experience has told us in the past from a construction standpoint when we seek a dewatering bid for excavation at or near the toe of a levee from a contractor, we typically get the comments back that that's an unreasonable exercise, the cost associated with dewatering these variable soils is extensive.

In many cases the risk is taken on such that the number that they throw in is anticipating that the dewatering wouldn't be as extensive as what's anticipated on the surface.

When you're dewatering variable soils that are not homogeneous you're having to deal with different

drawdown rates. It hasn't been established that a level of testing will be undertaken, but certainly if you're going to be putting a well every 150 feet you're going to need to test every 150 feet. You're going to be drawing water from very different soil types, some move very quickly, some move very slowly.

Secondly, not only do you have to evaluate the soil profile underneath the levee, you have to evaluate the soil profiles throughout the reservoir. As I suggested earlier clay lands that they talk about terminating these well points in may peter out as you get into the reservoirs and sand lens may go underneath those and pop up on the neighboring island.

I see this as a design exercise that would be very expensive, very time-consuming. And I'm not certain that it's feasible.

MR. MADDOW: Are there other mitigation measures which could in your opinion mitigate for the seepage caused by the Delta Wetlands reservoir islands and which you believe would be feasible?

MR. NEUDECK: Well, I think the example -- the present example that we testified to earlier today and that's the Cliffton Court Forebay. I think if this job was to be done properly that you would not utilize the existing levees.

Those levees have been proven to be difficult to work on. They're on soft foundations. If you're going to construct a dam to maintain, you know, this water surface that you construct it out of a new levee setback from the original levee and construct it on solid foundations excavating through all the permeable soils that may transmit to the neighboring islands as well as supporting a solid foundation.

MR. MADDOW: Have you seen an engineering, or environmental, or cost analysis for that alternative for this project?

MR. NEUDECK: No, I have not.

MR. MADDOW: Thank you. That's all I have.

HEARING OFFICER STUBCHAER: Thank you, Mr. Maddow.

Before we take our morning break I want to announce that we've received a request for additional time from CUWA, California Urban Water Agencies. Mr. Roberts requests an hour and a half, that's for direct testimony.

I will grant that request with the understanding that the hour and a half includes the opening statement. After the break we'll call Ms. Schneider for cross-examination. We will take a 12-minute break.

(Recess taken from 10:22 a.m. to 10:35 a.m.)

HEARING OFFICER STUBCHAER: Okay. Let's reconvene. You're going to do -- excuse me, that's not for you. You're going to conduct the cross-examination for the Delta Wetlands?

MS. BRENNER: Yes.

HEARING OFFICER STUBCHAER: All right.

---oOo---

CROSS-EXAMINATION OF CENTRAL DELTA WATER AGENCY
BY DELTA WETLANDS PROPERTIES
BY BARBARA BRENNER

MS. BRENNER: Good morning, Mr. Stubchaer, and Members of the Board. My name is Barbara Brenner and I'll be doing the cross-examination of Central Delta Water Agency this morning on behalf of Delta Wetlands.

Mr. Neudeck, were you on the Seepage Committee in 1991, or prior to that?

MR. NEUDECK: No, I wasn't. A representative of our firm and a partner of mine Ken Kelson served on that committee.

MS. BRENNER: But you were not on that committee?

MR. NEUDECK: No, I personally did not sit on the committee.

MS. BRENNER: Yet you claim to have knowledge

of the facts that occurred during those Seepage Committee negotiations with Delta Wetlands?

MR. NEUDECK: Yes, I do.

MS. BRENNER: Where did that knowledge come from if you weren't on the committee?

MR. NEUDECK: As I indicated my partner Ken Kelson was on the committee. And I would routinely discuss matters related to the outcome of the meetings with him.

MS. BRENNER: But you never participated in any of the meetings yourself?

MR. NEUDECK: No, I did not.

MS. BRENNER: Mr. Stubchaer, I'd like to move to strike Mr. Neudeck's testimony with regard to the Seepage Committee thoughts. He does not have direct knowledge of what occurred during any of those meetings, nor did he participate in any of those meetings.

HEARING OFFICER STUBCHAER: Ms. Leidigh, do you want to hover?

MS. LEIDIGH: Yeah.

HEARING OFFICER STUBCHAER: Off the record.

(Discussion held off the record.)

HEARING OFFICER STUBCHAER: Mr. Nomellini, did you have a response?

MR. NOMELLINI: I think the witness testified to his understanding and knowledge of the circumstances through conversations with his partners. And even though there might be some hearsay in that respect, the general understanding is pretty well known as to what the Seepage Committee was talking about. So I don't know what the importance would be if it was stricken anyway.

HEARING OFFICER STUBCHAER: I think that hearsay is the operative word here. And we'll allow it to remain in the record. And it will be treated as hearsay and the weight given to it will be given in accordance with that.

MS. BRENNER: Thank you.

Mr. Neudeck, doesn't Delta Wetlands agree that if it's necessary that additional piezometers and monitoring wells would be added?

MR. NEUDECK: With regards to what are you speaking of? I'm not exactly certain when you state that the fact that they'll be added.

MS. BRENNER: If they're necessary to control seepage.

MR. NEUDECK: There is a statement in the EIR that -- that is correct, yes.

MS. BRENNER: Thank you. Your testimony

included summary of the enormous expense to maintain the Delta levees. Do you believe that if subsidence continues that agricultural can continue to support this level of expenditure?

MR. NEUDECK: I believe that we are in the process of controlling that. And I think we -- we will be able to continue to maintain an upper hand on that. We do not rely solely upon agricultural revenue.

We are fortunate in working with the State Levee Subvention Program that have been funded to a great degree much of this work and appears to be an ongoing program for that same venue.

MS. BRENNER: So that the continued work on the levee structures and expenditures incurred as a result of that work cannot continue without the assistance of the government?

MR. NEUDECK: I think they play a very important role in assisting these reclamation districts in maintaining their levees, yes.

MS. BRENNER: Okay. You mentioned doing levee stabilization work when Mr. Nomellini asked you what AGON was doing about peat subsidence, correct?

MR. NEUDECK: Correct.

MS. BRENNER: Isn't it true that raising levees doesn't stop peat subsidence, but the subsidence

will continue and the levee heights will just have to be higher and higher?

MR. NEUDECK: We are arresting the peat subsidence and effecting its affects on the levee structure itself. Peat subsidence within the central core of the many islands in many cases has ceased altogether. There isn't necessarily peat throughout all of these islands. Our primary concern is of the structure itself. And I think we are effecting that by some of the methodology we're using to cap and stabilize the peats under the structure of the levee itself.

MS. BRENNER: But the islands themselves continue to subside as a result of farming.

MR. NEUDECK: There is some measure of subsidence. To what degree, the rates we are establishing in the environmental impact report are correct.

MS. BRENNER: Uh-huh.

MR. NEUDECK: I would rely upon other resources. I don't believe that they are still subsiding at the rate that was cited in the report.

MS. BRENNER: Okay. But you can -- you seem to testify that you can just continue stabilizing the levees and build them higher and higher as the ag land

continues to subside.

Isn't there an economic limit as to how high you can go?

MR. NEUDECK: The height of the levee is not necessarily directly reflective of the depth of the island. If we can stabilize the foundation of the levee we can also stabilize the height of the levee. Much of what you see will add additional head to the levee that is being effective by the strengthening of the levee and flattening of the slopes.

MS. BRENNER: Has you, or your firm ever been involved with any levee rehabilitation?

MR. NEUDECK: Not to my knowledge, no.

MS. BRENNER: Can we go back --

And, Patty, can you put on the overhead, please, CDWA Exhibit 3. Turn it -- there you go.

HEARING OFFICER STUBCHAER: The style looks like --

MS. BRENNER: You'll get it. Okay.

And that's your CDWA Exhibit 3?

MR. NEUDECK: Yes.

MS. BRENNER: Correct. And also what we've done is made an overhead projector of that so we could talk about it a little bit. So the additional black lines doesn't change the exhibit itself, correct?

Right?

MR. NOMELLINI: We don't have any problem with your lines.

MR. NEUDECK: Yeah. I'm not sure of the purpose of them, but I'll say that they outline a contour, so that's fine.

MS. BRENNER: Okay. Is this a map of Woodward Island that shows potential levee breaches?

MR. NEUDECK: What this is is an aerial view of Woodward Island, north half with an overlay of the potential scour of a levee break. And what I've done is overlaid two levee breaks, one from McDonald and one from Mildred that actually occurred and were surveyed.

MS. BRENNER: Okay. So you're -- you're -- okay. What was the purpose of this overlay?

MR. NEUDECK: This was used in another proceedings where we were working with Santa Fe Pacific Pipelines to demonstrate the protection of the levee for purposes of protecting the pipeline itself and what the results of a levee break would do to the pipeline.

MS. BRENNER: Okay. I'm trying to determining the scouring?

MR. NEUDECK: Determine the scouring and the effects of what a levee would have on the stability of the pipeline.

MS. BRENNER: Okay. And there's two different sizes of breaches that are shown, right?

MR. NEUDECK: That's correct.

MS. BRENNER: And what's the difference between the two?

MR. NEUDECK: As I stated earlier, one is a break on McDonald. The ones that are to the left of the drawing A and B are the McDonald Island levee break. And C and D, the ones to the upper right, are the Mildred Island break.

MS. BRENNER: Is it true that the factors that affect the size of the breach, or the size of the islands are the difference in elevation between channel water levels and the interior island elevation?

MR. NEUDECK: That's one of the factors that plays into the size of the breach.

MS. BRENNER: The depth of the island, the more it would cost --

HEARING OFFICER STUBCHAER: Excuse me. Could you pull the mic closer. The people in the back can't hear you in the back. Tip it down.

MS. LEIDIGH: You can telescope it down.

MS. BRENNER: Sorry.

HEARING OFFICER STUBCHAER: Thank you.

MS. BRENNER: Some of us are shorter than

others.

Is it true the deeper the island the bigger the breach would be if there were a levee failure?

MR. NEUDECK: Not necessarily. The factors that play into the breach depth and the breach width are the size of the island. In many cases the amount of fillings that occurs, the depth of the island, the amount of water that's going to rush the broken levee.

MS. BRENNER: Okay.

MR. NEUDECK: The type of soils that underlay that section of levee. The softer the soils the more susceptible the scour, the size of the island, the length of filling.

And then the width of the break depends upon how many tide fluctuations over what period of time occurs such that each time the tide fluctuates in and out it will continue to widen the levee before someone effects the repairs. So that could continue to widen provided a repair was not undertaken relatively quickly.

MS. BRENNER: But you still agree that this -- the depth of the island is a factor in this?

MR. NEUDECK: Yes.

MS. BRENNER: Okay. And you estimated the cost of eight million was now to repair a breach on

Woodward Island. Woodward Island would subside even more, wouldn't the resulting breach be even larger?

MR. NEUDECK: It could, certainly, play a role in causing a deeper breach, yes.

MS. BRENNER: It would be larger than, wouldn't it.

MR. NEUDECK: As I indicated, there's many factors that cause the breach and its size. I put on a couple examples here to show two conditions. There is a potential with a deeper island that it would cause a deeper breach.

MS. BRENNER: Okay. And a deeper breach -- or the deeper the island the larger the breach the greater the cost.

MR. NEUDECK: That theory would follow, yes.

MS. BRENNER: And if you could control the islands around you wouldn't you want to stop the subsidence and improve the levees on those islands?

MR. NEUDECK: If I could control the islands around me, I'm not -- I'm not -- could you repeat your question?

MS. BRENNER: Right. If you could control the islands around that particular island, wouldn't you want to stop the subsidence and improve the levees?

MR. NEUDECK: It all depends who you're

asking, who I'm representing.

MS. BRENNER: I'm asking you.

MR. NEUDECK: Actually, if I'm representing them, yes, I would like to improve their levees and seek to stabilize the subsidence, yes.

MS. BRENNER: Okay. Mr. Shimasaki in his policy statement described the problems that many of the Delta farmers face, that it's harder and harder to maintain these levees where agriculture is less and less profitable and good peat soils are being lost at larger rates.

Do you recall that policy statement?

MR. NEUDECK: I was not here on that day of testimony, but I've heard that statement repeated a number of times since then.

MS. BRENNER: Wouldn't you want your neighboring land -- island/land owners to have some sort of financial incentive to repair the levees in that kind of situation?

MR. NEUDECK: I think you're asking me more as a farm advisor here than you are as an engineer.

I'm not certain if I agree with Kyser's statement as to the loss of organics. Many of our farmer clients are quite satisfied farming the mineral soils. They may change some of their cropping

patterns, but certainly they have taken complete advantage of the soil type that presents them. And I don't have the same opinion as it relates to the removal of the some of the peats.

MS. BRENNER: Wouldn't you agree that it would be more favorable to have a neighboring landowner who had a financial incentive to keep his levees up?

MR. NEUDECK: Oh, I think that would be a favorable situation. I think --

MS. BRENNER: Okay.

MR. NEUDECK: I think most islands -- yes. The answer is, yes.

MS. BRENNER: Thank you. Alfred Zuckerman.

MR. A. ZUCKERMAN: Yes.

MS. BRENNER: Good morning, sir.

MR. A. ZUCKERMAN: Good morning.

MS. BRENNER: You stated that McDonald Island has demonstrated that levees can be maintained with a series of toe berms and levee improvements to facilitate farming.

MR. A. ZUCKERMAN: I don't know whether I used the word "facilitate farming."

MS. BRENNER: Okay. But that it could be maintained with a series of toe berms and levee improvements, correct?

MR. A. ZUCKERMAN: That the levees could be maintained, that's true.

MS. BRENNER: Okay. They could be maintained to facility farming, or anything else; isn't that correct?

MR. A. ZUCKERMAN: They would -- mainly to repel flood threats.

MS. BRENNER: Okay. On McDonald Island what percentage of the improvements were paid by PG&E?

MR. A. ZUCKERMAN: On the levee rehabilitation program up to 95 percent.

MS. BRENNER: And PG&E pays how much of the routine maintenance?

MR. A. ZUCKERMAN: They pay 79 percent.

MS. BRENNER: Thank you. Could I just take one minute?

HEARING OFFICER STUBCHAER: Yes.

MS. BRENNER: Thank you, Mr. Stubchaer, we have nothing further.

HEARING OFFICER STUBCHAER: Okay. Thank you. Is Mr. Gilbert here today? Does anyone know if he wishes to cross-examine?

MR. NOMELLINI: I think he said yesterday, Mr. Chairman, that he did not intend to do any cross-examination.

HEARING OFFICER STUBCHAER: Thank you.

Mr. Etheridge, you wish to cross-examine?

MR. ETHERIDGE: Yes, I do, Mr. Stubchaer.

---oOo---

CROSS-EXAMINATION OF CENTRAL DELTA WATER AGENCY

BY EAST BAY MUNICIPAL UTILITY DISTRICT

BY FRED ETHERIDGE

MR. ETHERIDGE: Good morning. My name is Fred Etheridge. I'm in the General Counsel's Office at the East Bay Municipal Utility District. I have a few questions for Mr. Neudeck.

HEARING OFFICER STUBCHAER: We need to raise it now.

MR. ETHERIDGE: Yes. Are you aware of any existing projects that use interceptor wells to control seepage on the scale proposed here by Delta Wetlands?

MR. NEUDECK: No, I'm not.

MR. ETHERIDGE: Are you aware of any existing projects that use interceptor wells to control seepage on islands as proposed by Delta Wetlands here?

MR. NEUDECK: No, I'm not.

MR. ETHERIDGE: Turning to the CDWA Exhibit 3, it's the black and white behind you. I understand -- does that show superimposed upon an aerial photograph of Woodward Island actual levee failures on McDonald

Island and Mildred Island?

MR. NEUDECK: Yes. As I indicated earlier, the two on the left are the superimposed underwater topographical conditions of McDonald, and the underwater topographic condition on Mildred demonstrating the amounts of scour that develops after a levee break.

MR. ETHERIDGE: So those two levee breaks on McDonald Island and Mildred Island actually occurred; is that correct?

MR. NEUDECK: They both occurred within about nine months of each other.

MR. ETHERIDGE: Is it fair to say that you superimposed those two historical breaks on the -- the image of Woodward Island to demonstrate the type of scour that could occur given a levee break on Woodward Island?

MR. NEUDECK: That's correct.

MR. ETHERIDGE: What exactly is scour when you speak of scour?

MR. NEUDECK: This was the amount of material that was removed by the inrush of water after the levee break. And both of these areas were -- we had good survey data on. So we were able to provide a survey showing the amount that was scoured, or excavated by

the inrush of water and the erosion of water below that of the original field elevation.

MR. ETHERIDGE: Was there any estimate made, or measurement made of the depth of those scour holes?

MR. NEUDECK: Yes, there was.

MR. ETHERIDGE: Do you know what the depths were?

MR. NEUDECK: In the case of Mildred it went as deep as maybe 75 to 80 feet. In the case of McDonald I think they were about 55 feet.

MR. ETHERIDGE: Thank you. I have no further questions.

Thank you. Mr. Stubchaer.

HEARING OFFICER STUBCHAER: Thank you.

Is Mr. Turner here?

Department of Water Resources, Ms. Crothers?

MS. CROTHERS: Yes. I do have some questions.

---oOo---

CROSS-EXAMINATION OF CENTRAL DELTA WATER AGENCY
BY CALIFORNIA DEPARTMENT OF WATER RESOURCES
BY CATHY CROTHERS

MS. CROTHERS: Good morning. My name is Cathy Crothers with the Department of Water Resources. I just have a few questions for Mr. Neudeck.

There's been some -- much testimony throughout

the hearings about eyewitness accounts of increases in island seepage after flooding of an adjacent island.

Do you know of any engineering investigations that may have been performed to study this problem?

MR. NEUDECK: The only investigation that slightly resembles that would be the work that would have been done through Haring, Lawson and Associates on the interceptors wells -- or the relief wells adjacent to Mildred Island.

To what extend they were viewing ongoing seepage from Mildred Island would be the one that would be most reflective of an engineering study.

MS. CROTHERS: Do you believe that the seepage problem is well understood by engineers who work in the Delta?

MR. NEUDECK: I -- it's a known fact that seepage does occur. When you say well-known I would say, no. I think it requires a significant level of subsurface investigation. The conditions are so varied out there, we could not predict what's going to occur to the -- to the magnitude cited in the question.

MS. CROTHERS: Yesterday afternoon in your testimony you were referring to a term "factor of safety" with regards to the levee stability. Could you explain what you meant by that, or what that term

means?

MR. NEUDECK: Well, I was reflecting on what was being referred to out of the EIR as increasing the factor of safety. Factor of safety is what the design ratio is to overcome failure.

I don't know exactly how to explain factor of safety, but what they're indicating is I was reflecting on the decrease in factor of safety due to the subsidence of organics, or the peats. Whereas because of increased head on the levee that could be overcome by a number of different alternatives, one of which was the buttressing concept; and the other was shallow flooding. Those were the two ideas that we were bantering about.

Increased factor safety is the ability by which that levee could sustain its water holding capability and not fail, not slump, not subside. You know, maintain its existing structural configuration.

MS. CROTHERS: Did you know what factor of safety might be chosen from, say, an Army Corp's levee?

MR. NEUDECK: Yes. As I indicated I don't have the theory exactly committed to memory on factor of safety. But for reflection of the variation, a factor of safety less than one is considered failure. A safety factor greater than one is considered on the

order of stability.

Anything less than one you're going to probably fail. Above one you will not fail. The factor of safety, say, for water tide slopes that are -- would achieve a Corp standard would be 1.4.

MS. CROTHERS: Do you have an opinion of what you might consider an acceptable minimal factor of safety for a Delta Wetlands reservoir island levee?

MR. NEUDECK: I would reflect on the Division of Dam Safety from that standpoint. I would use their criteria. Certainly, the minimum factors of safety set forth by the Corp would be considerable. But I don't know that we've actually addressed land slide slope stability under saturated conditions with the Corp's standard.

MS. CROTHERS: The Delta Wetlands have mentioned -- or I think they describe in the Draft EIR that they would have their levee designed to the Bulletin 192-82 criteria.

Does that criteria establish a factor of safety?

MR. NEUDECK: No. They do not come out with an actual factor of safety, nor do they evaluate interior reservoirs. That standard is set forth for exterior loading from the standard fluctuation in the

tide in the Delta.

MS. CROTHERS: Well, that concludes my questions. Thank you.

MR. NEUDECK: You're welcome.

HEARING OFFICER STUBCHAER: Thank you, Ms. Crothers.

Mr. Schulz, you wish to cross-examine?

MR. SCHULZ: Yeah.

---oOo---

CROSS-EXAMINATION OF CENTRAL DELTA WATER AGENCY

BY STATE WATER CONTRACTORS

BY CLIFF SCHULZ

MR. SCHULZ: These questions are for Mr. Neudeck.

Following up, perhaps, on Ms. Crother's line of questions because I've heard a lot of discussion --

HEARING OFFICER STUBCHAER: Now, I know we need to raise the mic.

MR. SCHULZ: Okay, but I talk loud. We had a lot of discussion about wave fetch and possible overtopping and factors of safety.

What I'm trying to find out is: What is Central Delta asking this Board to do? In other words, if you were going to ask this Board to impose a term, or condition with respect to the safety factors on

levees, what would they be?

In other words, you've got this open water. You've got the potential for overtopping from wave fetch. Would you have recommendations that you would make with respect to the amount of free board that would have to be on a levee, or materials that the -- that they would be constructed? What is it that the State Water Resources Control Board might do in order to satisfy your concerns?

MR. NEUDECK: Well, I said -- I think first of all, with regards to the wind fetch, I think it needs to be evaluated from the fetches that were established as well as any potential prevailing wind direction and designed accordingly. I don't think overtopping should be allowed provided that the levee can't withstand it.

As far as setting forth a standard, I can't think of any worse place in the entire Delta to put a reservoir than these two islands. These two islands are probably considered some of the softest soils under the foundation conditions and some of the weaker levee systems. And when it comes to reconstructing and rehabilitating both of these islands, which my firm and myself have worked on, it's a very sensitive operation.

And to go out and construct on these levees under even the best conditions takes a very long time.

To set forth criteria and cross-examination would be very difficult. I would suggest that it may not even be feasible to construct on those foundations. Certainly, not in the time frame that makes this an economic proposal, I don't believe.

And if you're talking about raising these levees two to three, maybe upwards in the range of five feet to keep them from overtopping, maybe that's too aggressive. Maybe you allow them to overtop in some conditions, but then you're going to have to consider the erosive force of that water.

It was testified to earlier that the predominant soil for borrow is sand. Sand is highly erodible. To overcome that you're going to have to place a lot of aggregate loading through the section of riprap that you're going to have to place on the lands side to keep from eroding.

I think if I were to set forth a plan I think the best thing would be to look at an alternative, and that would be to do a setback levee, construct an engineering field. You're starting off with a levee that has a lot of setbacks from the standpoint of strength and stability and highly variable soil types. And effectively it has some weaknesses when it comes to, you know, maintaining longevity for the sake of

holding water.

MR. SCHULZ: That's all the -- the only question I had.

HEARING OFFICER STUBCHAER: Mr. Schulz, thank you.

Ms. Murray, do you wish to cross-examine?

MS. MURRAY: Yes.

---oOo---

CROSS-EXAMINATION OF CENTRAL DELTA WATER AGENCY
BY CALIFORNIA DEPARTMENT OF FISH AND GAME
BY NANCEE MURRAY

MS. MURRAY: I have just a few questions for Mr. Thomas Zuckerman.

MR. T. ZUCKERMAN: Yes.

MS. MURRAY: Good morning. Mr. Zuckerman, you have requested that the Board include as permanent conditions terms substantially similar to those in the agreement working draft submitted in the written testimony.

Is that correct?

MR. T. ZUCKERMAN: Yes.

MS. MURRAY: The reclamation plan described in that working draft calls for a description of actions to restore the habitat islands under certain conditions to farmable land, or shallow marsh, and habitat.

The habitat management plan has been called a farming, modified agricultural, and shallow marsh habitat. Do you intend for your reclamation plan to supersede the habitat management plan as to the habitat islands?

MR. T. ZUCKERMAN: No.

MS. MURRAY: And is it fair to say that the reclamation plan's concerns focus really on the reservoir islands and not the habitat islands?

MR. T. ZUCKERMAN: We have as much concern about the maintenance of the levee systems on the reservoir -- I mean on the habitat islands as we do on the reservoir islands. But you don't -- you don't have the same internal stresses that have been identified by Mr. Neudeck in that regard.

So we felt it was more important here to emphasis the problems that are created by the proposal on the reservoir islands. We are equally concerned that the habitat island systems be maintained.

MS. MURRAY: And, yet, you see the seepage problems on the reservoirs islands to be more significant than to see any potential seepage problems --

MR. T. ZUCKERMAN: Yes.

MS. MURRAY: No further questions.

HEARING OFFICER STUBCHAER: Thank you.

Is there anyone else other than staff who wishes to cross-examine? Seeing none, does staff have questions?

MS. LEIDIGH: Yes.

HEARING OFFICER STUBCHAER: Is Mr. Canaday going to begin? Mr. Cornelius?

---oOo---

CROSS-EXAMINATION OF CENTRAL DELTA WATER AGENCY

BY STAFF

MR. CORNELIUS: Yes. Mr. Neudeck, you in your testimony, or in cross referred to how you stop subsidence. At one point you talked a little bit about capping and stabilizing. I was wondering if you could explain a little bit more for the record how that is done.

MR. NEUDECK: When I was reflecting on stopping subsidence it was reflecting on the foundation of the levee system. I don't necessarily think we stop subsidence. What we have been doing is consolidating the underlaying organics in a very slow and, I guess, diligent process.

