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NUCLEAR REGULATORY COMMISSION

IN THE MATTER OF:

PUGET SOUND POWER & LIGHT COMPANY
ET AL.

Skegit Nuclear Power Project
Units 1 and 2)

Docket Nos. 50-522/50-523

Place - Seattle, Washington

Date - Tuesday 31 July 1979

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the matter of:	
PUGET SOUND POWER & LIGHT COMPANY, et al.	Docket Nos. 50-522 50-523
(Skagit Nuclear Power Project Units 1 and 2)	

New Federal Building
Courtroom 3086
915 Second Avenue
Seattle, Washington

Tuesday, 31July 1979

The hearing in the above-entitled matter was reconvened, pursuant to adjournment, at 9:00 a.m.

BEFORE:

VALENTINE B. DEALE, Esq., Chairman
Atomic Safety and Licensing Board

GUSTAVE A. LINENBERGER, Member

DR. FRANK F. HOOPER, Member

APPEARANCES:

On behalf of the Applicants:

P. THEODORE THOMSEN, Esq., DOUGLAS S. LITTLE, Esq., Perkins, Coie, Stone, Olsen & Williams, Seattle, Washington; and MICHAEL BAUSER, Esq., Lowenstein, Newman, Reis, Axelrad & Toll, Washington, D.C.
and DOUGLAS P. BEIGHLE

On behalf of the Regulatory Staff:

RICHARD L. BLACK, Esq., DANIEL T. SWANSON, Esq., Nuclear Regulatory Commission, Washington, D.C.

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APPEARANCES: (Continued)

On behalf of the Skagitonians Concerned about Nuclear Plants, Intervenors:

ROGER M. LEED, Esq., 411 Fourth Avenue, Seattle, Washington

On behalf of Forelaws on Board and the Coalition for Safe Power:

ERIC STACHON, Portland, Oregon

On behalf of Skagit County:

THOMAS MOSER, Esq., Deputy Prosecuting Attorney for Skagit County

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C O N T E N T S

Witness	Direct	Cross	Redirect	Recross	Board
F.C.Mikels	14,250	14,278	--	--	14,304
D.H.Knight	14,325	14,332	14,382	--	14,383

Exhibit No.		Iden.	Rec'd.
Appl. 200			14,176
Appl. 203 - 207			14,177
SCANP 208	Darland Supplemental Testimony	14,181	
Appl. 209	4 sketches of Ranney Collectors	14,267	14,324
Appl. 210	sketch, cross-section Ranney Collector	14,272	14,324
Appl. 211	WSCC Figure 6	14,330	14,387
Appl. 212	WSCC Resources Planned	14,330	14,38[illegible]

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P R O C E E D I N G S

CHAIRMAN DEALE: Please come to order.

This morning the chairman learned from the NRC offices in Washington, D. C. that the Appeal Board had made a decision on FOB-CSP's motion to require disqualification of board chairman.

And the bottom line of the Appeal Board's action on the motion is that it is denied. I assume that all the parties will receive copies of th eal boa d's decision in due course.

At the end of the last session yesterday, we were proceeding with the -- with the exhibits,making sure that the exhibits which have been and which are being introduced have the right numbers.

There is certain material that we have not covered, and Mr. Thomsen wishes to start the ball rolling so that we can handle this essential matter.

MR. THOMSEN: I think the only -- the first pending item, perhaps, is Exhibit 200. I was to ask Mr. Leed whether he had any objections to Exhibit 200. That's table A of January of this year.

That's the Puget forecast of loads and resources of January 1979. It was marked during the cross examination of --

MR. LEED: That's the same as --

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MR. THOMSEN: -- Mr.Carstens, that's based on --

MR. LEED: That's the same as West Group.

MR. THOMSEN: Same numbers as are incorporated or reflected in West Group, Puget's numbers.

MR. LEED: This is table A of what document?

MR. THOMSEN: It's table A of a series A through H or I or J or K or something like that, distributed to the board and all parties in a letter of January 25, 1979.

We'd previously put in table E from that series, and now this is table A. It was used in cross examining Mr. Carstens yesterday.

MR. LEED: No objection.