What happens is you load these organics. It takes a fair amount of time for them to dewater and eventually compress. And so what we've been doing over

time is consolidating those underlaying organics to a point where they stabilize. They no longer want to laterally.

At such time then we can start constructing essentially height. And that stability provides for in the toe berm the ability to raise the height of the levee on the crown. It also gives us the capability to raise -- or flatten the back slope.

As one example, this is not necessarily an unusual example, but on Twitchell Island which is immediately north of Webb Track we put in in a period of about 10 years over 15 feet of fill material on the toe of the levee, ultimately to gain no elevation whatsoever.

We basically stabilized but in that whole time frame consolidated the underlying peat to a point where we were able to start constructing above that point to flatten the land side slope. So there is significant time and -- in the process to consolidate those underlying peats to the point where they're stable enough to really start adding height to the crown of the levee.

MR. CORNELIUS: Also you talked, or eluded to the rate at which the islands themselves are subsiding. Could you explain that a little bit? There seems to be

conflicting testimony in the record about, you know, three inches or whatever. I don't know.

MR. NEUDECK: Yeah. I think three inches is a number that everybody grabs. It's a number that I think a lot of people reflect on, because it was in the report from the Department of Water Resources.

I'm not sure of the accuracy of that. I know the Department of Water Resources with the cooperation of the USGS has undertaken a fairly extensive study over the recent years. And I believe there should be more current data as to the current ongoing peat oxidation subsidence of burning and blowing.

There has been some change in farming practices. We have areas out there that no longer have peat on them. So there are areas of the islands that have reached their ultimate elevation. But I felt that the three inches per year that was cited in the EIR was a number that's been grabbed out of previous reports. And I think there's better available information on that rate right now.

MR. CORNELIUS: You indicated the DWR and GS are doing some studies on that. Are there any published reports, and what are the bulletin numbers, and/or GS report number?

MR. NEUDECK: Yeah, they're both numbers that

I don't recall. I don't have them committed to memory.

MR. CORNELIUS: They have been published?

MR. NEUDECK: There is a site on Bacon Island on the west side that is evaluating the very issue of peat subsidence and deep organics and things of that nature where they put extensionometer very deep into the floor of the island. So there's information available. I'm sorry, I don't have reference to the reports.

MR. CORNELIUS: Okay. Well, maybe that's something we can find later. Thank you.

MR. NEUDECK: You're welcome.

HEARING OFFICER STUBCHAER: Mr. Sutton.

MR. SUTTON: Jim Sutton.

Mr. Neudeck, you discussed the problem of long fetches, winds fetches on the islands, the potential for wave development, and overtopping under the long fetches.

After watching the Olympics last year I became aware that the swimming pools that they use -- the lane dividers are specifically designed to reduce waves between lanes and pools.

Is it possible to design, or incorporate into the reservoirs a series of floating buoys, or shallow

curtains, or something like that that would essentially break up or reduce the continuous long fetch that one sees on the island?

MR. NEUDECK: None that I'm aware of. A large rock, buttress, or eddie, or something like that which would actually divide the island in half, or you know in thirds, or something like that to breakdown the wave generating area. But as far as floating attenuation, they have a limited success.

It's not -- I don't know that there's anything out there that's going to be as successful as necessary to break some of these waves. There may be a product that I'm unaware of. We've tried to break them down after an island floods. And we've tried a number of floating attenuation devices and they've all failed.

MR. SUTTON: And also -- just so I clarify for the record, there was numerous discusses both with you and Mr. Tom Zuckerman relative to the habitat islands.

Is it my understanding that in terms of operating the habitat islands the way it's proposed to be operated that other than assuring continued maintenance of the levees, that there's no inherent problem in operating the habitat islands as they are proposed to be operated under the HMP; is that correct?

MR. T. ZUCKERMAN: I believe that's correct.

But what we're saying is we believe there needs to be an enforceable obligation to maintain those levees as well to the standards that they're proposing.

And it's even more foreseeable that once they get taken over by creatures and so forth, that there might be less incentive on the part of project operators to do diligent levee maintenance. We're very concerned that that funding we're talking about be available and accessible and the arbitration procedure and so forth to ensure that those levees are maintained to the applicable standards.

MR. SUTTON: Okay. But assuming that that happens, that those levees are maintained, other than that you don't see any inherent problems in operating the two islands as habitats?

MR. T. ZUCKERMAN: There are inherent problems in operating them as habitat levees that are related to, you know, probably encouraging more beavers and that sort of thing to inhabit within the area. But not to the same degree that Mr. Neudeck is talking about with regard to the reservoir islands.

MR. SUTTON: And finally while I have the microphone in front of you, Mr. Zuckerman, you discussed the arbitration board, this independent arbitration board that would be established under your

proposed agreement.

Does the proposed agreement preclude, or prohibit any of the parties from filing a complaint, or an appeal of the decision of that board to either the Water Resources Control Board, or the Corp of Engineers?

MR. NOMELLINI: No. That was an additive remedy not precluding any other remedy.

MR. SUTTON: So the presence of this arbitration board does not necessarily mean that if there's a problem that it could still end up here, or with the Corp?

MR. NOMELLINI: It could very well end up here, or with the Corp. However, the idea is to provide a more expedited process that would be on top of the problem on a daily basis, or have that capability. And, therefore, there would be no need to go to the other forums, but they would not be precluded.

MR. SUTTON: Thank you. That's all I have.

HEARING OFFICER STUBCHAER: Mr. Canaday.

MR. NOMELLINI: I assume that was a legal question, that's why the lawyer --

HEARING OFFICER STUBCHAER: You were sworn.

MR. CANADAY: This is for Mr. Neudeck. Are

you aware on any of the islands of which you either consult, or work the borrow areas that are potentially as large as would be on the islands, or proposed for these islands? Large by meaning either in depth or in size.

MR. NEUDECK: The answer is, no, with one qualification. This is borrow areas that are throughout the Delta, particularly very shallow borrows. One exception -- actually two exceptions of shallow borrows and the interior of the islands have been on some of the upland islands along the western -- excuse me, the eastern fringe near Stockton.

Whereas some of the borrow areas have been turned into shallow lakes. For the most part, the borrow areas that are ongoing in the Delta are skimming off the sedimentary soils on some of the higher fields that exist within the islands. So it's a relatively innocuous exercise. It's more or less just redeviling the sedimentary field.

MR. CANADAY: Is it your understanding of the proposal here that these borrow areas are more in the -- would be more typically considered pits?

MR. NEUDECK: It's been referenced in that sense that they be five, ten feet deep, yes.

MR. CANADAY: Is there -- is there a problem

with deeper?

MR. NEUDECK: The deeper you go the more likely you are to intercept the sand as it runs between the islands.

MR. CANADAY: So if they were trying to tap resources say under an overburden of peat to get this sand then they have to go deeper than ten feet?

MR. NEUDECK: Yes.

MR. CANADAY: You talked about your preferred way of dealing with the levee maintenance would be to create a setback in their own dam, or levee system within the island; is that correct?

MR. NEUDECK: That's my engineering preference, yes.

MR. CANADAY: And to build those types of facilities you wouldn't be able to borrow that amount of material from within the islands would you, or could you?

MR. NEUDECK: It could be a challenge to find that much material on an island.

MR. CANADAY: So that the material would probably have to be imported from outside the area?

MR. NEUDECK: Yeah. I think if you're going to design it as a dam you're going to have a variation of materials available on an island.

MR. CANADAY: Also to make sure I understand, one of your recommendations is that in the development of these piezometer monitoring sites that your recommendation is that there should be a -- a -- an array within the island floors themselves rather than just on the levees.

Is that correct?

MR. NEUDECK: Actually, what I was referring to was an array of evaluation on the islands -- the reservoir islands to determine the potential for seepage. That's when I was referring to the array of investigation.

You're likely going to tap into some of these veins that run from one island to the other far away from the levee itself. As far as having an array of piezometers on the interior of the islands on a neighboring island that's going to be difficult to predict without going out and investigating every of the -- every one of these adjoining islands.

I think in that case you would rely much upon visible inspection, provided the visible inspection would result in some type of remediation.

MR. CANADAY: This is for Thomas Zuckerman. So I better understand the characterization of the arbitration board. The word "arbitration," is it

proposed that there's some sort of -- let's suppose the project proponent, whoever they were at the time this came before the arbitration board, is there a mechanism within that to if there was a continued disagreement between the project operators and members of the arbitration board, that the arbitration board could, in fact, cause a change to occur in operations at the project that, you know, would break a tie breaker, or --

MR. T. ZUCKERMAN: Well, the arbitration board would control the expenditure of the security funds.

MR. CANADAY: And that's all?

MR. T. ZUCKERMAN: Well, that's -- that's a big all.

MR. CANADAY: Yeah.

MR. T. ZUCKERMAN: That would trigger the ability of the Central Delta Water Agency to use the example to go in and initiate the work using the project proponent's money to effectuate the necessary repairs that were deemed necessary by the arbitration panel.

MR. CANADAY: That gets to your one exhibit where it's added to the proposal actions that the arbitration board could do. You had the word "filling." So I assuming that that has to do with the

physical work of repairing levees and not control the filling of the islands with water?

MR. T. ZUCKERMAN: The arbitrator specifically would have the ability to order that the reservoirs be maintained at a lower level than they were currently at if there were problems. When I say the easements that would grant -- that would be the powers that would be vested in the arbitrators, the ability would be go in and actually lower the level of those islands if they were deemed to be causing a problem.

MR. CANADAY: Okay. Either lower the level, or restrict the filling to a higher level?

MR. T. ZUCKERMAN: Yes. Correct.

MR. CANADAY: Okay. And finally -- maybe you don't have any experience with this. The representative of an investment banker --

MR. T. ZUCKERMAN: Yes,

MR. CANADAY: -- and the recommendation of the people you represent is to have this bond, or fund of which can be tapped to make changes.

Are these kinds of arrangements common?

MR. T. ZUCKERMAN: Well, they are. I mean the most common form of it that I think we're all aware of is in making subdivision improvements, or anything of that nature in an urban area.

Off-site improvements are required to be bonded by the municipality, so that the municipality has some assurance that the conditions that are imposed upon the development plan, such as the extension of a sanitary sewer, or a storm drain, or construction of streets, or lights, or whatever the case might be, will occur regardless of the success or failure of the development itself.

MR. CANADAY: Okay.

MR. T. ZUCKERMAN: That's the most common occurrence. And it's a very common condition of almost every urban development plan.

MR. CANADAY: Is this in the form of a surety bond, or is it cash on hand?

MR. T. ZUCKERMAN: There is a series of options that are granted to the developer. One could be cash. Another can be a surety bond, which is the most normal way of doing it. I think there's a third method that you can apply.

MR. NOMELLINI: Letter of credit from a bank?

MR. T. ZUCKERMAN: Letter of credit from a bank. There's very common. It's the same issue.

MR. CANADAY: Thank you. That's all I have.

HEARING OFFICER STUBCHAER: Thank you, Mr. Canaday.

Ms. Leidigh, do you have any questions?

MS. LEIDIGH: No.

HEARING OFFICER STUBCHAER: I have no questions. That concludes the cross-examination.

Do you have any redirect, Mr. Nomellini?

MR. NOMELLINI: I do. I want to call you Chairman.

HEARING OFFICER STUBCHAER: You can call me chairman. I guess that would be --

MR. NOMELLINI: Sir.

HEARING OFFICER STUBCHAER: Okay.

---oOo---

REDIRECT EXAMINATION OF CENTRAL DELTA WATER AGENCY

BY DANTE NOMELLINI

MR. NOMELLINI: This is kind of a question of the panel, there's been a lot of questioning about the extent of peat soil with preventing subsidence of peat soil.

And, Chris, you talked about how you handle the problem of subsidence of peat from a levee standpoint. And your testimony was that you add material on the land side of the levee to fortify it as the land surface goes down inside the island the levee maintains its stability.

Is that correct?

MR. NEUDECK: That's correct.

MR. NOMELLINI: All right. Now, you heard the Delta Wetlands representative talk about saving the world from peat subsidence. And at the same time Kyser Shimasaki came up and said there was no peat soil left on Bacon Island. That it was mineral soil. And he was having a hard time farming the mineral soil in order to get the money to maintain the levees.

Now, in general, the Delta Wetlands are not uniformed with regard to their peat soil content, are they?

MR. NEUDECK: That's correct.

MR. NOMELLINI: And you guys all agree that in some places there is no peat. Other places the peat might be thick. And let's take like Webb Track. There are places on Webb Track where there is no peat soil left. Is that correct?

MR. NEUDECK: Yes. It is higher on Webb Track, yes.

MR. NOMELLINI: And there's areas that are fairly deep?

MR. NEUDECK: Correct.

MR. NOMELLINI: All right. And with regard to Bacon Island, do you know if Kyser is right that there's no peat soil left on Bacon Island?

MR. NEUDECK: Yeah. I'm familiar with some areas that are down to mineral soil, but this would reflect on farming interests more than --

MR. NOMELLINI: Does anyone else know whether or not Kyser is right that there's no peat left on Bacon Island?

MR. A. ZUCKERMAN: Well, I've had a lot of experience on Bacon after farming there over 30 years on Bacon 11, which is --

MR. NOMELLINI: When you say Bacon 11 you mean camp --

MR. A. ZUCKERMAN: Camp 11.

MR. NOMELLINI: That's an area within the island divided up into camps.

MR. A. ZUCKERMAN: There are -- Kyser is partially right, but he's partially wrong. Large areas of Bacon have been eroded from peat, eroded -- the peat is gone, oxidized away. And large areas still have peat.

There's extensive potato farming on Bacon. And I think that's true of all the areas. McDonald Island is part peat and part sediment. And as most of you well know, peat extended all the way to the City of Stockton a hundred years ago.

And some of the best farming we now have is on

Union Island and Drexler Tract and Roberts Island, they all have peat material. And the land sells there much -- at a much higher price.

MR. NOMELLINI: So the loss of peat doesn't mean, in your opinion, that you can't successfully farm?

MR. A. ZUCKERMAN: That's true.

MR. NOMELLINI: All right. Now, with regard to the peat soil subsidence problem in the Delta, taking Bacon Island there is some parts of Bacon Island that there's a subsidence problem and other parts that aren't going to subside anymore. Is that correct?

MR. A. ZUCKERMAN: That's true.

MR. NEUDECK: There's one underlying fact that can't be disputed and that is that the underlying peat under the levee foundation is only being compressed. It's is not blowing away. It's not oxidizing.

In fact, in some cases it's twice as thick as what was in the field, because the construction of the levee was they dredged the river out, placed the peat on top of the peat and started building the levee. So there's one undisputed fact that underneath that levee it is still there. And we have to contend with that peat. That's why I described some of the methodology in controlling the subsidence and strengthening of the

island organics.

MR. NOMELLINI: All right. Now, with regard to -- there was a question as to what the recommendation of the Central Delta Water Agency would be as to a standard for the levee construction for the reservoirs.

And I think it's clear that you -- you, Chris, testified that the Bulletin 192-82 is a standard developed by the Department of Water Resources and was not intended to cover a reservoir, or flooding within the island, and then water on the outside as well as. Is that correct?

MR. NEUDECK: That's correct.

MR. NOMELLINI: All right. Now, you recommended that there be an interior levee. Are you talking about something like they did on Cliffton Court Forebay where the Division of Dam Safety would approve the structure?

MR. NEUDECK: Yes, I was.

MR. NOMELLINI: Okay. So the standard that you would like to see imposed for a reservoir of this type would be the Division of Dam Safety standards?

MR. NEUDECK: Yes. And that's the only successful demonstration of this similar use in the Delta is on the forebay. So that's what I would refer

to.

MR. NOMELLINI: Now, with regard to the borrow areas, we know that within the rim of the Delta we've had various development projects that construct the borrow pits that turned them into residential lakes. And you've testified to that, I believe?

MR. NEUDECK: That's correct.

MR. NOMELLINI: And in any of those proposals did they propose to flood those areas at the elevation plus six?

MR. NEUDECK: No. In fact, the elevation of the lakes is held below the surrounding ground elevation.

MR. NOMELLINI: And there was no problem with -- regarding inducing seepage into adjoining islands, was there?

MR. NEUDECK: No, there was not.

MR. NOMELLINI: The water levels in these lakes was basically somewhere near ground water level?

MR. NEUDECK: Yeah. Near ground, or in some cases -- yeah, ground water level. In fact, it was just below the adjoining ground. In many cases they're at or near existing ground level.

MR. NOMELLINI: One of the problems with borrow pits as proposed by Delta Wetlands is that

because they're going to fill these areas to reservoir height that they will induce more seepage because they've opened up the sand bank; is that correct?

MR. NEUDECK: They'll sir-charge it with increased -- yes.

MR. NOMELLINI: Okay. And the second area of concern was whether or not the borrow pit, in fact, undermine the stability of the levee. And, therefore, in a case like on Webb Track if you went within 400 feet of an unstable stretch of levee you could destabilize it by the excavation; is that correct?

MR. NEUDECK: Yes. You could lose lateral support.

MR. NOMELLINI: Right. Now, in these surrounding areas where we have borrowed pits used as residential lakes, do we have any of those unstable foundation conditions like we have on Webb and Bacon that you talked about?

MR. NEUDECK: That's what I was reflecting on, cases where we any excavations on the eastern edge, or eastern fringe of the Delta is primarily sedimentary soils.

MR. NOMELLINI: In other words, they're not the soft soil conditions that we're dealing with in these two reservoir locations?

MR. NEUDECK: That's correct.

MR. NOMELLINI: All right. Now, with regard to the question pertaining to knowing the soil conditions within the reservoir islands, what you were saying was that you need more soil investigation out there in order to determine whether or not an interceptor well system around the perimeter could be affected?

MR. NEUDECK: That's correct.

MR. NOMELLINI: In other words, if you found other lenses that slipped underneath the clay lands, you might have to go deeper with these islands?

MR. NEUDECK: Exactly. Just having the profile underneath the levee isn't going to tell you what's outside that levee structure as far as the potential of seepage patterns.

MR. NOMELLINI: So you were talking about investigation that would proceed at a specific design of this interceptor well.

MR. NEUDECK: Right. It would be part of the -- to determine the depth of the seepage interceptor well as to whether it's going to be effective. If you have an underlying seepage pattern that's below the clay lands it's transmitting underneath the channel of the adjoining island, your

seepage interpreter well is not going to pick that up.

MR. NOMELLINI: All right. Thank you. That's all I have.

HEARING OFFICER STUBCHAER: Okay. Any other recross-examination? Seeing none, staff?

MS. LEIDIGH: No.

HEARING OFFICER STUBCHAER: All right. You wish to offer your exhibits into evidence?

MR. NOMELLINI: Yes. I would at this time like to offer Central Delta Water Agency's Exhibits 1 through 16.

HEARING OFFICER STUBCHAER: All right. Are there any objections to the receipt of this evidence into the record? Seeing none, they're accepted.

MR. NOMELLINI: Thank you.

HEARING OFFICER STUBCHAER: Thank you. We'll take a minute or two while we rearrange here, but the next item will be the direct testimony of Pacific Gas and Electric.

Good morning, again, Mr. Moss.

MR. MOSS: Before we begin, I would like you to swear in our two witnesses they were not here the other day.

HEARING OFFICER STUBCHAER: Okay. Thank you. Please stand. Raise your right hand. You promise to

tell the truth in this proceeding?

THE WITNESSES: I do.

HEARING OFFICER STUBCHAER: Thank you. You may be seated.

HEARING OFFICER STUBCHAER: That's fine.

---oOo---

DIRECT TESTIMONY OF PACIFIC GAS AND ELECTRIC

BY RICHARD MOSS

MR. MOSS: Mr. Stubchaer, if you'll allow me, I have an opening statement I would like to make and then we will go to the testimony. Thank you.

PG&E's protest to the subject application is somewhat unusual in that it does not involve our usual objection based on injury to prior senior water rights, but it is instead based on the public interest and environmental impact that we believe comes from the Delta Wetlands's applications and how they -- that impact would fall on us and our utility infrastructure within the project area in the Central and Southern Delta.

In particular, PG&E believes that the intentional flooding of Bacon Island will seriously impact the maintenance and condition of Line 57, which is the sole gas transmission between the McDonald Island underground gas storage facility and the rest of

PG&E's gas supply and customer-service system.

While PG&E believes that it has vested land rights that will protect the easement right-of-way on Bacon Island from this intentional inundation, or other unreasonable burdens, we are not asking this Board to judge the validity of these claims.

Rather, PG&E is here today to explain what the land rights are and to present the factual evidence that even if Delta Wetlands were to prevail on the issue of our easement rights, the use of Bacon Island as a water storage reservoir would put an unreasonable maintenance and operations burden on PG&E. And, therefore, on our several million gas customers which we believe that burden would not be in the public interest.

PG&E does not support, or oppose the concept of the Delta Wetlands Project, but from the beginning of our relationship, first with Bedford Properties now Delta Wetlands, we have stated our concerns. We believe that they've been heard, but as a practical matter they've been ignored.

This lack of seriousness by Delta Wetlands was, again, just illustrated last week when Mr. Forkel admitted that he was not really familiar, had not recently even looked at the substance of PG&E's protest

of January 29th, 1988.

Or when we found out that Dr. -- that they had not asked Dr. Egan to personally go out and see Bacon Island and see our right-of-way before he opined that it shouldn't make much difference to PG&E if Delta Wetlands floods the pipelines. So I make that point.

Although it's already in the record of this proceeding, we believe it is useful to briefly review the terms of PG&E's protest. It starts by noting that the proposed reservoir project, quote, will inundate numerous PG&E electric and natural gas distribution lines and will affect the interstate transmission of electricity and natural gas, unquote.

It goes on to point out that the 500 kv Pacific intertide is situated not far from the Delta Wetlands Project, and expresses our concerns that the project not endanger this critical energy facility. The protest then highlights the threat to the McDonald Island pipelines which is set forth in an attached December 22nd, 1985, letter to John Winter from Marv Bennett who was then the manager of PG&E's Pipeline Operations Department.

I think it's important to note that the protest is not absolute, but states the conditions that Delta Wetlands would necessarily have to fulfill for

PG&E to drop its protest, that is provided on the form that you're very familiar with.

These conditions are that Delta Wetlands, quote, agrees to fully fund the cost of, one, all feasibility and engineering studies to ascertain the potential relocation and damage to PG&E properties.

And, two, the actual relocation replacement and/or reconstruction cost of all PG&E facilities impacted directly, or indirectly by their proposal.

Additionally, Delta Wetlands shall post a performance bond and shall fully ensure their near and long-term responsibility for all impacts on PG&E facilities and operations that arise from the development and/or operation of their project, end quote. That's on our protest.

As you can see PG&E did not say no to the project. We said, basically, make us whole, be responsible for your impacts on utility facilities and operations, don't endanger the backbone of California's gas and electric infrastructure. Basically, don't expect PG&E's ratepayers and shareholders to bear the risks of those facilities and operations that this proposed project will unquestionably bring.

I believe it doesn't take rocket science to know that the cost, the nature of the undertaking, the

physical and worker risk of maintaining a high-pressure gas pipeline is by a factor of many folding easier on dry land than it is at the bottom of some 20 -- 20-foot reservoir or muddy lagoon.

How has Delta Wetlands responded? One, they have never seriously discussed the land rights issue. As recently seen by Mr. Forkel's attempt to pass off questions regarding these issues by saying they were the subject of some undocumented conversations with somebody at PG&E a long time ago, et cetera.

See, it wasn't a substance. They didn't say to us, you asked for something unreasonable. Here's what we'll offer. It never took place, not that I'm aware of anyway.

Two, they have attempted to dissuade the Board from even hearing PG&E's case, because it is in their minds, quote, a private matter of no apparent interest to the public.

And, three, they hired Dr. Egan to say that PG&E has nothing to worry about if we just let Delta Wetlands do its thing, its project. And, of course, you'll remember as he said we should have those two big barges nearby loaded with equipment and a trained staff, one barge to raise the other over the levee in case there was a problem.

And I would also point out that the barge better be anchored, because if we're there releasing 4,000 csf that barge may start pulling the barge off somewhere else.

Lastly, I'd like to comment on two points. The issue of PG&E's alleged noncooperation with the Egan/Delta Wetlands inquiry and why it isn't unreasonable for this Board to condition any permit, or license granted to Delta Wetlands on a condition that clearly finds that before Delta Wetlands can build a project that has the directed capacity to impact its neighbors that they agree to indemnify these property owners for any loss or damage that may a raise from the construction and/or operation of the project.

On the first issue, Delta Wetlands has requested from PG&E detailed records concerning the operation and maintenance of the gas transmission lines that cross Bacon Island. Some of these requests were for information that does not exist at all, or is kept by PG&E in a different format than the request.

Nevertheless, in response we gave them a lot of detailed information. Everything that we could lay our hands on that was not of a proprietary nature. But still as you heard they want more. Why? What was the point of these data requests?

If it was to show that PG&E built a robust pipeline and that it is well maintained, we'll stipulate to these facts. If it was to suggest that we should bear the burden of a flooding Bacon Island as we do for a river crossing, or a flooded Mildred Island, I believe this is to ignore the reality that this is not a purely technical issue. Nor are we asking for engineering help.

Dr. Egan testified that if we give him the smart pig results for a run under Mildred Island he will tell us how to maintain Mildred Island. Thanks, but it's basically off the point of what we believe this hearing is which is mainly the question of whether we intentionally create another flooded Mildred Island and subject PG&E to additional costs and risks. If they, of course, have questions about our operation, our witnesses are here to answer them.

And on the surety issue a few thoughts. The apparently unthinkable for Delta Wetlands expenses of Delta Wetlands relocating Line 57B off Bacon Island. Yes, it will be expensive. And as we'll shortly hear it's probably a matter of several million dollars, but it's not a cost that is out of the ballpark, or unreasonable for a project that has admitted in an average year they could have revenues of almost, at a

minimum, 31 million dollars.

So that's basically why we think this Board should consider our protest in that scope. It's not out of the question to relocate these facilities if, in fact, they want to use the island.

I'd like to call as our first witness Scott Clapp.

MR. CLAPP: Good morning.

MR. MOSS: Mr. Clapp, would you state your name and occupation for this Board.

MR. CLAPP: My name is Scott Clapp. I'm the director of Gas Transmission Pipeline Engineering for PG&E.

MR. MOSS: And briefly would you tell us your education and experience.

MR. CLAPP: Yes. I'm a registered mechanical engineer with the State of California. I have a bachelor's of science degree in mechanical engineering.

I spent the last two and a half years as the director of gas transmission pipelines for PG&E. Prior to that I was a division gas engineer, that may not mean a lot outside of PG&E, but basically responsibility for a geographic regional area. I was directly responsible for code compliance, for design and replacement -- design of new facilities,

replacement of inadequate facilities.

I directly supervised the field forces that do the routine maintenance, operations, and inspection of our transmission pipelines as well as distribution of pipelines in that capacity.

Prior to that I worked as a facility engineer for a subsidiary company, Pacific Gas Transmission Company in Sandpoint, Idaho. And, again, I was directly involved in the code compliance, maintenance and operation of the pipelines there.

MR. MOSS: Thank you. Is the statement of your qualifications, which I believe we labeled as PG&E Exhibit 3, was that prepared by you?

MR. CLAPP: Yes, it was.

MR. MOSS: And I will show you your -- the written testimony of Scott Clapp. Is that your testimony?

MR. CLAPP: Yes, it is.

MR. MOSS: And was it -- did you prepare it?

MR. CLAPP: That was prepared by myself and parts of it under my direction.

MR. MOSS: Would you, please, summarize that testimony.

MR. CLAPP: Yeah. Thank you. First, I'd like to begin by giving everyone a basic description of our

system operation.

PG&E gets gas from three sources. First of all from a Line 400 system, which is Canadian gas. And that enters the State in our service territory at Klamath Falls. We have -- those are -- there's two pipelines there 36-inch and a 42-inch diameter pipeline.

We also get gas from the southern part of the State around Needles through a Line 300 system. And then we have some production that's local, California gas production. Those three sources of gas are not sufficient to meet peak load requirements for PG&E, you know, during residential high-load demands, to meet cold whether.

And so, therefore, we've installed and maintained a McDonald Island storage facility which injects gas during low periods during the summer, withdraws gas during high periods, high-low conditions during the winter. And that facility is connected to our greater transmission systems through Line 57B.

McDonald Island is not only used for injection withdrawal, it's also very important to have for two other reasons. First of which is inventory control. And sometimes you can imagine we forecast our load conditions based upon the weather and upon large

industrial load. And sometimes we miss those forecasts. And we need to use McDonald Island storage facility as inventory control so to be able to park gas and put it in and move it out.

And that's becoming increasingly important as the deregulation of the gas industry continues. We also need that facility to handle a planned, or unplanned capacity constraint on those other major legs of our system. So that if we had an incident on one of those legs we'd be able to withdraw gas on a short notice and not hold the rest of the system up so we wouldn't have to curtail customer load.

I think it's important to give you a description of the pipeline system as well. There are two lines out there. There's 57A, and that line was installed in 1949 by Standard Oil Corporation. We purchased it 1959. And it's, you know, basically state-of-the-art at 1949. It's not concrete coded. It's weighed in some sections. It has some dysmastic garb, it has problems with dysphonic coding. We maintain that line --

HEARING OFFICER STUBCHAER: Pardon me. Has problems with what?

MR. CLAPP: Dysphonic codings. Thank you for asking that. Dysmantic is a coding that goes on a

pipeline and it's prone to falling off, and that causes us some real issues with corrosion control.

That line is being maintained kind of in abeyance for PG&E with a potential evolution of rehabilitation techniques. So ultimately some day we may be able to rehabilitate that line.

Line 57B is the line that we're most concerned about. It is a 22-inch diameter pipeline. It consists mostly of .660-wall thickness pipe. That's .066 inches, so roughly nearly three-quarters of an inch thick steel. It's got a primer coding on it. It's triple-wrapped in polyethylene tape. And that is encased in concrete to give a negative buoyancy of 12 pounds per linear foot when it's underwater, which it is most of the time, because it's underground water.

That pipeline's dead weight is approximately 200 pounds per linear foot. So it's quite heavy. This pipeline was geometrically pigged in 1992 to ascertain whether -- if there was any damage caused by the consolidation of the levees, and consolidation of the islands and levee instability.

And it was determined that it was under stress. And we ended up having to replace an elbow and add a small section of pipe to deal with those stresses. We also increased the maintenance activity

on that line by installing some tilt meters, so we monitor those monthly now so we can anticipate any further stresses put on that pipeline.

Another thing I thought would be beneficial for the Board is to hear some of the routine maintenance and operation activities that is required for the transmission pipeline. And we'll go into an exhaustive list of those, but basically we have to do routine maintenance.

These are minimum standards that are prescribed by code. And I emphasis that they're minimum. We do an annual control. We do a leak survey. We have to maintain cathodic protection levels to assure the pipeline does not corrode. And that in a minimum requires us to go out to the -- to the -- to intervals along the pipeline and take certain reads and witness any potential sources of harm for the pipeline.

HEARING OFFICER STUBCHAER: Another question -- sorry for the interpretation.

MR. CLAPP: No problem.

HEARING OFFICER STUBCHAER: You said "prescribed by code," which code?

MR. CLAPP: Oh, okay. I plan to try to clear up that issue at the end of my testimony, but I could do it --

HEARING OFFICER STUBCHAER: No. That's fine.

MR. CLAPP: Okay. That's one main area of pipeline maintenance. There's another one. We have to do periodic assessments where the minimum standards are not sufficient to ensure the integrity of the pipeline. And such is the case on Line 57B as evidenced by what we've done on doing the smart pigging and the close interval surveys. That's another more rigorous technique to determine cathodic protection and prevent corrosion and other things that we've done I can discuss if it benefits the Board.

And then if these minimum standards -- they're kind of like looking at symptoms. And if you find that there are problems by -- by looking at these symptoms you have to do post investigations and evaluations to determine the cause, and to further identify what the damage is and if a repair is necessary. Most all of those investigations ultimately end in an excavation of the pipeline, which leads me into some construction techniques and the issues that we have at PG&E.

Doing work anywhere in these islands is not a preferred construction area. And you can imagine that any time you're going to work on a pipeline first you have to excavate it, you have to maintain that excavation throughout the course of the -- of the

repair. You have to remove the concrete coding. You've got to remove the tape coding. You have to evaluate the damage. And you have, generally, a couple of choices.

If there is damage you might have to use a repair sleeve, which is basically a heavy piece of pipeline that's cut in half. And you can put a saddle underneath, and one on the top. And you essentially put a pipeline inside of the pipeline so that the damage is confined and a new pipeline is installed around it.

Or you have to replace a segment where you can get fed up with other problems that prevent you from using a sleeve. And if you can imagine for a moment trying to do that in these kind of conditions, you have to either bench, or slope the excavation which would make it huge. You'd have to -- and probably most likely wouldn't work.

We have experience in installing pipeline out there. And it's been very difficult. You have to drive down the piling. And you have to pump all the water and you have to shore this pipeline -- this piling. There's a lot of cross-braces inside there that would prevent you from access, not entirely, but it would have to be dealt with. And then you'd have to

support this pipeline that weighs -- again, weighs 200 pounds per linear foot.

You'd have to sling a sleeve at the lower end to be able to get a clip on it and weld it out, or when the worse case presents, you'd have to put in a section of line which would have to be lowered in. It would have to be aligned and would have to be welded up until it could be supported from the wells and you could drill out the other wells, replace the coding, remove all the shoring and -- you know, while dealing with these soil conditions. So I think you can get a pretty good idea that it's not a preferred location to work on a pipeline.

And I'd like to kind of bring these two things together in that the criticality of Line 57B to our gas transmission system and the difficulty in working on this pipeline not only in an inundated condition, but in its existing condition gives us grave concern about the Delta Wetlands Project.

Now, if I may, I'd like to try to clear up the code issue that was discussed yesterday afternoon. PG&E is a public utility in the State of California. And, therefore, falls under the jurisdiction of the California Public Utilities Commission.

California Public Utilities Commission uses

General Order 112(e) that gives us the code requirements for design, maintenance, operation, recordkeeping, and such for the pipeline. General Order -- the Commission just adopted DOT 49 CFR, primarily sections 192, as -- by reference as the governing code. DOT 192 -- or excuse me, 49 CFR incorporates specifically 26 industry standards. And it incorporates industry associations by reference.

Those 26 standards ASEMB 31.4 is not listed. It's not incorporated by reference. However, the industry association is incorporated by reference. So I just hopefully leave the Board with the assurance that DOT 49 CFR has -- is the code that's required for us to design, maintain, and operate our pipeline facility. And while the other codes do have some good stuff in there, it is not the primary standard for which we have to design and maintain our pipelines.

This concludes my oral testimony.

MR. MOSS: I have a few more questions. You stated, of course, that beginning in the so-called dry condition it's not a preferred area to work in the Delta.

Could you contrast what it would be like to if, in fact, Bacon Island was flooded how would we then carry out the same work that you described as difficult

in the dry condition?

MR. CLAPP: Well, I think we probably would be safe to say that we would give a repair a shot, maybe, by driving the sheet piling and things and determine if we could actually accomplish that kind of a repair. And at some point we'd have to decide whether that was just, you know, chasing our tail and back up and have to make a replacement of the effected -- of the damaged section, you know, across the island.

MR. MOSS: And --

MR. CLAPP: I don't know if that answers your question or not, Rick. I mean it's just working in an inundated condition, it would be difficult to keep the water and the soil from migrating into our excavation. And I'm not very optimistic that it would be possible to even do.

MR. MOSS: Would it make any difference if we were doing that during the time of year when they had say only a foot of water on the island rather than the full reservoir?

MR. CLAPP: It would make some difference, but not a lot. It's difficult to get the equipment out there. And this equipment is pretty large and heavy in its own. It has to be supported while it's doing its job. And -- and -- although I'm not a soil expert, I

have been out to the island and looking at some of the conditions out there from the surface doesn't seem like it's going to be a good soil to deal with.

MR. MOSS: Dr. Egan suggested that PG&E, perhaps, have two barges standing by, one smaller than the other one with a crane in case it's flooded.

Do you have any comments about that proposal?

MR. CLAPP: No.

MR. MOSS: Do you think it's feasible?

MR. CLAPP: Yeah, anything is feasible. PG&E has built pipelines and pipe lands and things in pretty adverse conditions, but they require a tremendous amount of engineering resources, planning preparation, and expense. I'm really concerned that we may not be afforded that in an emergency situation when we need to get our McDonald Island storage facility back in operation.

MS. BRENNER: Excuse me, for just one second. I'd like to raise one objection to PG&E's presentation of their case-in-chief.

During the oral presentation the opening statements by Mr. Moss he went ahead and engaged in argument and rebuttal testimony. To that we hesitated to object. And now he's engaging in rebuttal testimony by asking cross questions that are really rebuttal and

have nothing to do with the direct testimony that's been prepared and written by Mr. Clapp.

HEARING OFFICER STUBCHAER: Ms. Leidigh.

MR. MOSS: I would like to make an observation.

HEARING OFFICER STUBCHAER: Mr. Moss.

MR. MOSS: Certainly, his direct testimony addresses problems of trying to maintain the pipeline in flooded conditions and in emergency issues. So, it turns out that's directly out of his testimony.

MS. LEIDIGH: Okay. What I have to point out is that the structure of this hearing is to provide direct testimony during the case in chief. In other words, your main case has to conform to the written testimony you've provided. There will be time for rebuttal at the end of the hearing. And that would be the proper time to put on rebuttal, not during the case in chief. I think it's better not to mix things up.

So I would suggest to the Hearing Officer that PG&E be asked to stick to the direct testimony.

HEARING OFFICER STUBCHAER: All right. That will be the ruling.

MR. MOSS: Certainly. Thank you.

I'd like to ask two questions that I understood earlier came from Mr. Brown and were asked

to Delta Wetlands. And that first one was: How feasible would it be to parallel the existing line to build a second pipeline to, I guess, to provide greater reliability?

MR. CLAPP: Are you talking prior to, or after inundation of Bacon Island?

MR. MOSS: I assume to build it now before it would be inundated.

MR. CLAPP: It's quite feasible.

MR. MOSS: And do you have any idea what the cost would be?

MR. CLAPP: I can give a rough order of magnitude. We would -- we would need to do quite a bit of engineering and probably prepare an RFB for taking bids, but on the order of two million dollars a mile.

MR. MOSS: The second question was: How feasible is it to relocate the existing line in the levee to get it basically, I assume, in a higher position?

MR. CLAPP: That's also feasible to do. Probably getting appropriate rights-of-way and permits would be a difficult -- as difficult a process as constructing it.

And I might add that I don't think it would eliminate our concern in that now we'd have -- although

we'd have redundant capacity and if we had a damaged pipeline we could run on another pipeline, we're still going to have pipelines underneath an inundated island that if we do discover material defects, or anything that has to be repaired we're going to deal with the same construction issues that we have otherwise.

MR. MOSS: And does PG&E hold the Bacon Island easement potentially for the use of additional pipelines?

MR. CLAPP: That's my understanding, yes.

MR. MOSS: Okay. Thank you. I'd like to next --

HEARING OFFICER STUBCHAER: All right. I think we'll take your next witness up after lunch, Mr. Moss.

MR. MOSS: Thank you.

HEARING OFFICER STUBCHAER: Any announcements of staff before we break for lunch? Okay. We'll take a 60-minute lunch break. We'll be back here at 1:00 p.m.

(Luncheon recess taken.)

---oOo---

TUESDAY, JULY 15, 1997, 1:02 P.M.

SACRAMENTO, CALIFORNIA

---oOo---

HEARING OFFICER STUBCHAER: Good afternoon. We'll reconvene the Delta Wetlands Water Rights Hearing.

Before you start, Mr. Moss, I just want to make an announcement of a discrepancy. The version of the hearing notice which is on our web site, misses -- does not include one of the hearing dates. And that's July 24th.

I don't know how many of you relied on the hearing notice on the web site as opposed to what was received in the mail. But we are scheduled, if necessary, to meet on July 24th. That's one of the noticed hearing dates.

And could someone sitting by that back door, please, close the door. The glare behind the witness is disturbing. Thank you.

And, Mr. Moss.

MR. MOSS: Thank you, Mr. Stubchaer. And welcome, Mr. Brown.

I'd like call as PG&E's second witness Bruce Hardy. Mr. Hardy you took the oath?

MR. HARDY: Yes.

---oOo---

CONTINUING DIRECT TESTIMONY OF PACIFIC GAS AND ELECTRIC BY RICHARD MOSS

MR. MOSS: Would you state your name and your occupation, please.

MR. HARDY: Bruce Mills, M-I-L-L-S, Hardy, H-A-R-D-Y.

MR. MOSS: And your occupation?

MR. HARDY: Occupation, I'm land rights -- Senior Land Rights Specialist at PG&E.

MR. MOSS: And could you briefly tell us about your education and experience.

MR. HARDY: I've been with PG&E 32 years, the last 25 of which have been in the land-related work supervision administration. I train other people in land rights, interpret land rights, legal interpretations. Assist the operating departments in determining what they can do and what they can't do within the rights we have acquired for facilities.

HEARING OFFICER STUBCHAER: Could you take the microphone a little closer to you, please?

MR. HARDY: Certainly.

HEARING OFFICER STUBCHAER: Thank you.

MR. MOSS: And was the statement of your qualifications that was filed in this matter prepared

by you?

MR. HARDY: Yes, it was.

MR. MOSS: And was the "Written Testimony of Bruce Hardy" prepared by you?

MR. HARDY: Yes, it was.

MR. MOSS: Could you briefly summarize that testimony.

MR. HARDY: Yes. Pacific Gas and Electric company acquires land rights for its facility installations in a variety of manners. Primarily they're nonexclusive easements in gross. Although, with respect to the Delta area, we do have some licenses and leases from the reclamation boards and State Lands Commission.

The rights -- the easements rights that we have are -- for those of you that don't understand easements, are the right to use the property for a specific purpose, or purposes as set forth in the document, the easement grant.

The easements allow us to use the land in a manner set forth in the document without any unreasonable inference from the landowner with the enjoyment and use of those rights. PG&E has both gas and electric facilities on the islands that are the subject of this project.

The primary point of issue are the two major gas lines going across Bacon Island. However, we do have a considerable amount of electric facilities on easements that not only serve the islands that are part of this project, but go through those islands to serve other adjacent islands.

So they're an integral part of our distribution system the facilities performance rights. The concern about whether -- how flatting might affect these rights is that it could impair access to our facilities, obviously is one issue. And also it interferes with our enjoyment of those rights as -- as they were acquired.

MR. MOSS: And, Mr. Hardy, have you, since the preparation of your written testimony, seen most of these rights-of-way?

MR. HARDY: Yes, I have. The documents you're speaking of?

MR. MOSS: Well, both the documents and in the field have you seen the --

MR. HARDY: In the field, I've been on Bacon Island.

MR. MOSS: I have no further questions. That concludes PG&E's direct testimony.

HEARING OFFICER STUBCHAER: All right. We're

now ready for cross-examination. Who wishes to cross-examine Pacific Gas and Electric witnesses?

Only Delta Wetlands. All right. You may proceed.

MR. NELSON: My name is Joe Nelson. I'm appearing on behalf of Delta Wetlands through Ellison and Schneider.

Mr. Stubchaer, as an initial point we would like to move to strike the testimony of Mr. Hardy. His testimony solely expresses legal conclusions regarding PG&E's easements. They should not be accepted and should be reserved to PG&E's brief.

In particular, Mr. Hardy has not provided any of the documents that he is testifying to. His written testimony provides insights to a number of easements and other permits that PG&E allegedly holds with respect to both Bacon Island and Webb Track, but none of those documents have been provided as exhibits on behalf of PG&E.

Additionally, with respect to the issue of the exhibits and whether or not PG&E has provided those easements as exhibits, we would also like to make it clear on the record that in Mr. Hardy's testimony, he states that there are two easements on Webb Track with respect to PG&E gas lines.

I can assure you immediately after we saw Mr. Hardy's testimony, Delta Wetlands did an extensive title search on Webb Track and did not find any such easements.

Further, when we requested copies of those easements from PG&E. We have not received any such legal documents, or easements from PG&E identifying the easements that Mr. Hardy is referring to.

So in that extent, not only has Mr. Hardy -- is his testimony providing legal conclusions on easements, which is an issue of title property rights and what the easements provide in the sense of rights and obligations between the two parties, but also the exhibits have not been provided for those documents.

HEARING OFFICER STUBCHAER: Mr. Moss?

MR. MOSS: Two points, sir. One is, I stated in my opening comments we are not asking the Board to judge the validity of the document. We presented Mr. Hardy merely to inform the Board that from PG&E's perspective, we believe that we have these rights.

That if the rights are as we claim, they may have impact on the project. But we did not feel that it was appropriate to submit the documents. We're not asking you to pass on their validity.

So his testimony, basically, is informational.

It does not -- it does not attempt to put into the record these particular documents.

As to the issue of the -- that Mr. Nelson referred to on Webb Track, I would suggest that he ask Mr. Hardy a question, or questions about that. And I think he's prepared to respond to that.

HEARING OFFICER STUBCHAER: Just a moment while I look at this.

Mr. Moss?

MR. MOSS: Yes, sir.

HEARING OFFICER STUBCHAER: Looking at Mr. Hardy's testimony he states, I believe, that paraphrasing it, that it's certain whether you have some easements, but you do have other easements?

And to the extent that you have easements and this is sworn testimony, could you produce those easements?

MR. MOSS: Yes, sir, we certainly could produce those easements. Certainly, not today, but certainly within the pendency of this hearing.

HEARING OFFICER STUBCHAER: When could you produce them? By next -- by the time we resume Tuesday?

MR. MOSS: Yes, sir.

HEARING OFFICER STUBCHAER: All right. Now,

with regard to the rest of your objection, or motion to strike, Mr. Nelson, I think that you can proceed with your cross-examination questions.

We will consider your objection giving weight to the evidence. And dependent upon what easements are produced, we may -- we may or may not strike all or part of the testimony.

MR. NELSON: Thank you, Mr. Stubchaer. Just to -- to clarify, and I don't mean to repeat anything. I want to make sure. Sometimes I forget how much I've said.

With respect to our objections on this piece -- on Mr. Hardy's testimony, our objections are both to the fact that it has not been provided and also that it's irrelevant to the water rights matters that are here before the Board. So --

HEARING OFFICER STUBCHAER: Well, that's something that -- that you can argue. I'm not sure that we have turned down direct testimony on that basis. We have been through some other parts of this, too. So, as I said, we will consider your objections and give the weight to the evidence.

MR. NELSON: Thank you, Mr. Stubchaer.

//

//

---oOo---

CROSS-EXAMINATION OF PACIFIC GAS AND ELECTRIC

BY DELTA WETLANDS PROPERTIES

BY JOSEPH NELSON

MR. NELSON: My first questions are for Mr. Hardy.

Number one, are you an attorney for PG&E?

MR. HARDY: No, sir, I'm not.

MR. NELSON: Do you hold any legal degrees?

MR. HARDY: No, sir, I do not.

MR. NELSON: So when testifying to the documents that you are going to provide at the request of the Board, your testimony is only with respect to the factual existence of those documents?

MR. HARDY: Yes.

MR. NELSON: And not to any legal conclusions as to what the rights, or obligations of any of the parties are?

MR. HARDY: My conclusions are limited to my knowledge of -- acquired over 25 years of reading documents and understanding and interpreting those documents.

MR. NELSON: As a non lawyer?

MR. HARDY: As a non lawyer. That is correct.

MR. NELSON: Thank you. Now, I would like to

first of all address the issue of Webb Track easements that you referred to in your testimony.

In your testimony you said you identified two Webb Track easements. Did you -- are two easements in existence with respect to Webb Track?

MR. HARDY: What I identified was that we have mapping and information which indicates that we had gas well connections to two gas wells located on Webb Tract Floater Number one and Number two. And those facilities are in the ground. And although I understand that they're currently idle and not withdrawing.

MR. NELSON: So there is no easements for those two --

MR. HARDY: I could not find a document per se, no.

MR. NELSON: Okay. And floater well number one and two have been inoperable for how long?

MR. HARDY: I don't know whether they're inoperable. They're not currently in operation as I understand.

MR. NELSON: Mr. Clapp, do you know how long those two wells have not been operated?

MR. CLAPP: No, sir.

MR. NELSON: Let me turn to Mr. Clapp. Are

you aware that the Delta Wetlands not only requested documents from PG&E, but also asked to meet with a PG&E engineer -- have a meeting with PG&E engineers and Mr. Egan?

MR. CLAPP: Yes, I'm aware of that.

MR. NELSON: Was that request granted?

MR. CLAPP: No, it was not.

MR. NELSON: Do you think that such a meeting would be useful?

MR. CLAPP: Yes, I do. I was advised by Counsel, given the situation and the dealings that we have had with Delta Wetlands Project, that it was not advisable at this time.

MR. NELSON: In the past, with respect to the maintenance activities that PG&E conducts for Line 57B, how long does it take PG&E to conduct their annual maintenance inspection?

MR. CLAPP: There's several maintenance inspections that are required. So I really can't answer that question without a more detailed question on your part.

MR. NELSON: Well --

MR. CLAPP: I mean in total?

MR. NELSON: For example, your annual inspection that you conduct about every year the last

week of April that is a walk down of the line.

MR. CLAPP: We meet most of the requirements of that inspection by aerial patrol. The cathodic protection survey is one that we can't meet obviously because of aerial patrol.

And that requires us to pick up type of soil potentials on about eight-mile intervals once a year. And we do rectify our inspections and readings which is the device that puts the current on the pipeline. We do those once every other month.

And so I would expect that probably takes about -- let's see, couple, three days to complete the pipe to soil inspection. And probably, you know, on the order a day a week to do the rectifier readings and maintenance.

MR. NELSON: How long, if you are just limiting your inspection work to Bacon Island?

MR. CLAPP: It's a minimal amount of time.

MR. NELSON: How long -- minimal, less than a day, six hours, two hours?

MR. CLAPP: Couple hours. Couple hours, but as I mentioned in my oral testimony, those are -- those are minimum required activities. And if we discover that we have, say, low pipe to soil potentials we have to do post-investigation, and that could be very

substantial and include excavating a line.

MR. NELSON: And how long does it take you to just do your planning for those more extensive inquiries?

MR. CLAPP: That's dependent upon what we discover in the, you know, in the initial readings that we pick up.

MR. NELSON: When you're talking about your extensive investigations, you talking about things like geometric pigging, or those -- those types of investigations?

MR. CLAPP: Yeah, geometric pigging and potentially post-interval survey, which is a more in depth investigation of the particular section of the pipeline.

MR. NELSON: And don't you have to plan several months ahead to do those?

MR. CLAPP: We have contractors available that actually perform that type of work. And so we could -- we could probably get them geared up in a couple of weeks or so to do that.

MR. NELSON: So it's not an immediate reaction time by any means with respect to finding an initial anomaly, or question that you want to further investigate.