MR. THOMSEN: Excuse me, that's my copy. I think you've got one. You can borrow it again if you want to.

CHAIRMAN DEALE: What is the exhibit number?

MR. THOMSEN: 200.

CHAIRMAN DEALE: The document has been received into evidence as Exhibit 200.

(The document previously marked as Applicant's Exhibit 200, was received into evidence.)

MR. THOMSEN: I had in that connection also asked the assemblage whether they wanted tables B, C, D -- but at that point, some colloquy developed - and I don't want to push it. I don't really care whether we have those

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additional tables.

CHAIRMAN DEALE: All right.

MR. THOMSEN: So then I think we pass to Exhibits 203, 204, 205, 206, and 207; those are the documents relating to the Wild and Scenic Rivers Act, and I believe they were admitted subject to a motion to disagree or something by Mr. Leed, I believe. But I'm not sure how they were left in the record.

CHAIRMAN DEALE: I think it was left in the record like this: that Mr. Gendler felt that he should pass or object to the proposed exhibits on Wild and Scenic -- the Wild and Scenic law, but he wanted to give Mr. Leed the chance to go over your proposed Exhibits.

MR. THOMSEN: So I wonder whether he's done that.

MR. LEED: We will not make any objection, Mr. Chairman.

CHAIRMAN DEALE: We have already -- or had we -- yes, we had already given Exhibit numbers to the Wild and Scenic Exhibits of the Applicant, and hearing no objections, those Exhibits, Exhibits 203 through 207 are received into evidence.

(The documents previously marked Applicants Exhibits 203 - 207 were received into evidence.)

MR. THOMSEN: Then I would just like to verify --

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I believe that Exhibits 201 and 202, the two Western Systems documents, were admitted last night subject to something from Mr. Leed when he had a chance to look at them, I think .

CHAIRMAN DEALE: These were the exhibits that last night were admitted. In other words, I think it was contingent on any second look-see.

It was on the basis that Mr. Gendler accepted the word that these exhibits had been stipulated inasmuch as -- inasmuch as they included exhibits which had already been introduced.

MR. THOMSEN: I think that concludes our business on exhibits, as far as I know.

CHAIRMAN DEALE: As I understand it, we had on our agenda testimony scheduled today by Mr. Darland, and we'd like to raise the question of are we in the right -- are we dealing with the right subject here?

We have Mr. Darland's testimony that is outstanding. It relates to evacuation planning, and we thought that that subject of evacuation planning and emergency planning was to be put off until the August session.

If this is a wrong impression, why I'd certainly welcome hearing -- but as I -- it's our understanding that the matter was to be put off until then.

MR. THOMSEN: You are correct. That subject in general was deferred, but we thought if there was time

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and the intervenor wanted to offer Darland's testimony, it seemed to us there would be time and he could.

And we had no objection to it, but I don't see him in the room anyway.

CHAIRMAN DEALE: It was Mr. Darland's testimony on alternative sites.

MR. THOMSEN: No, that's been given. It was evacuation planning, admittedly an August subject. But I thought the intervenor wanted to do it this session, and we had no objection to that.

CHAIRMAN DEALE: I see. Fine.

Mr. Leed, what is your --

MR. LEED: The matter relating to witness Darland is the supplemental testimony concerning alternative site selection criteria that we distributed that's dated July 26, 1979, and which we never had the opportunity to offer. And we would like to have that testimony put in the record, and we'll summon witness Darland to put it in the record if the board will receive it.

MR. LINENBERGER: What about the evacuation planning testimony of Mr. Darland?

MR. LEED: It is my understanding we were supposed to defer that.

CHAIRMAN DEALE: Oh, I see. So you're directing your comment about Mr. Darland's testimony, which had not

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yet been offered into the record --

MR. BLACK: Mr. Chairman --

CHAIRMAN DEALE: -- concerning alternative site selectio criteria, and -- go ahead, Mr. Black.

MR. BLACK: I am totally confused now and a little bit disturbed because the supplemental testimony of Michael Darland, dealing with alternative site selection criteria, has basically been brought into the record over my objection on supplemental direct examination.

I asked Mr. Leed to put in the supplemental testimony at hat time, and it seemed like -- well, it seemed like most of the information concerning the "fatal flaw approach," whatever it was -- I think that's the name of it -- it was discussed at length.

So now I find it a little bit confusing and disturbing to find out we're going to come over to the subject matter once again.

I see really no nee(for it, and I'm -- I really thought that Mr. Darland was going to be brought back for the evacuation planning testimony.

So I am totally confused now.

MR. THOMSEN: And certainly it isn't my recollection that there was any lack of opportunity to introduce this. He was invited to introduce it. He didn't. He chose not to the other day when Mr. Darland was here on

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alternative sites.

Instead he covered it in the questioning. So it's much too late for that one, it seems to me.

(Board conferring.)

CHAIRMAN DEALE: All right, the board rules that the testimony will be rejected as being untimely submitted.

MR. LEED: Okay. Can we --

CHAIRMAN DEALE: Mr. Leed, do you care to offer this as proof in this?

MR. LEED: Yes, I guess we should make this Exhibit 208. Is that the next number?

CHAIRMAN DEALE: Is that the next number?

MR. THOMSEN: Yes.

CHAIRMAN DEALE: The board recalls much of this testimony was used in Mr. Darland's examination of the applicant -- staff's witness.

Exhibit 208 will be the supplemental testimony of Michael Darland concerning alternative site selection criteria dated July 26, 1979, and was received by the board on July 26, 1979.

The exhibit is an offer of proof.

(The above-mentioned document was marked Intervenor SCANP's Exhibit 208 for identification.)

CHAIRMAN DEALE: Now, the next item that we have on

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the agenda is an item that we wanted to make sure was emply covered, and that is the planning for the next hearing session to begin the last Monday of August in this building and in this room at 9:00 o'clock.

The board order to that effect will be issued next week.

Now, the purpose of that hearing session will be hopefully to cover testimony on all subjects, other than the subject of geology and seismology.

To make an orderly proceeding, we'd like to identify what will -- what testimony will be coming up at that hearing session. This will of course identify the subject matters which the testimony will be related to.

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I think there is a point of departure. We refer you to the Board's order identifying the subject matters for this hearing session.

I believe the order is dated June 5.

MR. THOMSEN: June 5?

CHAIRMAN DEALE: June 29, sorry.

We can go to page 2 under the general heading of environmental matters.

There is nothing further on A, that has to do with environmental impact statements; nothing further on B. Now let's see, is there anything on C. There is nothing further on C-1, C-2. C-3, we have the reference that SCANP may file a motion to reopen aquatic impacts.

To date the board has not received that motion. The motion is still under consideration by SCANP?

MR. LEED: Yes, Mr. Chairman.

We do not have the evidence in hand, but we anticipate it will be available from studies being conducted. I don't know, frankly when -- I can't say for certain we will have ever, and if we do have, I can't say when. So that is all I can say.

CHAIRMAN DEALE: So we will just let the matter rest there.

MR. LEED: If and when we get it, we will make the appropriate motion no matter what stage the proceedings

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are at. Maybe the operating license will have been granted, but we will make it when we have it.

CHAIRMAN DEALE: Let's see. My colleague here reminds me that under Item B, impact of construction, we have not gone over the testimony on that subject as yet; reactor pressure vessel delivery.

DR. HOOPER: Mr. Black, weren't you going to try to get -- the material from your witness on this has been stipulated into the record, I think. I think that is the status of it right now, it has been stipulated into the record and that's all that is required since it was a Board-directed inquiry.

MR. BLACK: That's correct. We don't plan to do anything further on that subject matter.

MR. THOMSEN: Neither does Applicant.

CHAIRMAN DEALE: I see.

MR. THOMSEN: We consider the matter closed.

CHAIRMAN DEALE: All right.

Now we go down to this Impact of Operations of Ranney Collector System.

If we do not finish that subject today that certainly will be carried over. But I suspect -- Mr. Thomsen, what is your disposition with respect to your witnesses?

We have several witnesses that are identified from the Applicant, and I guess a query is, where does the

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Ranney Collector system witness fit in?