MR. CLAPP: Not in with respect to the cathodic protection surveys, but it potentially could be in respect to the intelligent pigging that we do of the line. We may find an anomaly that we would choose to -- this is somewhat unlikely, but we may find an anomaly that we would need to derate the pipeline so we could do a proper investigation and repair.

MR. NELSON: I'm sorry. You said "derate"?

MR. CLAPP: Yeah. The pipeline is currently rated for 2160 psi. And we may choose that if we found an anomaly that caused us concern we may choose to downrate that pipeline to a lower pressure, or take it out of service until we could do further investigation and repair.

MR. NELSON: And how long would that pipeline typically of be out of service to do that further investigation?

MR. CLAPP: As short as possible.

MR. NELSON: Can you give me an estimate as to -- number one, have you ever had that happen before where you had to take the pipeline out of service?

MR. CLAPP: Yes, we have. And that was as a result of an intelligent pigging survey done in 1992. And we were able -- with that particular problem we were we were able to plan the remediation. And we did

that in 1993. Does that answer your question?

MR. NELSON: What -- when in 1992 did you find the results that led you to do the work?

MR. CLAPP: I am not familiar enough with the specifics of that project to be able answer to that. I know that that data does exist.

MR. NELSON: So it was an extensive period of time in which, after you found the results, you felt you needed to do work, you did planning and you planned your remediation in a matter was so that you both could have access to the areas you needed to work on, and to have all the equipment you needed for it; is that correct?

MR. CLAPP: Yes, sir. That was on the -- on the levee from McDonald Island though, which is a different situation than is proposed by Delta Wetlands.

MR. NELSON: With respect -- with respect to these line inspections that you do, has PG&E conducted inspections of the portion of Line 57B that underlies Mildred Island which is now flooded?

MR. CLAPP: No, we have not. We plan to do a post-interval survey -- well, yes. Wait. Let me answer that question differently.

The intelligent pigging that we performed on 57B did include Mildred Island. Close interval survey

of the pipeline has been performed on McDonald Island, but has not been performed on Mildred Island, nor has it been performed on any of the other islands that 57B crosses.

MR. NELSON: Do you do annual inspections of the line with respect to leaks --

MR. CLAPP: Yes.

MR. NELSON: -- of McDonald Island?

MR. CLAPP: Yes. That's required by code.

MR. NELSON: And how do you do it with -- for the section that is flooded under Mildred Island?

MR. CLAPP: Via boat survey.

MR. NELSON: How long does it take to do that?

MR. CLAPP: As long as it takes to cross Mildred Island with a boat. I mean you can -- you need to go at a speed so that you could assess if there are any leaks via bubbles coming up through the surface. So that with -- you know, of course, you'd have to probably do that at about a mile or two an hour.

MR. NELSON: Is it true that your maintenance inspections to date for Line 57B have generally characterized the pipe as "in good and in excellent condition"?

MR. CLAPP: Yes, sir. I should qualify that with the exception, of course, as we mentioned several

times about the intelligent pig survey that we did.

MR. NELSON: And that was with respect to looking at stress burdens for levees and that was what caused you to replace the elbow on McDonald Island. Correct?

MR. CLAPP: That's correct.

MR. NELSON: Let's just go to that point. Right after you did -- or at the same time that you did the replacement at McDonald Island for the elbow, did you put monitors on other levees along 57B to check for additional stress?

MR. CLAPP: Yes, we did. We established benchmarks and we installed tilt meters on those levees.

MR. NELSON: So did Bacon Island have monitors placed on its levees?

MR. CLAPP: Yes, it did.

MR. NELSON: So you are presently monitoring the burden for Line 57B that are caused by those levees?

MR. CLAPP: That's correct. We monitor it monthly.

MR. NELSON: With respect to the inspections that you were discussing, is it correct that you stated that some or most of the inspections you -- result in

excavations of the line?

MR. CLAPP: I can't recall exactly what I said. But what the intent of the response was is that if you find reason to be concerned with your minimum maintenance and operations, or your other assessment that's necessary on your pipeline, they ultimately yield and -- and these things are not reason to weigh by engineering analysis, then they will ultimately result in the excavation of the pipeline.

MR. NELSON: How often have you had to excavate portions of Line 57B on Bacon Island?

MR. CLAPP: I'm -- I'm not prepared to answer that question just because I'm not close enough to the history of that pipeline to be able to answer that accurately right now.

MR. NELSON: Do you manage Line 57B?

MR. CLAPP: I have been -- no, I do not. I guess I probably should describe that a little bit; is that I'm an engineering director. And there are other departments within our organization that are responsible for the maintenance of the pipeline.

As I say the field supervision of the crews and such. And so I don't have that capacity in this job, although I have had that in my previous career experience. And so maybe that has added some

confusion, in difference assignments. And my other assignments were in different geographical areas than what we're talking about here with Mildred Island and Bacon Island and such.

MR. NELSON: All right. In your position do you usually authorize major repair work that's going on in a line?

MR. CLAPP: Yes. I authorize the capital investments.

MR. NELSON: Since you've been here -- been with PG&E have you ever authorized a -- a -- an investment for repair or maintenance on Line 57B underlying Bacon Island?

MR. CLAPP: No, sir. I have not been in that capacity prior to January of 1995.

MR. NELSON: To your knowledge have any such authorizations been made?

MR. CLAPP: We can get specific details on that. Actually, I believe it was provided as the information recorded on the pipeline survey sheets.

If you're not familiar with those documents it would be difficult to read, but we can give you the history of that pipeline in detail across Bacon Island.

MR. NELSON: All right. I -- I suggested -- we would appreciate that greatly with respect to some

of the documents you provided with the pipeline survey sheet. They do have a lot of numbers on them. And some of them are -- if by chance after the hearing if you can give us a little more information, or provide it to the Board with the exhibits and the easements that you're going to provide next week.

In your testimony --

HEARING OFFICER STUBCHAER: Pardon me, Mr. Nelson, you said after the hearing.

MR. NELSON: Excuse me. Today. I'm sorry, just after today that he provide, or meet with us to explain some of those pipeline survey sheets a little bit more.

HEARING OFFICER STUBCHAER: Is that a request that PG&E has agreed to and be part of what we expect on Tuesday, or is --

MR. MOSS: No. Again, my reaction is on Tuesday we'll supply the easements that Mr. Hardy referred to.

And I feel that as much as the engineers would like to have a friendly chat about this, we're in an adversarial situation with Delta Wetlands. And my advice to them is to basically hold off until that situation is resolved.

HEARING OFFICER STUBCHAER: I think we need to

clarify the informal understandings that was just discussed there.

What is your understanding, Mr. Nelson?

MR. NELSON: Well, let me back up a little bit. First of all, we have asked for extensive maintenance records. We have asked for maintenance records on Line 57B.

And while we have received some inspection reports and other documents, I do not believe -- and I'd have to check with Mr. Egan, but I do not believe that we have found any records pertaining to excavations, or major repair work on Line 57B underlying Bacon Island.

That was with respect to my -- that was the focus of my question. And so to the extent that we already requested those maintenance records from PG&E. And while we did get some, what we don't know is if we got all.

MR. MOSS: I'll be happy to review that question and if there are additional records pursuant to that request, we'll supply them.

HEARING OFFICER STUBCHAER: And when will you do that review?

MR. MOSS: In the next week. I mean I have to find the people who have the records. I certainly

don't have them, and find out, whether in fact, they have such records. Do such records even exist? I'm not aware of that.

It may be as testified that no such work was done within the time period we have records. I don't know one way or the other.

HEARING OFFICER STUBCHAER: If we conclude this hearing on schedule, that will be a week from tomorrow on the 24th, would you have it before then?

MR. MOSS: We'll make every attempt to locate if there's -- these records exist, yeah.

HEARING OFFICER STUBCHAER: And if they exist, then what?

MR. MOSS: To supply them.

HEARING OFFICER STUBCHAER: All right.

MR. MOSS: Yeah. We have no problem to supply them if they exist.

HEARING OFFICER STUBCHAER: All right. Thank you.

MR. NELSON: Mr. Clapp, in your testimony you asserted that Delta Wetlands must be required to draw down the phreatic surface, which I think means water level, below Line 57B and keep Bacon Island dry for three months every summer.

How often has PG&E asked landowners or the

Reclamation District on Bacon Island to draw down the water to below the bottom of Line 57B for three months in the summer?

MR. CLAPP: I don't know, if at all.

MR. NELSON: To your knowledge you -- that has never been requested?

MR. CLAPP: To my knowledge it has not been requested.

MR. NELSON: Can we turn a little bit to Mildred Island, again. Isn't it true that Mildred Island has been flooded for the past 14 years?

MR. CLAPP: That's true.

MR. NELSON: Does PG&E have any plans to reclaim Mildred Island, dewater it?

MR. CLAPP: No, we do not.

MR. NELSON: So you intend to continue to maintain your Line 57B under its present conditions for Mildred Island?

MR. CLAPP: While we intend to maintain the pipeline, there it's a matter of economics that we do not prefer our pipeline to be there and the -- be accessible.

I do know the Mildred Island was -- there was levee breaches. An act of God flooded that pipeline. And it was not by any effect that PG&E would have had

nor preferred.

MR. NELSON: With respect to concerns about flooding of islands, does PG&E -- Mr. Zuckerman testified previously that PG&E contributes I believe 79 and 95 percent of the levee maintenance and repair funds for McDonald Island levees.

Is that a result of PG&E's concerns about McDonald Island flooding, or protecting its facilities on McDonald Island?

MR. CLAPP: I don't have -- I don't sit on the Rec Commission Board. And I have no reason to doubt those percentages that -- that were offered in the testimony. But one thing I can comment on there is McDonald Island has two large facilities within its levees.

They're Turner Cut Platform and McDonald Island platforms. These are the facilities that have the compressors to put the pipeline -- put the gas under pressure and put it is into the storage field, and also to withdraw it, remove any liquids and put it into 57B.

So we have a larger capital investment and concern out there, you know, to protect other levees at other islands.

MR. NELSON: Do you provide, or assist in

funding of levee repairs and maintenance on Bacon Island or on Palm Tract?

MR. CLAPP: That's not my area of expertise. I don't know.

MR. NELSON: Does Line 57B cross those two islands?

MR. CLAPP: 57B crosses Bacon Island --

MR. NELSON: Doesn't --

MR. CLAPP: And -- yeah, 57A and B both cross Palm Tract as well.

MR. NELSON: Okay. With respect to that, you have been testifying that you are concerned about inundation of Line 57B on Bacon Island, but you are not willing to pay for any -- just under its present condition, you're not willing to pay for any of the additional costs for levee repair and stability?

MR. CLAPP: I don't think that's a question for a gas engineering-type question. I think it's more of a management question and a rights issue, isn't it?

MR. NELSON: I've -- my question with respect to this is: You seem to make a distinction between protection of your McDonald Island facilities versus the other islands with respect to the fact that you have easements over these lines.

You don't seem to be very concerned about

protecting those easements versus your protection of McDonald Island. So you just essentially stated that you make a calculated risk that inundation could occur on Bacon Island and you are not going to pay for any levee repairs to stall such an occasion.

MR. MOSS: I have an objection. I don't believe he said that. He basically said that he's not the person who would make that decision. And he has certainly already testified that PG&E actively monitors the condition of the pipeline on Bacon Island and has expressed concern for its well-being. So I believe that -- that's what he already testified to.

HEARING OFFICER STUBCHAER: Is your objection that he has misstated the testimony?

MR. MOSS: Yes.

HEARING OFFICER STUBCHAER: Okay.

MR. MOSS: And that it's been basically --

HEARING OFFICER STUBCHAER: Okay. Sustained.

MR. NELSON: Lastly, I'd like to discuss a little bit about the third-party impacts. Isn't it true that third-party impacts are one of the largest causes of pipeline ruptures and damage to the pipeline underground?

MR. CLAPP: Yes, that's true.

MR. NELSON: And isn't it true that flooding

of Bacon Island will actually reduce the amounts of third-party impact since it is presently under heavy ag -- intensive agricultural use?

MR. CLAPP: Line 57B was installed with third-party damage in mind. It is installed primarily at the edge of the roadway, which isn't subject to agriculture. It has doglegs that put it down below the ditches that it crosses so that it's less likely to be hit or damaged during cleanout.

We have good operating relationships with the people that farm the island. And we contact them frequently. And so third-party damage to Line 57B is already minimized in respect to other pipelines where Mr. Egan gathered his statistics.

And so the inundation of Bacon Island, although it would have some affect would probably not have as great of an affect that it would on eliminating third-party damages, because we've already designed that into the consideration of the pipeline.

MR. NELSON: For the record, are you aware of just how far away Line 57B is from the road?

MR. CLAPP: Yeah, I am. I visited the site and it's well marked. I would -- if you want to know specifically exactly where that alignment is, I'd like to refer to some of the documentation that we have.

MR. NELSON: Would you agree that it starts out at about 1500 feet north of the road at the east side of the levee, runs down and crosses the road around the center of the island and then parallels the road about 30 to 40 feet away from the road?

MR. CLAPP: I'm aware that it -- that it crosses north of the road and then it intersects the road. I can't accurately tell you right now whether it's halfway, or a third of the way, or how far that is into -- into the island. And I do know that it parallels the road on the shoulder. I would want to refer to some stuff about the 30 feet offset -- the 30-foot offset.

HEARING OFFICER STUBCHAER: Mr. Nelson, your initial 20 minutes is up. How much time will you need?

MR. NELSON: I have four more questions.

HEARING OFFICER STUBCHAER: That's fine.

MR. NELSON: Thank you, Mr. Stubchaer.

Does PG&E have an emergency preparedness plan for Mildred Island?

MR. CLAPP: PG&E has an emergency -- an extensive emergency preparedness plan in general, which incorporates all of our pipelines.

MR. NELSON: Do you have a -- does your emergency plan address repairs of lines in shallow

water?

MR. CLAPP: That's a difficult question to answer. I'd say -- I'd say, yes, in we have -- excuse me, emergency materials, emergency training of welders, of shoring, of equipment operators, and all those things. And we are prepared to deal with pipelines in shallow waters.

I don't think I can put my finger on a tab in our emergency plan that would show -- show you that. So basically we're prepared from our other -- our other training and other measures.

MR. NELSON: Okay. In your direct testimony you testified that it's possible to do maintenances in 20 feet of water using the same techniques for maintenance and repair you now use to do so, but it would require some more resource planning and a little bit more cost and planning time.

Given the fact that Mildred Island is under water right now and has been so for 14 years, isn't it true that PG&E needs to undertake more specific planning program for repairs for shallow water habitat?

MR. CLAPP: Again, I think probably deferred to my previous answer, in my other answer, in that PG&E is well-trained and prepared to be able to respond to emergencies. I think my testimony was that if we had

to make a repair in an inundated condition we would give it a shot.

I'm not prepared to say that it is -- that it is feasible using our techniques. We would probably give it a try, might consider some under water techniques which we are not prepared to do. We'd have to do that via contract with other firms. And at some point we'd have to determine whether the line needed to be back in service and we could afford to continue to chase our tail, or make a more extensive replacement of the line from levee to levee.

MR. NELSON: Under, I believe you said, the CPUC adopted DO 112(D); is that correct, or 112(E)?

MR. CLAPP: The current version in effect is 112(E).

MR. NELSON: All right. Does that require written maintenance plans being filed to the CPUC?

MR. CLAPP: Yes, it does.

MR. NELSON: Do you have such CPUC?

MR. CLAPP: Yes, PG&E does have those plans. And we're audited annually by the CPUC and comply with those plans. I think a good point of clarification is that they reside within the standard of practice with specifications and other sources. Many smaller pipeline companies -- excuse me, I'll back up.

In they're comprehensive of our entire transmission system, many smaller pipeline companies have them a line specific. And there's one document, one manual that you could be able to show about this particular line.

Since PG&E operates every 200 miles of transmission pipelines, we don't have those documents specific to the line.

MR. NELSON: Is the reason you don't have it specific to the line is you have general conditions, but in cases like Delta -- the Delta where you have some very unique conditions wouldn't it be prudent to have a specific maintenance plan for these more unique situations for Line 57B?

MR. CLAPP: Yes, it is. And, yes, we do. That's what the additional inspection is part of is the tilt meters, and the periodic assessment is in addition to the code and is part of the overall plan to deal with the specific concerns we have of that running our pipe -- this pipeline through the Delta area.

MR. NELSON: That goes to inspection with respect to maintenance and repair operations?

MR. CLAPP: That's right.

MR. NELSON: I'm sorry, didn't -- did you say that you have a plan for maintenance and repair for

Line 57B then?

MR. CLAPP: Specific to Line 57B?

MR. NELSON: Yes.

MR. CLAPP: I'm trying to, you know, objectively answer this question. And I feel kind of painted in a corner here. The answer is, yes, we have them, but they're not in a binder for 57B.

We are prepared to do the maintenance and operation on that pipeline. And all our standards and design specifications and all those things that make up our overall maintenance and repair plan are sufficient to deal with 57B.

MR. NELSON: Thank you. I have no more questions.

HEARING OFFICER STUBCHAER: Okay. Mr. Nelson.

I didn't see any previous -- any hands when I previously asked the audience -- I don't expect the Board and staff to raise your hands, we'll get to you in due course, but are there -- is there anyone else who wishes to cross-examine?

Staff?

MS. LEIDIGH: Does anybody have anything? No questions.

HEARING OFFICER STUBCHAER: Mr. Brown?

MEMBER BROWN: Yes.

HEARING OFFICER STUBCHAER: All right. Do you have --

---oOo---

CROSS-EXAMINATION OF PG&E

BY BOARD MEMBERS

MEMBER BROWN: One question. You said the pressure rate on that pipeline was 2150?

MR. CLAPP: 2160.

MEMBER BROWN: 2160 psi. What diameter is that line?

MR. CLAPP: 22 inch.

HEARING OFFICER STUBCHAER: Does it operate at that pressure?

MR. CLAPP: Yes. We have a normal operating pressure of the pipeline and we try to maintain it below its maximum allowable operating pressure.

We -- just to kind of add something here. We spend a lot of money squeezing the gas to put in an underground storage facility. And so we utilize that pressure to maximize the capacity of the pipeline back to our Brentwood Terminal, whether -- to regulate it down to a lower pressure. So it's to our advantage to operate that to its full rate of capacity, full rate of pressure.

HEARING OFFICER STUBCHAER: What is the

pressure necessary to liquefy natural gas? It has nothing to do with this hearing, but just out of curiosity.

MEMBER BROWN: I'm glad you asked that. I was thinking of the same thing.

MR. CLAPP: I'm a gas pipeline engineer, not a liquefied pipeline engineer. Maybe Mr. Egan can answer that question.

HEARING OFFICER STUBCHAER: Let's go off the record for a little bit.

(Discussion held off the record.)

HEARING OFFICER STUBCHAER: We'll go back on the record.

Do you have any redirect, Mr. Moss?

---oOo---

REDIRECT TESTIMONY OF PG&E

BY RICHARD MOSS

MR. MOSS: Yes, just one -- one question for Mr. Clapp, and that is:

In your explanation of the difference in response to Mr. Nelson's question about why PG&E pays money for McDonald Island and not for Bacon Island, could you give us a little bit more basis in terms of the wells and other materials that exist on McDonald Island, and do they exist on any of the other islands?

MR. CLAPP: I'm -- I'm -- I will attempt to do so. We -- I'm a -- again, I'm the director of gas pipeline engineering. I have counterparts in the station department and McDonald Island and Turner Cut are both station facilities, so this is just kind of general observation of being out there.

But those two facilities are on platforms. There are injection, withdrawal wells, major supply pipelines that allow us to inject gas into the ground and withdraw it. There are compressors that pressurize the pipeline in excess of 2000 -- excuse me, pressurize the gas in excess of 2000 psi.

There are separators and other equipment associated with the injection withdrawal. And, no, we do not have similar facilities on any of the other islands.

MR. MOSS: And is it fair to say that all of these facilities cost a great deal of money?

MR. CLAPP: Yes, that's fair to say.

MR. MOSS: That's all. Thank you.

HEARING OFFICER STUBCHAER: Any recross-examination? All right. Thank you. You wish --

MR. MOSS: I would --

HEARING OFFICER STUBCHAER: Yes.

MR. MOSS: I would -- I'd just like to identify for the record the exhibits since our initial filing we didn't have all of them numbered.

PG&E Exhibit 1 would be the testimony of Bruce Hardy. PG&E 2 would be the testimony of Scott Clapp. PG&E 3 would be the qualifications of Scott Clapp. And PG&E 4 would be the qualifications of Bruce Hardy.

And I would just comment also for the record that the two maps that are on the easel there are attached to Mr. Clapp's testimony, and unless there is interest to mark them separately they would just be considered as part of the testimony. They were served on -- everyone has a copy of them. And if you wish I can assign PG&E 5 and 6.

MS. LEIDIGH: We don't need to.

HEARING OFFICER STUBCHAER: It's not necessary.

MR. MOSS: All right. I'd move for the admission of PG&E's Exhibits.

HEARING OFFICER STUBCHAER: All right. Are there any objections to the acceptance of these exhibits into the record? Seeing none, they are accepted.

MR. MOSS: Thank you.

HEARING OFFICER STUBCHAER: Thank you. Next will be the testimony of the California Urban Water Agencies.

Good afternoon. Have all of your witnesses taken the oath?

MR. ROBERTS: I believe Mr. Nuzum needs to be sworn.

HEARING OFFICER STUBCHAER: All right. Would you raise your right hand. You promise to tell the truth in these proceedings?

MR. NUZUM: I do.

HEARING OFFICER STUBCHAER: All right. Thank you.

MR. ROBERTS: Good afternoon, Mr. Stubchaer.

HEARING OFFICER STUBCHAER: Good afternoon.

MR. ROBERTS: Board Members, I'm James Roberts, Deputy General Counsel with the Metropolitan Water District of Southern California.

Today I'm going to be presenting these witnesses on behalf of the California Urban Water Agencies, known as CUWA, C-U-W-A.

As the name suggests, the twelve member agencies of CUWA all supply drinking water and other municipal water supplies. Several of them of supply water from the Delta. And therefore, they're quite

interested in the Delta as a source of drinking water.

For these reasons they've been intimately involved in researching water quality issues, in commenting on prior proposed projects that could have an impact on drinking water quality, and on development of drinking water quality regulations.

We will be presenting five witnesses today. All of them are employees of CUWA, or CUWA member agencies. Beginning on my right is Dr. -- is Byron Buck. He's the Executive Director of CUWA. He will present an overview of our testimony.

Mr. Stuart Krasner, Dr. Richard Losee, both of the Metropolitan Water District of our Water Quality Division, will present testimony on potential impacts of the Delta Wetlands Project on dissolved organic carbon and the result and disinfection by-product formation.

Next will be Dr. K.T. Shum, Resource Specialist with the Contra Costa Water District. He will testify on the potential impacts of the project on salinity and municipal water supplies.

And, finally, Mr. Robert Nuzum, Natural Resources Manager for the East Bay MUD Industry Utilities District. He will present evidence regarding the potential impact of the project on salmonid.

During the presentation today several of the witnesses will be using overheads. These overheads some of them are tables and figures right out of the exhibits. Others are slightly changed versions that are derived from those exhibits.

We've given copies to the Board and I think the Board Members should also have some. We also have copies for the audience here. For the purposes of the clarity of the record after the testimony is over, we intend to offer some of those into the record as exhibits and we will mail copies to all of the parties. And with that I think we'll just begin our direct testimony.

HEARING OFFICER STUBCHAER: I'd just like to ask a question about these new exhibits. Is there any evidence in these exhibits which was not available to the other parties at the commencement of this hearing?

MR. ROBERTS: I believe our testimony contains the information necessary in all of these exhibits. Perhaps, Exhibit 11.

MR. SHUM: The numbers in that exhibit were -- Exhibit 11, the numbers in that exhibit were or are contained in the Draft EIR/EIS.

HEARING OFFICER STUBCHAER: So that is not new information?

MR. ROBERTS: Yeah. I think all -- all -- all the background data is in our exhibits or the Draft EIR/EIS. And, for example, Exhibit 11 they've just been put in a bar chart for presentation purposes.

HEARING OFFICER STUBCHAER: Same data?

MR. ROBERTS: Correct.

HEARING OFFICER STUBCHAER: Ms. Brenner?

MS. BRENNER: Yes. I'm just flipping through these exhibits that have been provided by CUWA to us, and there's a couple of -- definitely several that I've not seen before. And I'm not sure whether the information contained in their direct testimony is, in fact, supportive of the materials that have been provided to us this afternoon.

I do recognize that there's some additional information. And what I'd like to do is be able to have a standing objection to these exhibits. And we'll raise the objection, again, if it's not -- if the underlying evidence is not provided to support these particular exhibits.

And I'd just like to state an objection that this is -- you know, you're presenting in evidence a different manner. And you're putting it forth at a time -- in the mist of this hearing. And there's not really an opportunity to review this material.

If it had just been a slight change in a graph, or something like that, but to -- and I look at Exhibit 6E and that's what comes to mind. I don't know how this thing is being used, or what underlying evidence is utilized to support the graph.

And so it's hard for me to say whether we should continue to object to it, or what's going to happen with this particular evidence. It just puts us at a disadvantage, because we have no idea how these things are being utilized.

HEARING OFFICER STUBCHAER: I understand your concern. We don't allow surprise evidence. And that's why I asked the questions I did about whether there's, perhaps, any new data.

Perhaps, the presentation of it could affect your case, but we will note your continuing objection. It's not being offered for acceptance now, but it is being used now as visible exhibits for the testimony. And so you will have an opportunity to object further --

MS. BRENNER: Well, these have been marked as exhibits. So I'm -- I'm assuming that CUWA is going to go ahead and try to submit them as evidence and as additional exhibits.

HEARING OFFICER STUBCHAER: Well, I assume so,

but we wouldn't rule on that until after the cross-examination --

MS. BRENNER: Okay.

HEARING OFFICER SHUBCHAER: -- which then you can develop some of your objections then.

MS. BRENNER: Okay. Thank you, Mr. Stubchaer.

HEARING OFFICER STUBCHAER: All right.

MR. ROBERTS: Thank you, Mr. Stubchaer. And by the way, thank you for allowing us the time we need to fully present our case.

---oOo---

DIRECT TESTIMONY OF CALIFORNIA URBAN WATER AGENCIES

BY JAMES ROBERTS

MR. ROBERTS: Okay. Mr. Buck, would you please state your name for the record.

MR. BUCK: Yes. It's Byron M. Buck.

MR. ROBERTS: Would you, please, state your current position and duties.

MR. BUCK: I'm Executive Director of the California Urban Water Agencies. I oversee and direct research on water quality and water supply reliability studies for CUWA.

MR. ROBERTS: And could you briefly summarize your relevant qualifications from CUWA Exhibit 1.

MR. BUCK: Yes. I have about 19 years

experience in resource management and environmental planning. Seven of those years with San Diego County Water Authority in various management positions. And ten years as environmental specialist and manager for environmental planning for the Court District in Long Beach, California.

MR. ROBERTS: And did you prepare CUWA Exhibits 2 and 3.

MR. BUCK: They were prepared under my direction by CUWA's Water Quality Committee chaired by Dr. Roy Wolfe.

MR. ROBERTS: And would you, please, summarize your written testimony from Exhibit 2.

MR. BUCK: Yes. I'm here representing the California Urban Water Agencies in association of the 12 largest urban water purveyors located in Southern California, the Bay Area, and including the City of Sacramento. Our members deliver about 90 percent of the urban water supplies delivered from the Delta.

The primary purpose for California Urban Water Agencies members is to ensure the water served to the public is chemically and microbiologically safe to drink and is provided at a reasonable cost.

Water utilities throughout the State and across the country are faced with meeting increasingly

stringent drinking water regulations. These new regulations will require water agencies to spend hundreds of millions of dollars of the public's money in improving water treatment.

Water utilities continuously strive to find better and less costly ways of treating water to meet the new regulations. We are concerned whenever there is a likelihood for degrading source water quality as we believe is the case with this project.

Protection of source water is becoming increasingly important in meeting new drinking water regulations. Relying on treatment alone is no longer an option. CUWA is greatly concerned about the Delta Wetlands Project because of its impacts on the quality of water derived from the Delta.

It is well recognized that water quality significantly degrades as it transits the Delta. Because of current ambient conditions and increasing regulatory requirements, any unmitigated degradation of this already marginal water quality is unacceptable.

In summary, our position is that the Board should not issue a permit until the Applicant clearly demonstrates that exercise of that permit will not degrade water quality or otherwise injure users. We believe that the Applicant has failed to demonstrate

that it can prevent such degradation, or injury.

While it may be attempting to looking at drinking water quality issues as a disagreement among experts, it must be remembered that there are no comparable projects we are aware of in the world to provide a basis, or level of comfort that there will be no significant impacts. It appears that water utilities and the public they serve are being asked to bare all the risk of this project's uncertainties regarding drinking water quality.

If the Board believes granting a permit is in the public interest, appropriate terms and conditions must be applied to protect other water users and the public interest. In our written testimony we have provided such conditions for the Board's consideration.

In addition to our testimony here, CUWA submitted extensive comments from the Draft FEIR/EIS. Given that this document has not yet been finalized, we ask the Board to keep this hearing record open until this document is complete.

Our fundamental concerns regarding this project's likely effects on treating water to meet public health requirements result from our assessment of the impacts of storing water for extended periods on reservoir islands. We believe this will result in

unacceptable increases in concentrations of organic carbons and total dissolved solid in Delta waters.

Under Safe Drinking Water Act regulations, total organic carbon will now be a regulated chemical contaminate, due to its key role in disinfection by-product formation as part of the water treatment process. Because TOC levels in Delta water average just below levels where additional regulatory requirements will be triggered, any increase is significant.

Our expert testimony to follow will demonstrate that this project is likely to increase TOC in amounts much greater than the proponents estimate. And we'll explain the regulatory significance of this increase.

Water discharged from islands will tend to be higher in total dissolved solids, because filling will occur during periods of soil leaching in the Delta and the effect of evaporation while the water is in storage.

Ambient channel water during the proposed discharge period tends to have lower salinity than when islands will be filled as high quality water is being released upstream. Delta water quality will, therefore, be degraded during discharges.

Salinity of source waters is becoming a critical issue in determining the ability of urban areas to in part meet the reliability and water supply needs through wastewater recycling. Continued progress in recycling is contingent upon continued availability of high quality water from the Delta.

We also have concerns regarding fishery impact. This project will have adverse impacts to salmon fry during February and March when the project is diverting and fry are adjacent to the island.

In March, project diversions will entrain salmon smolts and draw smolts into Old and Middle Rivers and away from their seaward migration along the San Joaquin River.

In summary, because we believe the Applicant hasn't demonstrated that the project will not harm existing beneficial users, and we believe to the contrary that it is quite likely to do so, we believe the Board should deny the permit.

Should, however, the Board should decide to grant a permit, we respectfully request terms and conditions as specified on pages 10 through 13 of CUWA Exhibit 2, which will condition the project operations to prevent unacceptable increases in TOC and total dissolved solids, and collect adequate monitoring data

to assure over the long run that existing users are not harmed by the project.

MR. ROBERTS: Thank you.

I'd like to go to Dr. Richard Losee. Now, I think I'll have a question or two for Mr. Buck later on.

Dr. Losee, would you please state and spell your name for the record.

DR. LOSEE: My name is Richard Losee, L-O-S-E-E.

MR. ROBERTS: Okay. And what are your current position and duties?

DR. LOSEE: I'm currently a Senior Limnologist/Microbiologist for Metropolitan Water District of Southern California. And I manage the Metropolitan Source Water Reservoirs for water quality.

MR. ROBERTS: Could you briefly summarize your relevant qualifications from CUWA Exhibit 1.

DR. LOSEE: I have 17 years of experience in the field of aquatic ecology and limnology with a Ph.D. -- a masters and a Ph.D. from Michigan State University. I have assisted in teaching limnology and aquatic course in new planning ecology at the University.

In my position at Metropolitan, I share

responsibility for a comprehensive reservoir management program utilizing limnological principles, applied research, and modeling to the management of metropolitan source waters.

In our reservoir program, I've assisted in the design of source water storage and conveyance facilities to ensure the proper ecological function of those systems. And over the four years I've been with Metropolitan, we have developed a successful -- highly successful program to manage and control taste and odor problems in our source water reservoirs.

MR. ROBERTS: Dr. Losee, what are the key factors to analyze with respect to Delta Wetlands Project discharges of total organic carbon into the Delta?

DR. LOSEE: May I have the first slide, please. This is Exhibit 6A, which was divided from CUWA Exhibit 6, Figure 1. It's a simplified version of Figure 1.

MR. NOMELLINI: Can you put the mic a little closer?

HEARING OFFICER STUBCHAER: Yes. Thank you. Any time you can't hear, please speak up.

MR. NOMELLINI: Thank you.

DR. LOSEE: Again, this Exhibit 6A was derived

from CUWA Exhibit 6, Figure 1. It's a simplified version of that figure.

Levels of total organic carbon in the project waters will fluctuate over time, but the most important aspect of TOC associated with the Delta Wetlands island reservoirs is the amount of TOC in the water at the time of discharge.

There's two other factors that must be considered. And they involve the sources of organic carbon in the water column, and those are the release of organic carbon from the sediments and photosynthetic production of organic carbon.

MR. ROBERTS: Do you believe that Delta Wetlands has adequately assessed these factors?

DR. LOSEE: No, I believe they have not. May I have the next figure, please. This is Exhibit 6. This is Figure 1, the more complex figure.

I put this up because -- to show that there are more complex interactions and processes that combine to determine the organic carbon loading in the water column in the pool size at the time of discharge.

The boxes in this figure represent pools of organic carbon. And the arrows between the boxes represent the transformation processes that occur in the Wetlands. And you can see, there's a large number

of these boxes and transformation processes.

For example, dead -- particular organic carbon is one pool of organic matter. And that is -- that material can be processed by microbiotics, the fungi or bacteria. In a degradation process they can produce biomass of those microbes, CO2, and dissolved organic carbon.

Each of these transformation processes represent a level of uncertainty. There's some uncertainty in estimating the amount of organic carbon that would be present in the water at the time of discharge.

Unfortunately, in the work that has been performed for the Environmental Impact Report intended to elucidate these processes, the experimental design was inadequate and often unable to provide meaningful -- statistically meaningful results to assess these relationships. And this is necessary to minimize the uncertainties associated with any estimates of the organic carboning system.

Additionally, in the Delta Wetlands's analyses, the important sources of organic carbon released -- release mechanisms from the sediments, or production in the water carbon were either overlooked and -- and/or underestimated.

And lastly, there was a failure to consider the relationship between the timing of discharges and the seasonal biological variation in the biological processes that take place over the course of the season.

MR. ROBERTS: Over all, were the processes that influence the amount of total organic carbon in the reservoir islands totally considered by the Delta Wetlands?

DR. LOSEE: No. May I have the next slide, please. No, I believe they were not. Exhibit 6B was derived from CUWA Exhibit 6.

Here, I've listed most of the factors influencing water column total organic carbon. Release mechanisms from the peat soils may be grouped into two categories: Molecular diffusion and advective are both movement of water processes.

Diffusion of water was adequately addressed in the Delta Wetlands's assessment. Direct wave action under the advection category was also adequately addressed. But pore water circulation was not adequately addressed as was also the case with bioturbation. That was not adequately addressed.

The production of organic carbon in photosynthesis by aquatic and wetland plants was not

also adequately addressed, as is the case for terrestrial plants. Of these factors, production of organic carbon by aquatic or wetland plants was the most important parameter.

MR. ROBERTS: Do you believe the Delta Wetlands has underestimated the release of total organic carbon from the reservoir island sediments?

DR. LOSEE: Next slide, please. Yes, I believe that that is the case; that there has been an underestimate phreatic as to the release of organic carbon from the sediments.

This Exhibit 6C was also divided from the text of CUWA Exhibit 6. This is just a portrayal of the four -- of four of the release mechanisms of organic carbon sediments to the water column.

Diffusion was addressed by the Delta Wetlands, but I'd like to point out diffusion is the slowest process listed here. Direct wave action was also addressed in the Delta Wetlands's assessment. However, there was a component of direct wave action which was not adequately addressed.

Now, the Delta Wetlands's assessment did consider the resuspension of sediments caused by the impingement -- the direct impingement of the wave action on the sediment. However, they did not address

the complimentary forcing of water through the pore spaces that occurs when those waves impinge upon the bottom. This is one sample of pore water circulation.

Pore water circulation is also not adequately addressed. Pore water circulation will occur whenever there's a topographic feature on the bottom of reservoir, and lateral movement of water crosses that topographic feature.

Let's see. And lastly, bioturbation was not adequately addressed in the Environmental Impact Report of the Delta Wetlands's assessment. Certainly, there will be colonization of these -- or rather benthic organisms living in these reservoirs.

And because so many factors were inadequately addressed in the assessment, in the Delta Wetlands's assessment CUWA has made an estimate based on conservative assumptions of the amounts of potential TOC release from the sediments to the water column.

We found, even with partitioning, the potential amount of TOC to be released over ten filling cycles the concentration of the full reservoir would still be as high as 30 milligrams per liter of carbon.

MR. ROBERTS: Do you believe that Delta Wetlands has adequately assessed the photosynthesis component of total organic production -- total organic

carbon production?

DR. LOSEE: Could you repeat that?

MR. ROBERTS: Do you believe that the Delta Wetlands has adequately assessed the photosynthesis component of TOC?

DR. LOSEE: No, I believe they have not. This next slide is Exhibit 6D from CUWA Exhibit 6. And this is table -- I believe it's Exhibit 6.3.

This is a comparison of the range of primary production of photosynthesis from various habitat types that are likely to be found -- or that will be found on the -- the project islands.

The bottom row, production here is in amount of carbon produced per meter squared per unit area per year. The bottom row on this figure here is the Delta Wetlands estimate of vegetative biomass based on emergent vegetation in the demonstration wetland. And that has -- they found there to be 500 grams carbon per meter square per year production.

I'll note, however, that this level of production when compared to the literature values is -- is on the low side. The original vegetation from the literature ranged from a thousand to over 2,000 grams of carbon per meter square per year.

To put this in perspective, I'd like to show

the next slide which is CUWA Exhibit 6.4 and draw your attention to the --

MR. ROBERTS: Excuse me, Dr. Losee, this is an exhibit right out of your testimony?

DR. LOSEE: That's correct.

MR. ROBERTS: Your written testimony?

DR. LOSEE: Yes. In the upper panel of this figure is a trash rack in a shallow reservoir metropolitan's system which receives Delta water.

The trash rack is a stainless steel trash rack. And that material that's on the trash rack is a filament of green alga called cladophora. This reservoir was in service for four weeks, and over the course of that four-week period, this filamentous green alga grew to a depth of thickness on the bottom of three-feet tall.

The reservoir is an 80 acre reservoir. The depth of this reservoir is 10 to 12 feet deep as well. So it's a shallow reservoir.

At the end of the four-week period, the operations were ceased in this reservoir because of patches of material, the alga material, lifted off the bottom and clogged the trash rack. And that isn't an intended fancy design of the trash rack. That's the bending of the curve due to the hydrostatic head when

the cladophora clogged that trash rack. This material was dominated as remnants after the first batch of cladophora drained off and the reservoir drained.

The bottom panel is the cleanup procedure. This is an 80-acre reservoir. In the cleanup they removed a hundred and six tons of cladophora that grew in a four-week period. This translates to about a gram of carbon production per meter square per day.

MR. ROBERTS: What is the importance of timing in relating the production of TOC to TOC levels in discharge water?

DR. LOSEE: This is Exhibit 6E which was derived from the written testimony, the text of CUWA Exhibit 6.

And it's a conceptual plot of the relationship between organic -- plant biomass and time in aquatic systems. Along the X axis is time. There's four seasons and then one year represented.

The curve on this plot is the biomass over time. And you can see that biomass starts out low in the wintertime and increases through the spring and into the summer. And then in late summer there's a decrease in the total biomass in the system. And this is a result of the degradation of organic matter exceeding the production rate of organic matter. And

that happens in late summer.

I'd like to point out that the Delta Wetlands's estimates of biomass were made in October -- October -- I believe it was November and January, certainly, not at the high biomass times of the year.

HEARING OFFICER STUBCHAER: Question: Why is the ending value supposedly at the same time of year of the beginning value so much higher than the beginning value?

DR. LOSEE: Good question. Because this is a conceptual drawing, it doesn't include all of the degradation that would occur over the wintertime. And so that's right. Over the course of an entire season you would see a reset of the biomass in the system.

And there would likely be some accumulation of some organic matter in an aquatic system like this, and that would be the difference between the beginning and the end.

HEARING OFFICER STUBCHAER: Is this supposed to represent the whole year? I thought you said it was.

DR. LOSEE: It -- it -- well, it doesn't -- well, that's true, it doesn't include the entire year of what might happen at the end of one season and the beginning of the next. The function of the curve at

that point is somewhat arbitrary.

HEARING OFFICER STUBCHAER: If you're going to plot several years in a row, would you have the same beginning value each year?

DR. LOSEE: I would say in a Delta Wetlands situation, I would plot that as increasing slightly from year to year.

And I say that because in the wetlands here in the Delta, there has been an accumulation of organic matter over the time. That's evidenced by the fact that the islands exist.

MS. BRENNER: I would just like to, again, raise my objection. This is a clear example of the new exhibit; new information that we have not been provided.

Your questions indicate, too, that to the Board, also. We've never been presented with any of this type of information in their direct written testimony.

HEARING OFFICER STUBCHAER: You're objection at this time is noted and you may state it again later.

MS. BRENNER: Thank you.

MR. ROBERTS: I would just like to state this is a new presentation, but the information is in the exhibits.

MS. BRENNER: The information is where, sir?

MR. ROBERTS: It's in Exhibit 6.

DR. LOSEE: The point of this -- of this exhibit is the last point here. The cross-patched region represents the discharge periods of July and August for the reservoir project. And that discharge corresponds with the period when the biomass will be the greatest in that aquatic system.

MR. ROBERTS: Do you believe that the Delta Wetlands Project will cause taste/odor impacts to water utilities?

DR. LOSEE: I believe that there is a high likelihood -- a high probability that taste/odor problems will occur in the reservoir system, the Delta Wetlands system.

Metropolitan manages a number of reservoirs which receive State project water. And these reservoirs are both stratified and unstratified. Both kinds of reservoirs have exhibited extensive taste/odor problems throughout -- throughout the years. And since my four years at Metropolitan there have been taste/odor problems annually in these reservoirs.

These taste/odor problem can be both aquatic generated from algae in the water column as well as benthic generated algae attached to the bottom. And

these reservoirs will be ideal habitats for taste/odor producing algae.

MR. ROBERTS: Does that conclude your testimony, Dr. Krasner -- sorry, Dr. Losee?

DR. LOSEE: Yes, it does.

MR. ROBERTS: Thank you.

HEARING OFFICER STUBCHAER: I have a comment on this exhibit. And the clock has stopped when I do this. Sorry to interrupt you.

But I'm inclined to grant the objection on this exhibit unless it's redraw to show an ending near the beginning, because it is misleading. It shows the ending above the Delta Wetlands's assumption. And if the beginning is correct it should come back down underneath it.

And so that's just to --

MR. ROBERTS: I think that's fair, Mr. Stubchaer. It's intended sort of as a -- a qualitative description of a cycle. So that's -- that's a fair point.

MS. BRENNER: And, Mr. Stubchaer, I'd like to add to my objection. I have reviewed Dr. Losee's direct testimony, in fact, the area I would assume allegedly supports this particular exhibit. And no such information is available to support this exhibit,

or the information that he's just presented on this DW assumption and discharge period idea.

I'd also like particular axis, or some sort of scale on the axis to determine what exactly he's trying to say with this exhibit, if provided it will be allowed in. Though I really strongly suggest to the Board that this not be allowed in. This is completely new information that's being presented.

HEARING OFFICER STUBCHAER: Thank you. All right. You may proceed.

MR. ROBERTS: You want me to move on?

Mr. Krasner, would you, please, state and spell your name for the record.

MR. KRASNER: Yes. Stuart W. Krasner, K-R-A-S-N-E-R.

MR. ROBERTS: And what are your current position and duties?

MR. KRASNER: Yes, I'm a Senior Research Chemist with Metropolitan Water District of Southern California. And I'm in charge of research on the formation and control of disinfection by-products in drinking water.

In addition, I serve as the Chair of the American Water Works Association disinfection by-products technical advisory work group. They

develop technical information for the drinking water industry when we work on drinking water regulations with the Environmental Protection Agency.

MR. ROBERTS: Would you briefly summarize your relevant qualifications from CUWA Exhibit 1.

MR. KRASNER: Yes. I have my Masters in Analytical Chemistry from UCLA. I've worked as a chemist for 25 years, consider 20 years at Metropolitan.

In addition to the work that I have done at Metropolitan, I've been involved in numerous nationwide studies of disinfection by-products formation and control both for the U.S. Environmental Protection Agency and the American Water Works Research Foundation.

Also, I've had the pleasure to serve on the technical work group in support of the development of the disinfection by-product. And one of responsibilities that I was given on this technical work group was to take the lead in developing the enhanced coagulation requirements for the removal of total organic carbon that would be required of drinking water utilities.

And was asked by the Environmental Protection Agency to prepare an issue date summarizing this

regulatory information. And that has been incorporated in the EPA's Notice of Data Availability that will appear in the Federal Register later this year in helping promulgate the final role.

MR. ROBERTS: Did you prepare CUWA Exhibits 4 and 5?

MR. KRASNER: Yes.

MR. ROBERTS: And did you also participate in the preparation and submission of Metropolitan's comments on the Draft EIR/EIS for the Delta Wetlands Project which is marked as CUWA Exhibit 10?

MR. KRASNER: Yes.

MR. ROBERTS: Mr. Krasner, what is the significance of TOC to water utilities?

MR. KRASNER: Yes. I'd like to start with CUWA Exhibit 5A, and this is material derived from CUWA Exhibit 5. What I'd like to do is walk you through a day in the life of TOC.

What I'd like to do is --

HEARING OFFICER STUBCHAER: Where did you get that idea?

MR. KRASNER: Well, I can't say, because that would be rebuttal. So I'd not be able to tell you at this point.

I'd like to first take the day out of order

and start in the afternoon. And what I show here is when the source water gets to the treatment plant, one of the things that we do at our drinking water treatment plant is we disinfect the water.

And there are contaminates in the drinking water which include total organic carbon and bromide. And the disinfectants that we use react with total organic carbon and bromide and form a series of disinfection by-products of health and regulatory concern.

I've just listed a couple of examples, trihalomethane and bromate which is produced during ozone. There is actually hundreds of by-products produced during this disinfection process. And as long as you have total organic carbon or bromide present in your water, regardless of what you do to disinfect your water you'll form disinfect -- disinfection by-products.

Let's take you to the morning and see how TOC started their day. CUWA Exhibit 5B is the next figure I'll present. Again, this is information derived from CUWA Exhibit 5.

What I will show you is data that we described in great detail in our package where we've been collecting samples with the assistance of the

Department of Water Resources since the late '80s from the Sacramento River Greene's Landing and Delta export at H.O. Banks.

And we have treated this --

HEARING OFFICER STUBCHAER: I'm going to interrupt, again.

MR. KRASNER: Yes.

HEARING OFFICER STUBCHAER: Where in Exhibit 5 -- can you tell the audience where in Exhibit 5 you got the data --

MR. KRASNER: Sure.

HEARING OFFICER STUBCHAER: -- for the preparation of this chart?

MR. KRASNER: Sure. I'll be more than happy to. When you see where I got it you'll see why I tried to simplify. I have put together some figures in my Exhibit 5. This is from Figure Number -- hold on, yes, it's Figure Number 2.

Just for those who aren't statisticians I show Box-and-Whisker Plots. Sometimes when I show this the eyes start to glaze over, because there's a lot of information. So I thought I'd just simplify, but it is in that Figure Number 2.

HEARING OFFICER STUBCHAER: Thank you. Yes.

MR. KRASNER: And what we've done in this

experiment is treated the water and chlorinated it under conditions that would be used in an actual treatment plant.

So let's start as the dawn arises at the Sacramento River. The water enters the Delta with low levels of total organic carbon and low levels of bromide.

When we chlorinated this water in our experiment we found over these many years we have formed levels, and I show the median and 90th percentiles to give you an idea of the magnitude in the Sacramento River's water samples ranging from about 20 to 30 micrograms per liter.

Now, as the water goes through the Delta it picks up organic carbon from agricultural drainage and bromide from salt water intrusion. So by the time the water gets to the export, when you take water like this and chlorinate it you now see a very different picture. You now find that when you chlorinate these waters trihalomethane levels are in the ranges of about 60 to 80 micrograms per liter. And this is the type of water that we do get delivered to our treatment plants.

MR. ROBERTS: Would you, please, describe the new proposed drinking water regulations for TOC and disinfection by-products?

MR. KRASNER: Yes. I'd like to show CUWA Exhibit 5C. This is a summary of the drinking water regulations. Again, this information is provided in both tabular form and text in my testimony.

Just to give a few important points, in 1996 the United States Congress reauthorized the Safe Drinking Water Act. And as part of that reauthorization they mandated that the U.S. Environmental Protection Agency will promulgate Stage 1 and Stage 2 of the Disinfection By-product Rule by November of '98 and May of 2002, respectfully.

Just as a point, it's kind of an interesting coincidence, today as we speak in Washington D.C., the EPA, the water industry, environmental representatives, all of the stakeholders have signed an agreement in principle having to agree to all of these conditions that you see in the Stage 1 requirement.

And everything is moving along quite fine and it will be promulgated November '98. So all of these -- all of these parameters have been agreed to.

In the rule there will be lowering of the standard for trihalomethane, the introduction of standards for controlling other disinfection by-products. And for the first time in the history of the Safe Drinking Water Act total organic carbon has

been identified as a contaminate that drinking water utilities will be required to remove from their source waters.

I -- actually, for those who want to see the entire table, in CUWA Exhibit Number 5 I show all of the total organic carbon removal requirements in Table Number 2 of Exhibit 5. But I only show the two elements of the matrix that are relevant to those people who treat Delta water.

If the total organic carbon levels in a particular month is less than four milligrams per liter the utility will have to remove 25 percent of that total organic carbon. On the other hand, in a particular month if the organic carbon level is above four milligrams per liter the requirement will be that you have to remove 35 percent. So that will be an additional 10 percent that has to be removed in that particular month. So each month the requirements will change and you must meet the requirements for that month.

And another important parameter is that you must comply with all of the requirements in the Stage 1 rule, the control of disinfection by-products as well as the control of total organic carbon to be in compliance with the rule.

MR. ROBERTS: Mr. Krasner, do you believe that Delta Wetlands's analysis adequately addresses the impact of TOC loadings to the Delta and result in disinfection by-product formation?

MR. KRASNER: No. I'd like to first show CUWA Exhibit 5D. And that's just a brief summary of some of the difficulties we found when we reviewed the Draft Environmental Impact Report.

The trihalomethane formation testing method that was used was inaccurate. The laboratories that were performing these analyses did not meet minimum quality assurance requirements. And, unfortunately, some of the analyses done in this Draft Environmental Impact Report relied on inadequate information.

I'd next like to refer to CUWA Exhibit 5E. And this is derived from CUWA Exhibit 5. It's actually just a plot of the data that is in table Number 4. So I've just showed it visually. This is an example of an experiment that we believe didn't properly test what the investigators were attempting to test. And, furthermore, we believe that the conclusions were not properly arrived at.

What you see is over the several months that the demonstration wetland was operated the organic carbon level started off below five milligrams per

liter. By the end of the period it was close to 40 milligrams per liter.

I refer your attention to the last few sample points where I show an arrow going across where there seems to be an apparent plateauing out of the organic carbon level. And in the Draft Environmental Impact Report it was assumed that 40 milligrams per liter would be the maximum amount of organic carbon that you would get out of this demonstration wetland.

However, I call to your attention three data points collected in December, which I have a dotted arrow going across. If you look at that you see, again, an apparent plateauing out of the organic carbon level at this point.

If the experiment had been stopped in December we would have had in the Draft Environmental Impact Report the information that the maximum organic carbon level coming out of this demonstration wetland was 30 milligrams per liter.

What I suggest is that if you look at the January data, because the data was stopped at this point we have no way to know that this is actually the maximum amount of organic carbon that could have come out of this wetland, because those three points don't really suggest necessarily a plateauing out.

Another important point that must be considered is let's examine the period of time in which the experiment was covered: October, November, December, and January. And as Dr. Losee has just shown you, the period of time at which one conducts experiments there are many parameters that impact the production of organic carbon. And many of these are temperature dependent. And this is a period of time -- a cold period of time when you won't get actually the maximum yield of organic carbon from a wetland. So this actually isn't really representative of that type of time period.

MR. ROBERTS: Mr. Krasner, what impact do you think the Delta Wetlands Project will have on drinking water utilities with respect to the DBF's, the disinfection by-product formation?

MR. KRASNER: Yes. In Exhibit 5F I just summarize that we believe that some of the potential impacts are that there will be increases in total organic carbon, increases in treatment costs, and moreover our more fundamental concern an increased likelihood of not being able to meet the public health standards.

I'd like to now show CUWA Exhibit 5G. And this information is derived from CUWA Exhibit 5, Table

6. Actually, Table 6 is something like five pages long, so I've just summarized some of the data to clarify the impact of the Delta Wetlands Project on the total organic loading in the Delta.

First of all, I'd like to take a moment and explain that the Y axis shows the mass loading in pounds per month taking the project condition and subtracting out the base condition. And I, again, don't want to show all the 12 months, but I just want to highlight some examples.

We look at, for example, the months of January and February. You see that there will be slight decreases in the mass loading of organic carbon, because there wouldn't be reservoir releases at this time. And we've converted some agricultural land to other uses.

Now, if we go to the months of July, August, and September, periods in which is we can potentially have reservoir releases, you see significant increases in the mass loading potentially as much as over four million pounds per month of organic carbon.

Now, the important thing to take from this is that in the summer there is in agricultural operations typically less organic carbon from the islands than in the winter leaching period. And, moreover, the

reservoir islands will be releasing very large volumes of water. So when you put together the concentrations and the volumes and you get your mass loading you see these large increases in those periods of time.

Now, I'm not focusing on annual averages, because what I'd like to call your attention to are seasonal impacts. And the reason for that is that when we treat water at our treatment plant we don't store the water and get an annual average. We have to treat the water as it's coming into the plants. And there are significant seasonal differences.

Again, one of the important parameters is disinfection by-product formation is very temperature dependent. So, for example, if you get a large amount of additional organic carbon in the summer when the temperature is warmer that will result in much more trihalomethane formation as compared to winter months when the water is colder and kinetics of the formation are not as high.

Now, I'd next like to show CUWA Exhibit 5H. And this is derived from CUWA Exhibit 5, Figure 6. First, again, I'd like to explain this is trihalomethane data where I show the Stage 1 trihalomethane standard of 80 micrograms per liter, and the Stage 2 requirement of 40 micrograms per liter.

For this work I have done some modeling of the range of trihalomethane levels that would be expected.

I'd like to first call your attention to the base condition where I have found that the median to the 90th percentile, levels will be in the range of 60 to 75 micrograms per liter. If you compare that to what I showed you earlier in CUWA Exhibit 5B with actual samples collected from H.O. Banks this is in agreement with the levels we've seen in actual bench chlorination experiments in our laboratories.

When I show you now the project conditions, regardless, of whether you examine reservoir releases with TOC levels -- levels as low as 8 or as high as 30 milligrams per liter, you see that the ability to comply with the standard, the margin of safety becomes more tenuous until ultimately there is a point where noncompliance is potential to happen.

And I should point out that the way that the trihalomethane regulation works is you're not allowed to only comply with the regulation 95 percent of the time. You're suppose to comply with the regulation a hundred percent of the time. So that's why I do use these cumulative probability statistics.

Now, I mention about the potential to possibly fail a regulation. I'd like to just mention that one

of the consequences to a public utility if we fail either the trihalomethane standard or the total organic carbon removal requirement, the first is that we have to go to public notification and let our consumers know that they've been exposed through drinking of chlorinated water to disinfection by-products that can increase the risk of getting cancer from the chlorinated water. And that they are being exposed to a level that is greater than the level the EPA deems safe.

Moreover, if a utility continues to not comply with the regulation the State Health Department will then require you to install new ways of treating your water, which generally are more expensive ways to treating the water to be able to then reliably at a hundred percent of the time comply with the regulation.

In terms of cost, in CUWA Exhibit 5 we do present some data as an example for the costs of removing total organic carbon as part of the new enhanced coagulation requirement.

If a utility has in a particular month total organic carbon levels below four milligrams per liter the additional cost compared to how utilities currently treat water would be an additional $26 per acre foot to meet these requirements of 25 percent removal of your

total organic carbon.

On the other hand, in a month where your organic carbon level is greater than four milligrams per liter that 25 percent removal requirement will result in an additional treatment cost of $39 per acre foot. So that means being pushed over the four milligram per liter will result in a $13 per acre foot differential.

Now, I like to, because I'm sort of a practical person, give a real world illustration. And I have pulled out some data from Contra Costa from August and September of '96. And their total organic carbon levels for those months were 3.8 and 3.5 milligrams per liter.

And so they would only in those months have to remove 25 percent of the organic carbon. But if a project resulted in their exceeding four milligrams per liter they would have to go to the higher removal requirement. That $13 per acre foot additional cost we look at two months where they may treat, perhaps, 25,000 acre feet of water. That would be $325,000 additional cost per year over the years over the 70-year life of the project. That would be an additional 23 million dollars of cost.

MR. ROBERTS: Do you believe that the Delta

Wetlands Project will also have impacts on utilities that use ozone in their treatment process?

MR. KRASNER: Yes. I present data in CUWA Exhibit 5 that when the organic carbon level goes up your ozone demand goes up. And you're required at all times -- in fact, every time you take measurements every day that you maintain a positive ozone residual to get disinfection credit to comply with the disinfection requirement the Federal Government has established.

So every time there's an increase in organic carbon loading there will be additional operating costs for having to produce more ozone. But that's assuming that a utility has sufficient capability in their infrastructure to feed that much ozone.

Again, just to give you a real world example, when the Metropolitan Water District did estimates on what it would cost to retrofit all five of our treatment plants for ozone, our original cost was 750 million dollars. We kind of cringed at the number and we went back and came up with a new number based on a fine -- a lower dose, designing for a lower dose of ozone.

And that brought the cost down to 500 million dollars.

Now, again, if you think about when we're

going to have the releases that's during the summer months. That's when treatment plants are operating at their peak capacity. And so that's generally when you're operating at what you've designed for. So if you get additional organic carbon loadings at that time and you have a design for that, you may not have actually in your infrastructure adequate capacity so you might have to actually go back and do a capital investment to increase you ozone capability.

Another concern with the Delta Wetlands Project if a system is using ozone, and again this is information I provide in CUWA Exhibit 5, is when you ozonate organic carbon you divert it to a biodegradable form. And that can actually result in microorganisms regrowing in your distribution system and that will put you in violation of another Federal drinking water standard, the Total Chloroform Rule.

So it's always very interesting in terms how timing works. The time in which you have the greater vulnerability to biological regrowth in your distribution system is when the water is warmest. Again, when are we going to have reservoir releases? Summer months. That will, again, increase organic carbon levels, which will result in more biodegradable material at a time in which you're the most vulnerable.

Let's also look at the Disinfection By-product Standard. As I have shown as part of the Stage 1 standard there will be the introduction of the regulation of bromate. In the data I present in CUWA Exhibit 5 we do show that when your organic carbon level goes up, our research has shown bromate formation goes up as well. And so the organic carbon loads, those increases will also result in potentially failing to comply with the bromate standard.

MR. ROBERTS: Would you summarize what you believe are the most important concerns related to TOC loadings from the Delta Wetlands Project.

MR. KRASNER: Yes, I'd be happy to.

First the Delta Wetlands Project will not improve water quality in the Delta. Moreover, the data and analysis suggest that the project will erode an already tenuous margin of safety in being able to comply with the Stage 1 requirements. And we believe that noncompliance is likely to occur sometime during the operation of the project and that treatment costs are expected to increase.

Thank you.

MR. ROBERTS: Thank you, Mr. Krasner.

HEARING OFFICER STUBCHAER: Are you about to move on to your next witness?

MR. ROBERTS: Right now.

HEARING OFFICER STUBCHAER: Well, this is a good time to take our afternoon break then.

MR. ROBERTS: Okay.

HEARING OFFICER STUBCHAER: 12 minutes.

(Recess taken from 2:48 p.m. to 3:01 p.m.)

HEARING OFFICER STUBCHAER: Okay. Let's call the meeting back to order, please. I don't see Delta Wetlands here. Do you want to race ahead?

MEMBER DEL PIERO: How fast can you talk?

MS. LEIDIGH: They're conferring in the cafeteria.

HEARING OFFICER STUBCHAER: Okay. Are you ready, Mr. Roberts?

MR. ROBERTS: I am.

HEARING OFFICER STUBCHAER: You may proceed.

MR. ROBERTS: Okay. Next witness will be Dr. K.T. Shum.

Dr. Shum, would you, please, spell -- state and spell your name for the record.

DR. SHUM: My name is K.T. Shum, spelled S-H-U-M.

MR. ROBERTS: And what are your current position and duties?

DR. SHUM: I'm presently the Associated Water

Resources Specialist at Contra Costa Water District. As the title implies I work on the water resources issues in the Delta. In particular, I work on the American Modeling Flow and Transport in the Delta, and also on the analysis of the environmental impact result.

MR. ROBERTS: Could you summarize your relevant qualifications from CUWA Exhibit 1?

DR. SHUM: Yeah. I have more than 16 years of experience in the research and analysis of the flow and transport in the aquatic environment.

I got my doctorate degree from MIT. And I have worked at Protye, Incorporated, (phonetic) in Pasadena, California, on delta water issues. Before coming to the Contra Costa Water District I was a research scientist with the Department of Fisheries in the oceans of Canada.

And my major area of research is in the solid transport processes in the way -- in the water sediment phase. And I've been at the Contra Costa Water District for the last two and a half years.

MR. ROBERTS: Did you prepare CUWA Exhibit 6, 8, and 11?

DR. SHUM: Exhibit 7.

MR. ROBERTS: I'm sorry, 7, 8, and 11?

DR. SHUM: Yes. CUWA Exhibit 7 is compared jointly with Dr. Richard Denton of the Contra Costa Water District. In fact, a lot of the details of the materials presented in CUWA Exhibit 7 will be, or are elaborated in CCWD's Exhibit 4, in which case it is Dr. Richard Denton's testimony. And I prepared CUWA Exhibit 7, 8, and 11.

MR. ROBERTS: Could you tell us where you found the data in which -- which is the basis for CUWA Exhibit 11?

DR. SHUM: There are two sources of data. The first one is on the agricultural drainage, I believe, for Webb Track. And that's from Appendix A of the Draft EIR/EIS of Delta Wetlands Project. The other one is taken from CUWA Exhibit 7, Figure 9.

MR. ROBERTS: Thank you.

Dr. Shum, how do you believe that Delta Wetlands's operations could affect water quality in the Delta?

DR. SHUM: During times of the year for the Delta Wetlands's reservoirs, the reduction in Delta outflow would increase seawater inclusion. During times of release the salinity of historic water is generally higher than that that we receive in the chambers. And in both cases, the salinity at the

municipal intakes at the Delta would be higher than under the no-project scenario.

MR. ROBERTS: Could you summarize your quantitative estimates of the potential salinity impacts on municipal intakes during times of Delta Wetlands's diversions?

DR. SHUM: Yes. There can be a very significant increase in salinity of municipal intakes when the Delta Wetlands island divert up to 9,000 csf at monthly average of 4,000 csf.

Figure 1 from CUWA Exhibit 7 shows resources from the simulations on the salinity increase. In this case chloride at the Rock Slough at the Contra Costa Water District. A salinity outflow relationship which was developed by Dr. Richard Denton of the Contra Costa Water District is used to isolate the effect of seawater inclusion.

This so-called team model that Dr. Denton developed is used by a number of agencies, most notably by the State Board in its development of the 1995 Water Control Plan, and also by the Department of Water Resources in the -- in the inclusion in the DWRC model. The outflow data was obtained from Delta Wetlands Properties.

In Figure 1 in the vertical X's I plot the

chloride under Delta Wetlands's operation's conditions. This number is plotted against the chloride number in the same month and at the same location under no-project conditions.

If Delta Wetlands were to have no impacts at the Rock Slough, the data point would lie on the 45-degree line. However, we see that many of the data points about this 45 degree line which represents a degrade of water quality. And in many, many instances this increase can be between 10 to 20 milligrams per liter of chloride.

If we look at the actual data, the largest increase is 28 -- or 26 milligrams per liter. In this case, the chloride at Rock Slough increased from a 54 milligrams per liter under no-project condition to 80 milligrams per liter with Delta Wetlands's diversion underway. This represents a 48-percent increase in the salinity at Rock Slough.

What this figure shows is that the Delta Wetlands's operations can have a very significant increase at the Rock Slough intake. And the salinity increase at the municipality index would be of a comparable magnitude.

MR. ROBERTS: Will the water stored in the Delta Wetlands's reservoirs increase in salinity

because of evaporation?

DR. SHUM: Yes. Evaporation loss in this shallow Delta Wetlands's reservoir islands would be potential. It would be a large percentage of the capacity. Figures applied by Delta Wetlands Properties show that the storage time would range up to 24 months.

The CUWA Exhibit 7C which is derived from Figure 3 of the CUWA Exhibit 7 shows the number of occurrence of the months in storage of stored water. This is different from Figure 3 in only that Figure 3 is a season occurrence, or season probability for this storage time. And I trust that this is a more easier to read the draft for the same data.

The typical storage periods as we see is between 7 and 13 months with a range of up to 24 months. The evaporation loss during this period can be estimated from the DWR data, which is commonly used in Delta studies, those data suggest an average evaporation loss of 55.5 inches per year.

And for a typical storage period, from November to August around ten months, the evaporation loss would be of the order of around 45 inches, or almost four feet.

Even if we discount the accretion due to rainfall which averages 15 inches in the Delta there

would be a net loss of 30 inches, or two and a half feet. And this is very significant when you compare to the average depth of the Delta Wetlands's reservoir islands of around 20 feet.

And remember the -- when the storage time increases to over 20 months the net evaporation loss can be twice that amount. The correspondence salinity increase for net loss of two and a half feet out of 20 -- 22 feet of stored water is between 11 and 13 percent depending on whether topping off is allowed in this estimate.

MR. ROBERTS: Now, you said earlier that Delta Wetlands's reservoir operations could also degrade water quality in the Delta during times of discharges. Could you, please, explain that statement?

DR. SHUM: Yes. Even if we do not consider the evaporation loss the release from the Delta Wetlands could have a substantial salinity impact in the Delta. This can be seen from CUWA Exhibit 7, Figures 6, 8, and 9. And here I plot them on the same page.

All three figures show the annual variation over the 6 -- over the 12 months of the water year. The top graph -- back up. All these numbers are obtained from Delta Wetlands Properties. The top graph

shows the simulated average of salinity in Old River near Webb Track averaged over 70 years.

Because of the influence, or the effect of agricultural drainage in the interior Delta the salinity in Old River is not directly related to the current, or to the Delta outflow at the time. And, indeed, it's lowest around April and May and higher around October and November.

In particular, I'd like you to note that between September and February, or between -- yeah, between September and February the salinity range from about 180 to almost 275 milligrams per liter TDS. Whereas in July and August -- further, in July and August the salinity is between 150 and 175.

The middle graph of Figure 8 shows the combined reservoir filling averaged over 70 years of Delta Wetlands's operations. Both the average and the range are shown. They both show the same quality in nature in that the major fill-in occurred between September and February.

And the bottom graph of Figure 9 shows the combined reservoir discharge. And once again I show the average over 70 years of stimulation and also the range. The major -- most of the discharge comes in the months of July and August.

Now, let's go back to the top figure. In July and August as I pointed out the salinity is between 150 and 175. And between September and February the salinity is between say 175 and 275. If we take the average values of the typical salinity during fill in it would be around 225 milligrams per liter TDS. Whereas, during discharge it will be around 175. The difference is 50 milligrams per liter, or an increase of 29 percent over the baseline, or over the discharge period of 175 milligrams per liter TDS.

This shows that even without consideration for evaporated loss just the operation of the Delta Wetlands's reservoirs alone can increase the salinity in the Delta and in turn at the municipality intakes.

MR. ROBERTS: And would this salinity increase at the municipality intakes have an impact on the municipalities?

DR. SHUM: Yes. I have obtained quantitative data of this impact. And it is detailed in CUWA Exhibit 8.

As a summary the numbers I used in that particular simulation using the future Delta model assumes a Delta Wetlands discharge of 3500 csf, and a combined export it becomes at around 10,000. And in that particular case, around 60 percent of the

discharge from the Delta Wetlands's reservoirs end up at the State project pump.

MR. ROBERTS: Delta Wetlands has modeling results that show an annual average net improvement in water quality at the Rock Slough intake because of the project's reduction in agricultural drainage.

Would you agree that these model reductions would dispel your concerns on the water quality you discussed -- the water quality impact you just discussed?

DR. SHUM: No. Delta Wetlands have not shown to any certainty this water quality impact. As I discussed earlier, just the reservoir operations in itself are most likely to degrade water quality in the Delta.

The only way that this degradation can be compensated is by the removal of agricultural drainage from the four existing islands, and also a reduction in the ag diversion currently in the four islands.

But to properly assess this reduction in agricultural operations we need to model, assimilate the operations to a reasonable, or sufficient degree of accuracy. In my opinion this has not been done.

The estimate we have in Delta Wetlands Exhibit 14A and B shows a very small water quality improvement.

But the magnitude of this improvement is small compared with the certainty in the simulation of the agricultural diversion and drainage.

And as a result we cannot say with any reasonable confidence what the -- even the qualitative nature of this water quality impact is whether it's water quality improvement, whether it's water quality degradation.

MR. ROBERTS: Have you identified any uncertainties in the Delta Wetlands's modeling of reduction in agricultural diversion and drainage?

DR. SHUM: Yes. There are three major uncertainties in this modeling of drainage and diversion. The first is the quantity and quality of the ag drainage from the islands. The second is where the water that is not diverted from agricultural use from the four Delta Wetlands islands would actually serve to improve the water quality in the Delta. The third one is the issue of timing.

I'll take a few minutes to explain the three issues in turn. The first one has to do with quality and quantity of the ag drainage. The modeling conducted by Delta Wetlands in Exhibit 14A and 14B assumes a certain salinity in Delta Wetlands -- in the drainage from a system in the Delta Wetlands islands.

And in this product here --

MR. ROBERTS: Dr. Shum, can you identify this on the overhead, please?

DR. SHUM: Yes. This is CUWA Exhibit 7A. And the data for the FDM input is derived, or obtained from Delta Wetlands's Exhibit 14A. I believe it is in Table A, or Appendix A.

The dots on this figure are from the -- from the Department of Water Resources Municipal Water Quality Investigation Program. And the data is obtained from the Division of Local Assitance of DWR.

What it shows is the salinity assumed in the two Delta Wetlands reservoir islands are considerably higher -- at least for this case of Bacon Island, are considerably higher than the actual measurements obtained by the MWQI data by a factor of up to maybe three. And as a result, the water quality benefits, or reduction in degradation due to the elimination of the assistant ag drainage would be over-saturated in this simulation.

At this point it's also worth pointing out that the amount of ag drainage coming out from existence islands given in the Draft EIR/EIS may be overestimated. In CUWA Exhibit 7B the total ag drainage estimates in the Draft EIR/EIS in Appendix A

are plotted or are summarized.

In particular the yearly total over the water year is a sum for four different islands. There are some data that are missing. For example, on the Holland Tract there are no data from 1986 to 1989. What I did was I took this numbers and prorated to the -- and prorated the ag drainage per acre on those islands to the total agriculture -- total irrigated ag rate in the Delta.

In other words, I assumed what if the entire Delta assumes the same ag drainage per acre -- per acre as is shown on this four islands. And the numbers at the bottom half of this table shows those numbers, which is, for example, for 1996 Bouldin Island if I prorate the 24,663 acre foot ag drainage for this year to the entire Delta for -- I divide that number by the acreage in Bouldin Island and multiply by the 778,000 data of primary Delta irrigated area of the Delta, I got a number which equals about one and a half million acre foot.

In other words, if the entire Delta operates the same as Bouldin Island in that particular year there will be one and a half million acres foot of ag drainage in the entire Delta. And I've obtained those numbers similarly for the other water years and other

islands.

And the number range from a low of 359, which is on Webb Track in the year 1990, to a high of two and a half, or 2,400,000 acre foot per year from the -- based on the data from Bacon Island.

For comparison, in DWRC estimates in the Delta the net consumptive use is of the order of one and a half million acre foot. And it's not likely that the ag drainage would be this high of a magnitude.

The point of this table is to show that the amount of ag drainage coming out from the four existing islands could be overestimated from the Draft EIR/EIS. And as a consequence, any estimate of the water quality benefits due to the removal of this ag drainage may be overestimated.

HEARING OFFICER STUBCHAER: Excuse me, Mr. Brown has a question.

MEMBER BROWN: Just to clarify this, you're saying on 378,000 acres, irrigated acres that there's going to be 1.5 million acre feet of drainage?

DR. SHUM: If you prorate based on the drainage per acre given by the numbers on the top half of the table.

MEMBER BROWN: That's four to five acre feet per acre drainage, is that what you're saying?

DR. SHUM: We are surprised at that number, too. Those numbers are from Appendix --

MEMBER BROWN: The application rate for irrigation of those fields is --

HEARING OFFICER STUBCHAER: Remember '86 is a record flood year.

Go ahead, Dr. Shum. I'm sorry.

DR. SHUM: However, 1991 is a dry year.

MEMBER BROWN: Okay.

MR. ROBERTS: Dr. Shum, are these your estimates of how much ag drainage there would be?

DR. SHUM: No. The top half of the table is the data obtained from the Draft EIR/EIS. And the bottom half are prorated as I described earlier based on the drainage per acre.

MR. ROBERTS: So if you use the figures from the DEIR/EIS these are the -- this is the quantity of discharge you would get if you --

DR. SHUM: Assuming -- assuming that the entire Delta operates the same way as, for example, Bacon Island in that particular year.

MR. ROBERTS: Thank you.

DR. SHUM: The second point I brought up about the uncertainty in the modeling of the agricultural operations is the reduction in ag diversion when the

Delta Wetlands islands are converted from agricultural practices. There is a certain increase in Delta outflow that is assumed due to the removal of this ag diversion being Delta Wetlands Exhibit 14A and B.

However, note that the State and Federal projects are operated when the Delta is an in-balance condition. This projects are operated to meet salinity and flow objectives in the Delta. Any increase in Delta outflow, or improvement in water quality that brings the conditions in the Delta below that balanced condition would most likely lead to either reduction in the reservoir releases from the upstream project reservoirs, or an increase in the pumping at Banks and Tracy plants. And as a result the water quality benefits that show up in the modeling would not be likely to be realized under actual operating conditions.

Dr. Denton will further elaborate on this point in his -- in his testimony on behalf of the Contra Costa Water District.

I would also like to point out that the water that is not diverted onto the Delta Wetlands's reservoir islands for ag consumption is about the same as the evaporated loss when water is diverted onto the reservoir islands to top off.

For example, in July and August the topping off requirement for this two reservoirs are 115 csf and 130 csf. And in the modeling in Delta Wetlands's Exhibits 14A and B, the corresponding reduction in ag diversion are 145 csf and 101 csf.

In another words, the topping off requirement average around 123 csf in two months which is exactly the same as that of the reduction in ag diversion.

The third point I want to point out in the uncertainties in the modeling in the ag operations in Delta Wetlands's Exhibits 14A -- yeah, 14A and B are that the ag drainage model is based on the mean Delta operations. In Figures 15 and 16 of CUWA Exhibit 7 I plotted the actual variation of this ag drainage from those four islands.

In the Delta model the data assumed in that simulation assumes a higher ag return in the summer, but in reality based on the data in Appendix A of the Draft EIR/EIS three of the islands have a higher discharge during the winter months.

In addition, we should note that ag operations would give ag drainage that is discharged into the Delta on a more gradual basis and is spread out over many months of the year. By contrast in the -- under Delta Wetlands's reservoir operations the discharge

concentrates are limited mostly to the two months July and August.

And the salinity and TOC impacts would as a result be more concentrated in those two months compared with system diversions.

MR. ROBERTS: Dr. Shum, would you summarize your conclusions on the salinity impacts on the Delta Wetlands Project on municipal water supplies in the Delta?

DR. SHUM: Yes. In my testimony I discussed the salinity impacts of the Delta Wetlands's reservoirs in particular. And I've shown that the reservoir operations in itself would most likely lead to a water quality degradation.

And the only way this degradation can be compensated and lead to a net water quality benefit for improvement is by removal of the ag drainage and diversion. And this, in my opinion, is that the modeling of this agricultural diversion, or drainage have not been performed to a sufficient accuracy to come to a conclusion that there's any net benefit due to the Delta Wetlands's operations. And as a result there's a high degree of uncertainty on the salinity impacts due to the Delta Wetlands's operations.

MR. ROBERTS: Thank you, Dr. Shum.

I'd like to go now to Mr. Nuzum.

Mr. Nuzum, could you, please, state and spell your name for the record.

MR. NUZUM: Yes. My name is Robert C. Nuzum spelled N-U-Z-U-M.

MR. ROBERTS: And what are your current position and duties?

MR. NUZUM: Currently I am the manager of the Natural Resources Department for the East Bay Municipality Utility District. I'm basically in charge of fisheries, wildlife range, forestry, watershed management, lease permit administration, wild land recreation, law enforcement, fire prevention control.

MR. ROBERTS: And could you briefly summarize your relevant qualifications from CUWA Exhibit 1.

MR. NUZUM: Yes. I have a bachelor of science in zoology. I have supervised and/or managed regional fisheries for the past 25 years. And I have been a certified fishery scientist since 1979.

MR. ROBERTS: And did you prepare CUWA Exhibit 9?

MR. NUZUM: Yes, I did.

MR. ROBERTS: Mr. Nuzum, do you believe that the close proximity of the Delta Wetlands Project to the east side tributaries and the San Joaquin River

will have an impact on the salmon fishery in those rivers?

MR. NUZUM: Yes, I do. Let me ask Peter to show the Members of the Board and staff -- we have used the same map. That should be familiar to all of us by this point. It is also part of my Exhibit 9.

The habitat islands are shown in orange. The reservoir islands are shown in yellow. And I would like to show you the east side tribs and the main conduits that I believe are responsible for the in-migration of adults and out-migration of juveniles and yearlings.

So with that first, Peter, if you can show them the Consumnes River, one of the first inside tribs.

HEARING OFFICER STUBCHAER: Pardon me. I know we've all seen this before, but I don't think it was specifically identified for the written record.

MR. ROBERTS: It is attached as Figure 1 to Mr. Nuzum's testimony.

HEARING OFFICER STUBCHAER: Fine. Thank you.

MR. NUZUM: Yes. Thank you.

HEARING OFFICER STUBCHAER: Thank you.

MR. NUZUM: The second of the east side tributaries we would like to show the Board is the

Mokelumne River. And then, third, the Calaveras River. And then lastly the alignment of the lower San Joaquin River below their main tribs.

And the purpose of this was to just try to emphasis the close relationship that we have here between salmon runs on the east side tributaries and the San Joaquin River to the Delta habitat islands and also the Delta reservoir islands that are being proposed by the project that we're considering here before the Board.

MR. ROBERTS: In your opinion will the Delta Wetlands Project impact adult salmonids during migration?

MR. NUZUM: Yes, I believe it will. In general, the key chinook salmon adult migration period for fall-run chinook can vary somewhat. Basically it would include the period from September 1st through December the 31st.

And that would in all likelihood be followed by the end-migration of adult steelhead that would run sometime from December through March. The project operation in this period of time could reduce, and I believe more likely confuse olfactory cues that have been discussed here in testimony prior to mine.

And I think that the expected impacts would

include delays, meaning delay of a fish that is -- that has -- the Mokelumne River, it has the native river. They would be delayed someplace within that central part of the Delta from migrating directly up and into the Mokelumne River, or to any of the other east side tributaries.

Those particular delays during a period of time when temperatures can be excessive in the Delta -- and we've all heard what excessive is or isn't at these hearings. But basically anything over 60 degrees can be harmful to the eggs especially in female salmon.

The other impact that I think is very likely is that there would be, or could be excessive strain. One imprinted run from the Mokelumne River, for example, into the San Joaquin, or from the San Joaquin into the Mokelumne. And the hibernation, if you will, of fish in those runs and the fact that they are not using their native rivers is an issue of extreme sensitivity to environmental groups and to the resource agencies. So I think those are the two key impacts that we might see.

MR. ROBERTS: And have you identified any impacts from the project on juvenile salmon?

MR. NUZUM: Yes, I have. The -- in general and, again, the time period does vary from water year

types to the various rivers that we are talking about.

We could see fry migration from the systems. And fry I would characterize as less than 50 millimeters in size. These are fish that are very small. They're not capable of excessive swimming speeds. They're not capable -- capable of a lot of things that fish that are a little older and called smolts are capable of yet.

And they're certainly not ready to go to the ocean or a saline environment. But they do out-migrate these river systems. And they do that in the period from January through March usually with a peak in February and March.

Smolts on the other hand would out-migrate a little bit later, in the period from March through June, usually with a peak of smolt migration in April and May.

I believe that diversions and/or releases from the Delta Wetlands Project islands will attract and entrain both fry and smolts to project islands to project facilities and to the Old and Middle River conduits to the South Delta. And, therefore, there could be -- could very well be a substantial impact associated with the Delta Project operations.

I believe it's critically important to

understand that in normal and wet years the majority of out-migration from these river systems will be as fry and not as smolts. And I believe just as strongly that in the below normal and in dry years the out-migration will be as smolts.

We've heard a lot of testimony here about the April and May time period. We heard that the resource agencies had specified the April/May time period and we have seen in the documents provided by the project proponents and their consultants that they have mitigated to some extent by not operating the project for a period April and May.

But that does not account for the time period of February and March with very small fish, namely the fry. And it does not account for the time period of March smolt down-migration, or the more critical smolt out-migration period in June and July when temperature conditions and other factors in the Delta are much more harsh.

MR. ROBERTS: Will the projected increase in boating recreation identified in the DEIR/EIS have any negative impacts?

MR. NUZUM: In my opinion it would. The DEIR and EIS estimates a five-percent increase in recreational boating. And in my opinion this will only

serve to exacerbate wave-generated erosion. I think we've also heard testimony that that is of concern to the various reclamation districts surrounding almost all of the Delta islands.

In addition, the doc -- the same documents talk about the potential for a compromise to boating safety enforcement. And, yet, the documents do not, at least in my opinion, provide any substantive mitigation for what that particular factor may create.

MR. ROBERTS: Do you believe that the Delta Wetlands Project's facilities and operations will affect the fish degradation levels in the Delta?

MR. NUZUM: Yes, I do. The project proposes boat docks ranging anywhere from 330 boats up to a total -- and I would assume that this is a build out of about 1200 boats. It also lists 1472 pilings. And it lists a very large number of inlet pipes with spacing in between them, some with screens, the inlet pipes; and some without screens, the outlet pipes.

If you can picture by just taking the spacing that was provided in the documents between the pipes, it appears that we would have an impact area at each one of these facilities alongside of the outboard edge of these reservoir islands, in particular of about 640 feet, two football fields in length.

And in that gauntlet, as I call it, we would have a series of large pipes and screens and pilings and boat docks and whatever else that may accompany these particular facilities. And I think these particular facilities will harbor large predators.

You see these exact same facilities, although not as large, not as concentrated potentially where people tie up their boats and fish for predators just like what we're talking about here.

And I've heard it described that we don't think there may be a predation impact. On the contrary, I believe and I think the predation impact, especially on fry enticed into this area due to flow and are back and forth in these areas because they are rearing in the Delta over some substantial period of time, we could see substantial impacts on fry. And in wet years back-to-back, say the last two for example, I think we could see an actual population level impact due to predation alone.

MR. ROBERTS: And do you have any studies and modeling recommendations that the State Board should consider if it were to permit this project?

MR. NUZUM: Yes, I do. If the project is to go forward and the Board permits it in some manner, I believe that predator surveys must be required. And

those surveys, in my opinion, should include the number, the size, and the species of predator before, during, and after the operation of the project facilities.

And that the resource agency should be contacted to identify what they believe statistically significant what the number of stomach analysis should be. And that those particular analysis should include the stomach analysis for the predator surveys that are mentioned.

I also believe that mortality estimates must be prepared. In my opinion in looking at the documents, there is not an actual mortality estimate for the Mokelumne River, for the Calaveras River, or for the Consumnes River. And I think that those are absolute needs of the project in order to have it move forward, and also for the San Joaquin River system.

I also believe that there should be collection and tagging of adults as they migrate into the system prior to reaching the project say in the area of Collinsville to answer the questions that are outstanding about migration delays and/or strain of one particular winter fish to a river that's not its native home.

In addition, I think that all the results of

these particular studies and surveys should be provided to the resource agencies, to the State Board, and to CUWA upon collection and without delay.

And I believe that the State Board should consider whatever additional corrective actions, if they are warranted, what those might be to adequately protect the anadromous salmonids using the east side tribs in the San Joaquin River system.

MR. ROBERTS: Thank you, Mr. Nuzum.

With your indulgence, Mr. Stubchaer, I have one final question of Mr. Buck.

HEARING OFFICER STUBCHAER: Yes. Go ahead.

MR. ROBERTS: Mr. Buck, do you have any concluding remarks?

MR. BUCK: Yes. Thank you. Our testimony has shown that there's great potential for significant adverse impacts from the Delta Wetlands Project and injury to current beneficial uses.

We believe that due to the increases in TOC and salinity on the islands, the timing of discharge relative to that of the current agricultural operations, as shown on CUWA Figure 11, that there will be -- there likely will be significant harmful increases in TOC and salinity concentrations for current users.

What we've got here on this graph shows the pattern of the agricultural discharge from Webb Track versus the reservoir discharge. You've got a shift basically of water coming off the islands from the winter periods to coming off the islands during the summer period.

What we have testified is that we believe this water is going to degrade significantly both the high salinity coming on the island and will increase the TOC. And then it will be discharged at a rapid volume during relatively good water quality periods and we believe that's going to produce a tremendous impact on municipality users. Also, there would be a insignificant benefit of the reduction in agricultural drainage during this period of discharge by the project.

We believe that we've demonstrated that harm from the water quality degradation and fisheries impact is likely. And, therefore, the Board should deny the permit. At a minimum the Board should adopt conditions as specified in pages 10 through 13 of Exhibit 2 which will ensure that the actual impact of the project become known, that only better than average water quality be put on the islands, and that the water discharged does not create additional cost, or

otherwise adversely impact the ability of agencies treating Delta water to meet the public health needs.

Thank you.

MR. ROBERTS: Thank you. Mr. Stubchaer, that concludes our direct testimony.

HEARING OFFICER STUBCHAER: Very good. You ready for cross-examination?

MR. ROBERTS: One second. We are ready.

HEARING OFFICER STUBCHAER: All right. I'd like a show of hands of those who wish to cross-examine this panel. Again, I'll just go through -- down the list then.

Delta Wetlands, who's going to cross-examine? Ms. Schneider -- no. No. You're not Ms. Schneider. You're Ms. Brenner.

MS. BRENNER: Mr. Stubchaer, actually the three of us will actually be cross-examining CUWA. I'll be the person predominantly cross-examining on behalf of Delta Wetlands.

Mr. Nelson will also be cross-examining Mr. Nuzum on the fisheries issue. Ms. Schneider will be cross-examining a couple of the witnesses on some of the general policies issues that have been raised by CUWA. I'll be cross-examining predominantly on the water quality issues.

HEARING OFFICER STUBCHAER: This is a little irregular. Our rules usually require one person conduct the cross-examination.

Ms. Leidigh, do you have a comment?

MS. LEIDIGH: Well, it is unusual, but I would think if we can move it efficiently and get through it in a normal amount of time --

HEARING OFFICER STUBCHAER: So you're not going --

MS. LEIDIGH: -- probably subject to the Hearings Officer's discretion.

HEARING OFFICER STUBCHAER: So you're not all going to be questioning on the same issue?

MS. BRENNER: No. They'll all be --

HEARING OFFICER STUBCHAER: Just one at a time up there at the podium?

MS. BRENNER: One at a time all different issues, all different witnesses. Though Ms. Schneider and I may cross on Mr. -- Dr. Shum, but that will be the only witness that both of us would ask questions of, but they will different subject matters.

HEARING OFFICER STUBCHAER: All right.

MS. BRENNER: Before we get to that, there's -- again, I'm going to raise several objections to the testimony that's been presented today by

Mr. Roberts and his witnesses, and I can go through them specifically by the particular exhibits that have been set forth.

And also I would like to indicate, Mr. Chairman, and like to request that more than 20 minutes be allowed for Delta Wetlands's cross-examination of CUWA. And I'm going to request a minimum of a couple of hours. And why I'm going to request that is that if any of the issues raised by CUWA are similar issues raised by other witnesses in this testimony, or in this hearing including State Water Contractors and Department of Water Resources and CCWD, we felt it would be easier to focus our questions on CUWA and spend some time on CUWA and alleviate some of the time spent on some of the other parties during cross-examination.

In other words, there's similar issues raised by the other parties that CUWA has raised and some of the other parties's testimony fairly tracks CUWA's testimony, we felt it was most efficient to focus our attention on cross-examining CUWA in the sense -- on those issues that are the same and the testimony is predominantly the same. And that way we wouldn't be spending so much time cross-examining these other parties.

Also, I'd like some additional time to continue cross-examining on Tuesday morning because of the numerous new issues that have been raised to -- during CUWA's presentation. So there's two requests there with regard to the time.

On top of that, I would like to strike certain exhibits from the CUWA's request on the basis that they are completely new. They're not supported by the evidence presented in their testimony. And, therefore, should not be allowed in. And I'd like to go through each exhibit that I'd like to be stricken.

HEARING OFFICER STUBCHAER: All right. You want to wait until after the cross-examination to do that?

MS. BRENNER: No. Actually, I'd like to go ahead and move forward and request that particular exhibits be stricken before cross-examination. Is that all right?

HEARING OFFICER STUBCHAER: Yeah. Proceed.

MS. BRENNER: Okay. Exhibit 6E is labeled "The Impact on Timing of Discharge Total Organic Carbon." As I indicated --

HEARING OFFICER STUBCHAER: I will move to -- I will allow that to be stricken from the record.

MS. BRENNER: Thank you.

MR. ROBERTS: Mr. Stubchaer, can I make some remarks?

HEARING OFFICER STUBCHAER: You may make some comments.

MR. NOMELLINI: I have a point of order of question --

HEARING OFFICER STUBCHAER: Just -- just -- "strike' may not be the correct word. But we'll get to the correct word, but Mr. Roberts is ahead of you.

Mr. Roberts.

MS. BRENNER: Sorry, Mr. Nomellini.

MR. ROBERTS: Mr. Stubchaer, earlier you had suggested we should make some addition to this to correct it which I think we need to do. But with that change this is just a visual representation of a fairly fundamental linmologic point that Dr. Losee made in his exhibit at page seven.

It's not in here for any quantitative evidentiary purpose, but it is here for a qualitative representation of how the timing does affect the growth and biomass.

HEARING OFFICER STUBCHAER: And the qualitative representation is adverse to Delta Wetlands when you look after the summer period.

MR. ROBERTS: Well, if we make that

correction --

HEARING OFFICER STUBCHAER: If you make that correction we could reconsider. But as it exists here, it's not admissible.

MS. BRENNER: And I would just like to --

MR. ROBERTS: Okay.

MS. BRENNER: -- restate Dr. Losee's testimony does not provide the basis for that graph that you're presenting whether you include the additional information or not.

HEARING OFFICER STUBCHAER: Mr. Nomellini?

MR. NOMELLINI: Yes. I have concern that if you strike the exhibits before I get to cross-examine does that mean I wouldn't be able to cross-examine as to those stricken exhibits?

HEARING OFFICER STUBCHAER: That's a good question. That's one of the hazards on ruling on them early, I think, that's why I asked the question.

MR. NOMELLINI: You listened to all the testimony on these exhibits. And I think we ought to have the right to cross-examine with regards to those.

MR. ROBERTS: And, Mr. Stubchaer, I believe we could put these in as rebuttal exhibits later on. Perhaps, if there is any question we can just leave open the question whether they'll be accepted and until

that time just to allow cross-examination.

HEARING OFFICER STUBCHAER: That was my initial inclination was to hear the cross-examination first before we ruled on this. And I acquiesced to the request from Delta Wetlands, perhaps, erroneously. I think maybe I should reconsider that.

Ms. Murray?

MS. MURRAY: I have similar concerns as to Mr. Nomellini. And I think it has been resolved if I understand your -- your decision.

HEARING OFFICER STUBCHAER: Let me -- let me just hear how many exhibits you have concerns about.

MS. BRENNER: I have concerns also about Exhibit 5B which was compared to Figure 2.

HEARING OFFICER STUBCHAER: Don't tell me the details. Just tell me --

MS. BRENNER: Okay. 5B, 5E, 5G, 7A, 7B, and 11.

HEARING OFFICER STUBCHAER: All right. I'm going to defer ruling on those until after the cross-examination.

MS. BRENNER: Okay.

HEARING OFFICER STUBCHAER: And -- no. The first one, Exhibit 6E is pretty clear to me. If that's withdrawn and resubmitted later then I might change the

ruling, but as submitted I think it's misleading.

MS. BRENNER: Okay.

MS. MURRAY: May I ask one question?

HEARING OFFICER STUBCHAER: Ms. Murray.

MS. MURRAY: Will we be given a chance to have that redrawn and resubmitted prior to cross-examination.

HEARING OFFICER STUBCHAER: Well, we're not going to finish the cross-examination today. The next time we meet is Tuesday, but I don't know the answer to that question. Excuse me, time out.

MR. ROBERTS: We can have 6E on Tuesday.

HEARING OFFICER STUBCHAER: All right.

MR. ROBERTS: And we'll show it corrected.

HEARING OFFICER STUBCHAER: Okay. To answer Ms. Murray's question, I was going to say on cross-examination you can get into the basis, the foundation for the revised exhibit. I tried to do that partially as we went along. And on some of them I could see where it's just a rearrangement of the data.

MS. BRENNER: Right.

HEARING OFFICER STUBCHAER: Most of those that you objected to appear to me to be a rearrangement of the data. And you can cross on those and so can others. And then we will rule on their acceptance at

the close of cross-examination.

MS. BRENNER: Right. I tried to limit my objections to those -- those particular exhibits that weren't just a rearrangement. If you look closely there are times when there's new information provided in those exhibits.

And without an opportunity to take a look at those, especially with my expert witnesses to explain to me what's going on, I haven't had an ample opportunity to present -- or to provide the time to cross-examine on that information that's provided.

And the underlying problem that I have with what's CUWA done this afternoon is provided new information that we haven't had an opportunity to discuss with our expert witnesses in order to provide a basis for cross-examination.

So here you see Delta Wetlands scrambling around trying to determine, one, what's going on in these exhibits? And, two, why they're not in the same -- we don't have the same view of them as CUWA may have.

HEARING OFFICER STUBCHAER: All right.

MS. BRENNER: So I'm trying to do all these things at once while CUWA is putting on their testimony and then I'm not listening to half the testimony. And

I feel it's a very unfair advantage that's been taken.

HEARING OFFICER STUBCHAER: Is there any part of CUWA's testimony which you could feel prepared to cross-examine on without feeling prejudiced, because after -- in about 50 minutes from now we're going to be adjourned for several days and that should give you and your experts plenty of time to review the testimony.

So are there any areas that you could cross-examine on?

MS. BRENNER: We feel that there's very limited areas with regard to Mr. Buck.

Joe, you have something?

MR. NELSON: We feel --

MR. NOMELLINI: If you need a filler, Mr. Chairman, I could probably file in.

MS. BRENNER: Mr. Nomellini is always ready to help.

HEARING OFFICER STUBCHAER: You read my mind.

MS. BRENNER: We will be prepared on Tuesday to cross-examination CUWA in full. We will be prepared on Tuesday morning. The problem is what's occurred this afternoon and being able to rearrange everything and to be able to create the new questions with the new information, that's where the prejudice lies, Mr. Stubchaer.

HEARING OFFICER STUBCHAER: In my mind as I tried to state when we began -- when CUWA began its testimony there's a distinction between new information and rearrangement of the data in the record.

MS. BRENNER: That's right.

HEARING OFFICER STUBCHAER: And you're talking about new information. So I hope that you will clearly identify what you view as new information on Tuesday.

MS. BRENNER: I'll be more than happy to clearly identify what I consider to be new information.

HEARING OFFICER STUBCHAER: All right. Let's see any volunteers to pinch hit --

MR. ROBERTS: Mr. Stubchaer?

HEARING OFFICER STUBCHAER: Excuse me. Go ahead.

MR. ROBERTS: Seems Mr. Nuzum has -- we didn't submit anything new. So it seems to me we can cross-examine him.

MS. BRENNER: We'd like to do our cross-examination all at once, Mr. Stubchaer.

HEARING OFFICER STUBCHAER: And I think he's going to have to come back anyway. So if that was your motive --

MR. ROBERTS: All our witnesses will be here Tuesday.

HEARING OFFICER STUBCHAER: All right. Who volunteers to -- besides Mr. Nomellini? All right.

---oOo---

CROSS-EXAMINATION OF CALIFORNIA URBAN WATER AGENCIES

BY CENTRAL DELTA WATER AGENCY

BY DANTE NOMELLINI

MR. NOMELLINI: For the record I'm Dante John Nomellini. My particular interest here is the testimony of my friends from Met.

The first question I have is pertaining to Exhibit 6B, which was the derived from Exhibit 6. I don't know who put it -- maybe we can put it up on the screen. All right.

And I don't know which of you experts is the one best able to answer, but what caught my eye was the term "peat soil release mechanisms." And given the earlier testimony that these Delta Wetlands islands may not contain peat soil, or may not be entirely peat, are these factors -- are any of these factors totally dependent upon on whether the soil is peat or not?

DR. LOSEE: My name is Rich Losee. I can answer that question.

No, the mechanisms are not dependent on whether it's peat soils or not. Peat soils imply high organic content and it's the magnitude and it's

important in that terminology.

MR. NOMELLINI: Okay. Which of the factors are most affected by whether or not the soil is peat versus mineral soil, if any?

DR. LOSEE: I'm not sure that there would be much real difference whether the soils are peat or mineral soils. The order of magnitude -- poor choice of term. The amount of the organic matter in matter in a peat soil is substantially more than would be in a mineral soil. And that's really the point.

We could make the argument that a piece of gradience would be much greater for a peat soil than a mineral soil because the total quantity of the organic matter that would be in peat soil is so much greater than would be in a mineral soil.

MR. NOMELLINI: So the organic content of the soil would not affect any of these factors, is that what you're saying?

DR. LOSEE: No. The processes, not directly. These processes shouldn't be directly affected by the organic content of the soil.

MR. NOMELLINI: Okay. So there's another set of factors that's important on -- in terms of TOC that is not included on this exhibit. Is that what you're testimony is?

DR. LOSEE: Well --

MR. NOMELLINI: If somebody else can give me the answer.

DR. SHUM: I can add to that. K.T. Shum.

Many of these processes, for example, aquatic advection those are directly dependent on a number of factors, or characteristics of the soil type assembled and the ability and verbosity and so on.

And given the certain organic carbon content of the soil the salinity verbosity would vary. And all of these numbers would vary with the organic carbon content. Also so it's to those conditions that these processes would vary according to the soil type, but generically they are present in just about all the different sediment types except for maybe clay or say concrete.

MR. KRASNER: And I'm Stuart Krasner. I'd like to add something additional.

You're asking if any of these mechanisms might be different if it was peat or mineralized soil?

MR. NOMELLINI: Yeah. The addition of the word "peat" could be from a public relations standpoint rather than a scientifically one apparently -- but there's a difference in the organic content that is relevant here I presume.

MR. KRASNER: Let me maybe answer this way: I have some information from an article that was published in "Environmental Science and Technology." This is not in my exhibit, so if you want to stop me now this is in answer to this question --

MR. NOMELLINI: No, let me stay -- let me stay within the scope of the direct.

MR. KRASNER: Okay. But what I was briefly going to say is that the mechanisms that we show here in terms of the vegetation does not require that the soil be peat. So you're not just only looking at the release from the soil. You can have vegetation contributing, too.

MR. NOMELLINI: All right. So the bottom line would be is -- is there difference in your testimony if you knew that Bacon Island and Webb Track might be just 50 percent peat soil and 50 percent mineral soil rather than all peat?

DR. LOSEE: Rich Losee. That -- that would impact a quantitative assessment of -- of the release. The mechanisms and the importance of the mechanisms are the same, but in the full quantitative analysis, that would have an effect and that would have to be known.

MR. NOMELLINI: And you have done that. And you're simply saying it's not adequately done in the

documents presented by Delta Wetlands?

DR. LOSEE: That would be correct.

HEARING OFFICER STUBCHAER: Mr. Nomellini, just for your information, cross-examination can go outside the scope of direct.

MS. LEIDIGH: Yes.

MR. KRASNER: Can I give my answer then?

MR. NOMELLINI: Okay. All right. Let's go -- no.

With regard to the Exhibit 5B, this chart that shows Sacramento River and H.O. Banks --

MR. KRASNER: Yes.

MR. NOMELLINI: -- what's the relevance of that to this proceeding, unless any of you people have an intake on the Sacramento River?

MR. KRASNER: It was just to illustrate the "Day in the Life of TOC," that it starts off at the Sacramento River with low levels. And that as the organic carbon level increases through going through the wetlands that results -- the question that I was responding to: What was the significance of organic carbon to water utilities? And it was just showing that we do have the known source of organic carbon in the Delta that increases our ability to form trihalomethane.

MR. NOMELLINI: What difference does that make to the utilities if you do not have intake? What difference would it make that this project is in the Delta the intake for all you people starts in the Delta Slough on the south side?

So you would agree that that's -- that's of questionable relevance?

MR. KRASNER: I'm not saying that I would agree with that.

MR. NOMELLINI: All right.

HEARING OFFICER STUBCHAER: Mr. Nomellini, I have a question.

Who are members of CUWA? Are there any members north of the Delta?

MR. KRASNER: Yes.

MR. CANADAY: Sacramento.

MR. BUCK: Sacramento, East Bay MUD, and San Francisco.

MR. NOMELLINI: Next relevant question is: How are they affected by the Delta Wetlands Project?

HEARING OFFICER STUBCHAER: You said if any don't have an inlet in the Sacramento, where does Sacramento have its inlet?

MR. NOMELLINI: I think it's on the American River.

HEARING OFFICER STUBCHAER: Only --

MR. NOMELLINI: Anyway, with regard to the Met people I understand where the seasonal seasonality of the discharge of the Delta Wetlands Project would adversely impact Contra Costa Water District, but how -- how is that important to Met when your water goes through the aqueduct, goes in the reservoir system? I think most of it goes into San Luis and then you draw out of San Luis at various times for your water source.

So how does the seasonality of that affect Met?

MR. KRASNER: First of all, I'm not sure how long the water is stored in San Luis. Maybe someone else can answer.

MR. BUCK: I can do it.

MR. KRASNER: Yeah.

MR. BUCK: Unfortunately Dr. Wolfe who would have been able to answer this in detail had to leave us, but the water can move down in a pretty short period of time, less than two months in some instances. It will reside in San Luis, but it depends on the time of year and the volume of water.

HEARING OFFICER STUBCHAER: What about Castaic, and Pyramid, and Perris?

MR. BUCK: It moves into the water and then it mixes, yes.

MR. KRASNER: And I should -- let me just make a comment. That when I was preparing these information, I was not strictly only thinking of Metropolitan. I was thinking of all people who use Delta water.

So as an example we have people in Southern California that -- don't shake your head, Antelope Valley, East Kern Water Agency, which is commonly known as AVEK, they take water right off the aqueduct.

They do not take water that's been stored. They're upstream of the reservoir. So, again, I was trying to put together what was the significance to the water utilities not to the Metropolitan District, but all people who use Delta water.

MR. BUCK: To add to that, we have other members, Alameda and Santa Clara, that are much more connected to the Delta that don't have quite the benefits of --

MR. NOMELLINI: Would you agree that Met is not adversely impacted by the seasonality of this discharge?

MR. KRASNER: No, I wouldn't because in terms of Silverwood the detention time is nowhere near the

Castaic/Pyramid system. And, in fact, we have seen significant increases in both TOC and bromide coming out of Lake Silverwood.

We're done experiments in water taken out of Lake Silverwood where we have seen in the period of a month, I think, something of the order of a milligram per liter increase in total organic carbon. And that we've also seen significant increases in bromide. So it is not dampening the impacts coming out of the Delta.

MR. NOMELLINI: Have you analyzed the impacts between the Harvey O. Banks pumping plant and the particular treatment plant that you're concerned about?

MR. KRASNER: You're talking about like, for example, the plant taking water from Lake Silverwood?

MR. NOMELLINI: Well, no. It seems to me like you have a number of other reservoirs in the process plus you have an aqueduct, that if we apply all the factors that you have in 6B it would seem like the diffusion, the advection, the direct wave action, and poor water circulation, and the sediments in the aqueduct and the bioturbation, I'm sure there's animal life in the bottom of that channel, we would have a number of sources that are similar in some respects to a reservoir in the Delta in the terms of adding to the

loading of TOC.

MR. KRASNER: I totally -- Rich Losee can help me with this, but the analysis I've done I've actually taken results from H.O. Banks and done a model based upon water going in and being in there for a certain amount of storage time.

And I have seen no impact by the storage other than the fact that you're getting water coming in and mixing with water that's been there and just the impact of residence time.

The reason is that although we have alga activity in these reservoirs, we're talking about much, much larger bodies of water. And so in Lake Silverwood the amount of biomass to the volume of Lake Silverwood is a much different ratio than you would have in reservoir islands.

DR. LOSEE: A few comments, the aqueduct system is a flowing system. So we wouldn't expect to see an accumulation of organic matter in the aqueducts themselves.

I guess a point of clarification on the plumbing of the State system is there's an east branch and west branch. The east branch where Silverwood is located, the -- Silverwood is the last storage facility before the water is used by the Southern California

Water Agencies and as Stuart pointed out has kind of a very short turnover time in that reservoir. The water moves very quickly. So these processes wouldn't have -- don't have that time to act.

MR. NOMELLINI: Are you saying there's no added effect of this system of TOC?

DR. LOSEE: I don't think we've analyzed that and so we can't answer the question.

MR. NOMELLINI: So you haven't measured other points in the system to this date?

MR. KRASNER: Yes, we have taken measurements along the aqueduct. We've measured the water in and out of these reservoirs. And, again, the analysis I've done in the past have shown no discernible additional source of organic carbon.

MR. NOMELLINI: And is that in your testimony?

MR. KRASNER: No.

MR. NOMELLINI: Is it available?

MR. KRASNER: Is it available? The data is available.

MR. NOMELLINI: Could you provide that?

MR. KRASNER: Yes. In fact, I -- I actually have it on my computer.

MR. NOMELLINI: As long as you provide it to me and maybe the others would like to see it.

With regard to the tractors scooping up this algae at the one location, it's strange to me that it wouldn't have to scoop that algae up, you know, over here near San Luis, or in the aqueduct, or some other places where there's screens.

Is that -- are you saying that that is not caused by some terminal reservoir, or terminal condition?

DR. LOSEE: In fact, vegetation is a major problem in the system. At Banks pumping plant the fish screens are -- are frequently clogged by the vegetation. In that case, as I understand it, the clogging is done more by higher aquatic plants rather than this filamentous algae, but the plant material does -- does clog that screen.

I have an example in my testimony that demonstrates the enormity of the problem. And if I remember correctly, and it's in the testimony if I don't get this exactly right, but that during the three-month height of the growing season DWR is removing I believe it's a 32-yard container of plant material that they've harvested off of the fish screens at Banks per day.

MR. NOMELLINI: Is water hyacinth, a floating plant, you know, the same kind of problem for TOC as --

MR. KRASNER: Right --

MR. NOMELLINI: -- alga blooms algae?

MR. KRASNER: Yes. Post-synthetic production of organic hyacinth is also potentially an extremely large producer of organic carbon in the Delta. And there's an example for Tracy, the Federal pumping plant where they are removing enormous quantities of water hyacinth per day. And I'm trying to remember the numbers there. They're truly enormous. I believe it's 300 dump trucks per day during the height of the season when there's water hyacinth.

MR. NOMELLINI: All right. If we harvest the hyacinth, put it in a truck and haul it away is that a removal of TOC from these calculations?

MR. KRASNER: I don't -- whose calculations?

MR. NOMELLINI: The ones that are here that we're dealing with on Delta Wetlands.

MR. KRASNER: Well, it's my opinion that Delta Wetlands didn't account for that organic carbon production in their calculations. So we can't subtract --

MR. NOMELLINI: So there's no mass balance in these documents with regard to total organic carbon?

MR. KRASNER: If they had accounted for that source, if you harvested and removed it then you could

subtract it from the calculations, but that wasn't calculated for.

MR. NOMELLINI: All right. I'm not going to spend too much more time on this, but we have TOC, total organic carbon, that's available in the system.

It's in the water. We grow hyacinth plants on it. Between the discharge point of Delta Wetlands reservoir and the Harvey O. Banks intake, that plant doesn't consume total organic carbon out of the water?

MR. KRASNER: I'm sorry --

MR. NOMELLINI: Is that what you're telling me?

MR. KRASNER: Are you saying that the water hyacinth would consume organic carbon?

MR. NOMELLINI: Yes, that's my question. Does the water hyacinth --

MR. KRASNER: Oh, I'm sorry. I misunderstood you.

MR. NOMELLINI: Okay. Does it use up organic carbon?

MR. KRASNER: If the water hyacinth is producing organic carbon, it's a photosynthesizing plant. So it's taking carbon dioxide from the air and turning it into organic carbon.

MR. NOMELLINI: It doesn't take any carbon

from the water?

MR. KRASNER: The plant itself does not take a significant amount from the water, no.

MR. NOMELLINI: All right. With regard to the comparison of agricultural operations in the Delta, that proposed Delta Wetlands reservoir operation and the proposed Delta Wetlands habitat operation, I gather the testimony is clear from all the witnesses that the reservoir operation contributes an additional amount of total organic carbon versus the ag operation.

Is that correct?

DR. LOSEE: I would say from our assessment that, yes, it is likely that there will be more organic carbon entered into the system, the operation of the reservoirs versus the ag system.

MR. NOMELLINI: Now, with regard to the habitat island operation which includes shallow wetland habitat, how does that compare to the agricultural operation?

Must be -- must be a good question.

HEARING OFFICER STUBCHAER: Do you want to add, "if you know"?

DR. LOSEE: Actually, that last part would have been a good part to the question. No. We haven't assessed that.

MR. NOMELLINI: Okay. Now, one last question. In the water treatment process does filtration have any part? I see this -- we talked about adding coagulants to the water, but does filtration remove total organic carbon?

MR. KRASNER: When a -- this is Stuart Krasner. When we've done experiments, and we've published this in the scientific literature, you remove most -- virtually all of the organic carbon during the coagulation sedimentation process.

Generally, you remove a small bit more through filtration if we're talking about conventional filtration median such as anthracite coal over sand.

And, generally, in most instances the additional total organic carbon removal through those filters is just removing any flock that was formed from the coagulants reacting with the carbon that didn't adequately dissimulate.

MR. NOMELLINI: So the proper way to remove it is through this coagulation?

MR. KRASNER: Correct.

MR. NOMELLINI: Okay. That's all I have.

HEARING OFFICER STUBCHAER: Okay. Thank you for volunteering.

Anyone else want to cross-examine this

afternoon in the time remaining?

UNIDENTIFIED LADY: Mr. Stubchaer, I don't really want to put out at this time, but I would like to note that State Water Contractor League Counsel is suddenly ill. So I would like to be able to have the opportunity to cross on Tuesday if necessary.

HEARING OFFICER STUBCHAER: All right. Hope it's not serious. Yes, Ms. Crothers.

MS. CROTHERS: I have a few questions I could ask.

HEARING OFFICER STUBCHAER: Okay. Good.

---oOo---

CROSS-EXAMINATION OF CENTRAL DELTA WATER AGENCY
BY CALIFORNIA DEPARTMENT OF WATER RESOURCES
BY CATHY CROTHERS

MS. CROTHERS: My name is Cathy Crothers with the Department of Water Resources. This is a question for Mr. Krasner.

Yesterday Dr. Kavanaugh he talked about a significance criteria of 0.8 milligrams per liter. This was based on a 20 percent of the average concentration of four milligrams per liter measured at Banks in the water.

Do you believe this significant criteria is adequate to protect the public health?

MR. KRASNER: No. As I had indicated in my testimony there is a difference in, first of all, the treatment requirements whether you're above or below four milligrams per liter. So the first problem is that you are going to be in a situation where the project can result in you having a higher removal requirements.

But from a public health perspective, I think the more crucial point, which I was trying to make in Figure 5H, was that because these -- these larger amounts of organic carbon are going to come at times in which -- well, I'd actually like to take a moment to elaborate, because during direct I was trying to keep to a strict time schedule.

MS. CROTHERS: Well, we do want to leave by 5:00.

HEARING OFFICER STUBCHAER: We will.

MR. KRASNER: But I'd like to just point out that the organic carbon releases for utilities who are getting the water in the summer and fall, there are several issues that one has to look at from a treatment perspective.

As I mentioned, this is at a time that eight-tenths milligram when, one, the kinetics of the by-product formation are higher, because of the warmer

temperature, but there's also other issues. It will increase either your ozone demand, if you're using ozone, or your chlorine demands if you're using chlorine.

So that also will result in more by-product formation. So you actually have the effect twice. One, in that you're in the warmer temperature getting more by-product formation. And, two, because it's increasing your demand you're putting in more disinfectant. So all of these things.

In fact, in my testimony I provide an equation you for how I predicted the trihalomethane formation. And there are many parameters that go into this. The chlorine demand -- in fact, in my testimony I do show the difference in chlorine demand as it's related to temperature.

So all of these parameters add up to increases in by-product formation. So that release comes at a very unfortunate time in terms of it comes at a time in which all these parameters, you might say sort of conspire to increase by-product formation by increasing the kinetics of formation, increasing the demands for the disinfectant which also results in more by-product formation. So it isn't a simple averaging out over time.

Another parameter that I did not cover in my direct, but I do cover in my written testimony as part of the information collection rule, which is another regulation that the EPA came out with, utilities started last year monitoring their total organic carbon levels.

If their total organic carbon levels during this one year of monitoring is greater than four milligrams per liter, these utilities will be required to do a bench, or pilot scale study of granular activated carbon, or membrane treatment which are technologies that are more effective at removing photo-organic carbon than enhanced coagulation, but that is considerably more expensive.

One of the reasons for this requirement is -- I didn't have time to really go into detail, but when I showed you CUWA Exhibit 5C which summarized the regulation I only, because of time, showed you the Stage 1 requirement. But in Stage 2 the EPA has been looking at a potential goal of getting total organic carbon levels in finished water down to two milligrams per liter.

And so they are actually thinking in terms of the long-term solutions. And that is why CUWA has been very concerned about organic carbon levels not just

because of the short-term Stage 1 regulation, but because the long-term Stage 2 regulation that this expedited rule will just require utilities to enhance their existing treatment to remove organic carbon.

But in terms of the long-term efforts, EPA and all the stakeholders in the process have agreed that there needs to be long-term solutions to reducing the organic carbon levels before it gets chlorinated at the plant. So it is -- this .8 will significantly raise organic carbon levels such that when the water is either chlorinated, or ozonated that will result.

I also present this data in CUWA Exhibit 5, data that we did experiments where we ozonated water where the original organic carbon level is 2.9. We added eight-tenths of a milligram per liter of organic carbon, maybe serendipity we did that, and we got 3.7.

When we ozonated the water the bromate level -- when it was 2.9 milligrams of organic carbon the bromate level was 12 micrograms per liter. This eight-tenths of a milligram resulted in the bromate going up to 19 micrograms per liter. So this eight-tenths milligram of total organic carbon resulted in the bromate going up by approximately a little over 50 percent.

So this, again, keeps going to the point I

make that the higher organic carbon levels increase your disinfectant demand whether it's chlorine or ozone as they will result actually in a disproportionately higher percentage of additional by-products which is of health and regulatory concern.

MS. CROTHERS: Thank you. Well, do -- do you believe in that that Delta Wetlands proposed mitigation in this case it's monitoring and then reducing discharges from the reservoirs would be adequate to avoid impact to -- well, the impact being increased TOC levels in the Delta?

MR. KRASNER: Well, when I -- first in terms of the mitigation, their mitigation has been based on an analysis that only .8 milligrams per liter of organic carbon was significant.

And our data suggests that lower increases in organic carbon would be significant. So I can't answer whether their mitigation would be adequate if we had a lower significance factor.

MS. CROTHERS: I guess it's whether the -- the reduction of the discharges could solve the problems.

MR. KRASNER: Reducing the volume of discharge?

MS. CROTHERS: That's what I understand the results of the monitoring and finding the criteria to

be above their criteria than their response would be to not discharge, or reduce, just slow down the discharges.

MR. KRASNER: Right. Slowing down the discharges would reduce the organic carbon loading. The only concern would be what would be the basis for lower that discharge?

And if the basis was a significance factor of .8 you could still have significant discharges that would cause public health problems.

MS. CROTHERS: Thank you. This question is mostly I think for Mr. Losee. When Dr. Kavanaugh was talking yesterday about the Clear Lake sample where there were algae blooms, mostly I guess he believed it was because of the nutrients from Clear Lake. I think it was phosphates and that's not a good representation of what could be occurring here in the Delta.

Mr. Losee, would you expect that there could be the same problems such as were seen at Clear Lake since the water used for flooding the reservoir islands would carry with it nutrients from the Delta and algae?

DR. LOSEE: I think the answer is, yes. There are likely to be large -- large growths of algae in these reservoirs.

The nutrient levels in the Delta are very high

and there's every reason to expect that with those high nutrient levels and the sunlight that there will be large amounts of algae growth. It is very difficult to stop algae from growing given that you have light and nutrient.

MS. CROTHERS: Thank you. Yesterday, Mr. Krasner, Dr. Brown was testifying about the interagency group that reviewed the results of the Wetlands experiments that Delta Wetlands conducted. And Dr. Brown stated that an interagency group was -- was created to review that Wetlands experiment.

Were you a member of interagency team?

MR. KRASNER: Yes, I was.

MS. CROTHERS: Did you approve of the results of the experiment?

MR. KRASNER: No. We had many discussions with Dr. Brown. In fact, I even brought my notes from the meetings and some memorandum that I sent Dr. Brown. And we had pointed out at the time a number of problems with either the experimental plan, or the analytical methods used, or the quality control, or how the data was interpreted. And we did offer a number of suggestions and alternative interpretations.

I should point out that that group was formed -- or at least I joined that group after the

demonstration Wetlands Project had been done. So the only thing I could do was give them some retrospective values on how to evaluate that data. And to my knowledge that was not done.

But I was involved with both the soil experiments and the vegetation. And we did point out many problem areas. And, unfortunately, I have not seen any evidence that all that information was heeded.

MS. CROTHERS: Were the results peer reviewed?

MR. KRASNER: Actually, it's interesting. The only place where any of these results were peer reviewed were some of the -- in the vegetation biomass experiment and in the soil case experiment we had volunteered at Metropolitan to run some split samples in parallel with Dr. Brown.

And we did use appropriate methods with appropriate quality assurance. And we did publish some of those results in the "Journal of the American Water Works Association" in -- it was publish in June of '94. And that is -- and it's a peer-review journal. So those results that we did run on the parallel samples were published in the peer-review literature.

MS. CROTHERS: Thank you. Mr. Losee, can you explain to me what are nitrifying, or nitrogen fixing organisms and how such organisms can contribute to the

TOC in the shallow and deep wetlands even when nutrients are not -- nutrients are low in the waters?

DR. LOSEE: Well, I presume that when you say nutrients are low, you are referring specifically to nitrogen.

In -- where plants are concerned, growth of plants in aquatic systems there are probably two macro nutrients which can be living and phosphorous and supply nitrogen, and blue green algae.

A group of algae some of these algae have evolved an mechanism where they can fix nitrogen from the atmosphere to form combined nitrogen which they can use to supplement the nitrogen value of in the environment.

So where if you have very high levels of phosphorous you may start to deplete the amount of nitrogen, combined nitrogen, that's ammonia and nitrate in the system. These blue green algae are able to be successful -- be successful meaning that they are able to grow, because they're able to provide their own nitrogen by fixing it -- or taking it out of the atmosphere and creating the combined nitrogen form.

MS. CROTHERS: This is for Dr. Shum. Do you think that in terms of the reservoir operations if the Delta Wetlands had to discharge their -- their -- their

water at the maximum discharge rate which may be 4,000 csf say in an emergency such as they had to fix the PG&E gasoline, or they had to stop the seepage in adjacent islands, would that cause a water quality impact of TOC in the -- in the -- in the -- in the adjacent channels if the discharge were to exceed the ambient concentrations?

DR. SHUM: That depends on a large number of different factors. You'd have to go back to among them what are the project problems, a pump? And at what rate? And what's the inflows from the Sacramento and San Joaquin River?

All factors being equal, I do believe that there will be an increase if we increase the discharge rate.

MS. CROTHERS: Do you know what the channel flows in the -- along the Old River are and near Bacon Island during the summer?

DR. SHUM: The tidal oscillation, the tidal flow has a magnitude of I believe around 10 to 15,000 csf according to which part of the tide cycle it is.

MS. CROTHERS: Okay. Well, if -- so if Delta Wetlands were to discharge up to 3,000 or 4,000 csf, do you think there's sufficient dilution in that channel

so that you do not notice any significant increase in the TOC?

DR. SHUM: I did not say.

MS. CROTHERS: I know. I was just wondering how that was -- if there is an ability for the channel to --

DR. SHUM: If you just look at the -- yes, there are two considerations. One is the amount, or the measure of the tidal flow. The other one is the net flow.

The first one, the tidal flow, the amplitude, it's the shock, the duration of the discharge. You can imagine that all the discharge would go into the -- just into a different body of water as the tidal flow goes across the point of discharge.

And if it's a prolonged discharge the inflow in the channel would be a major criteria. Also, because the tidal flow would bring it back and forth. If there's no inflow you can imagine the discharge would be to the same body of water over a prolonged period of time. So the dilution would depend on the number of factors.

MS. CROTHERS: Such as the tidal sequence?

DR. SHUM: Duration, tidal flow, inflow in the river and all these are functions of the Delta flows.

MS. CROTHERS: Okay. Thank you. That's all the questions I have.

HEARING OFFICER STUBCHAER: Thank you.

---oOo---

CROSS-EXAMINATION OF CALIFORNIA URBAN WATER AGENCIES

BY BOARD MEMBERS

HEARING OFFICER STUBCHAER: Mr. Del Piero had a question that he left with me and I'll ask within the minutes remaining.

Mr. Krasner, did you say that the temperature effect of the Delta Wetlands discharges would be significant in the Metropolitan service area?

MR. KRASNER: No. What I said was that for people who would be receiving water in the summer, or fall during the reservoir releases and had the extra organic carbon loading from the releases, if the water temperature was warmer at that time that would result in higher by-product formation. And so --

HEARING OFFICER STUBCHAER: So you did not attribute the temperature increase to Delta Wetlands?

MR. KRASNER: No. No. No. I'm sorry.

HEARING OFFICER STUBCHAER: That's all right.

MR. KRASNER: The timing of the releasing is when the water is naturally warmer.

HEARING OFFICER STUBCHAER: Okay. I had a

question of my own. I think I may have gotten a partial answer just listening to the testimony. "Bioturbation" that's a new word for me.

I heard every way to benthic organisms I believe, and is that where the little critters in the mud are stirring things up and they're causing carbon to be released, or is it something else?

DR. LOSEE: That's correct. The organisms in the bottom can do that directly, directly move soil particles from the soil, sediment particles from the sediment into the water column, or they can -- some of these organisms pump -- pump -- actually, move water. And that would also be a component of this.

HEARING OFFICER STUBCHAER: Okay. Mr. Brown, do you have any questions before we recess?

MEMBER BROWN: No, sir.

HEARING OFFICER STUBCHAER: Are there any questions on procedure before we recess?

Yes, Mr. Maddow.

MR. MADDOW: On Tuesday we'd lead off with Delta Wetlands's cross-examination of these witnesses; is that correct?

HEARING OFFICER STUBCHAER: That's the plan.

MR. MADDOW: Okay. Just trying to think when other direct cases will be coming up.

HEARING OFFICER STUBCHAER: Well, the order you have already.

MR. MADDOW: Yes.

HEARING OFFICER STUBCHAER: And we'll follow that. And I can't predict how long cross-examination will take.

MR. MADDOW: Thank you. I appreciate that.

HEARING OFFICER STUBCHAER: Staff have any announcements or questions? Mr. Sutton.

MR. SUTTON: Just a quick question. CUWA Exhibit 5 has two figures unlabeled inserted between Figures 3 and 4. Are those suppose to be part of your exhibit?

MR. KRASNER: Between?

MR. SUTTON: Between Figures 3 and 4.

MR. KRASNER: Yes. Let me briefly explain. Those are also in CUWA Exhibit Number 10 and were part of our comments on the Draft Environmental Impact Report.

And when I refer to these in the text rather than referring to them as one of the new exhibit that was created for exhibit -- CUWA Exhibit 5, I just refer to them as these original figures that had been part of our comments on the Draft Environmental Impact Report.

MR. SUTTON: So you don't need them labeled in

this text then?

MR. KRASNER: Well --

MR. SUTTON: They're already referred to in the other exhibit in the text.

MR. KRASNER: Yes. And I refer to the first one --

MR. SUTTON: Okay.

MR. KRASNER: -- as DWR Figure 16, because it was not a CUWA figure. It was a figure derived from the Department of Water Resources. That's an example of how that one was so labeled.

MR. SUTTON: They're both identified in Exhibit 10?

MR. KRASNER: Right.

MR. SUTTON: Okay. Thank you.

HEARING OFFICER STUBCHAER: Anything else? All right. We're in recess until 9:00 a.m. Tuesday July 22nd. Off the record.

(The proceedings concluded at 4:58 p.m.)

---oOo---

REPORTER'S_CERTIFICATE

STATE OF CALIFORNIA)
) ss.
COUNTY OF SACRAMENTO)

I, MARY R. GALLAGHER, certify that I was the 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 774 through 1052 herein constitute a complete, true and correct record of the proceedings:

IN WITNESS WHEREOF, I have subscribed this certificate at Sacramento, California, on this 27th day of July, 1997.

MARY R. GALLAGHER, CSR #10749