MR. THOMSEN: He is here and we are ready to go at any moment with him; Mr. Mikels, and it will be just Mr. Mikels. I mentioned Mr. Anderson before, but we have scratched him.

In other words, we are presenting only Mr. Mikels as a rebuttal witness, and that would close that subject.

I am troubled by this RPV and I wouldn't want to leave the suggestion in the record that that is still open and fair game for the Intervenors. That is closed.

Remember, the Intervenors had an opportunity, they filed testimony and it was rejected. And it should be very clear that that is not an open subject for the August hearing or any other hearing.

CHAIRMAN DEALE: We were checking out. It says prefiled testimony responding to Staff by July 10. And we understand that the Staff had made their presentation and you had made yours.

We understand that SCANP had presented testimony and it had been rejected, and that SCANP had made an offer of proof.

This is correct. That is the status of that.

Again, we were not seeking further testimony. We were just trying to identify where we stood on the matter.

All right.

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Now the next one is impacts of operation. This has to do with the radiological releases. Now here we have the notation of no evidence contemplated. I assume that means no further evidence contemplated.

However, SCANP may file a motion re: the Class IX accident, and I think that that motion had been filed, had been ruled upon.

Then we have the impacts of operation, items 6, C-6 socioeconomic and others, and other impacts. This subject is transferred to H.

Then we have D, is effect of postulated accidents. No evidence contemplated. Subject relates to SCANP's position on Class IX accidents.

Now here is one which we certainly have been spending our time on during this hearing session. TThis is alternative sites. And at this time, as we understand it, we have heard the evidence. Again certain testimony by SCANP has been rejected and an offer of proof has been made with regard to that testimony.

MR.THOMSEN: Mr. Chairman, on that one we do have Mr. Knight to rebut this afternoon on alternative sites.

CHAIRMAN DEALE: All right. David Knight and Mr.Mikels on Ranney.

MR. THOMSEN: Yes. Those are our only two witnesses today, Mikels and Knight.

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CHAIRMAN DEALE: Now, on alternative energy sources, we have had testimony on that.

The need for power, SCANP still has a motion pending before the Board.

The cost-benefit analysis. Where do we stand on that?

MR.THOMSEN: I'm a little puzzled. Are we trying to identify August subjects here?

CHAIRMAN DEALE: Yes. The thought here is to identify the August subjects, and also to identify the subjects which we have in mind we would be requesting proposed findings on. And we are just running through, as I say, the laundry list of subjects.

MR. THOMSEN: Right.

Well, you missed one there, because on alternative energy sources, it is my understanding the Staff is coming with Dr. Gotchy in the August session.

CHAIRMAN DEALE: Right. This is correct. This is exactly what we had in mind, Mr. Gotchy for August.

MR. STACHON: In that regard, Mr. Chairman, I am wondering if Dr. Gotchy will be addressing the radon issue in August. We are still waiting determination with regards to the Perkins record.

CHAIRMAN DEALE: Yes. Mr. Black, could you respond.

MR. BLACK: I think the last information I had

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from the Staff is that we were going to attempt to address the radon issue. We are not going to wait around for the appeal board decision in the Starling docket, nor are we going to wait for an interim rule by the Commission.

We are going to try to address all concerns in this proceeding either in the August session, or if we can't make it perhaps the October or later session. But that subject matter will have to be addressed by testimony.

CHAIRMAN DEALE: Well, from our standpoint, if the Staff is going to make an independent presentation on the radon issue, we would really request that it be done in the August session.

Is this within, let us say, your powers to get your witnesses lined up and so forth? Having this in the geological-seismological session, I think, would extend that session too much.

MR. BLACK: We are going to try to do it in August.

The problem was I think we just sat back too long thinking that these other proceedings and the Commission would take care of the radon for us in the interim.

Well, as you know, SCANP has filed certain contentions on the validity of the Perkins docket to address

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these radon concerns.

We have given some thought to requesting discovery of SCANP and trying to find out exactly what their concerns were. But time seems to have eluded us now, and we are trying to get some testimony up to address what we presume to be the concerns. And hopefully, that will all be done by August. But it is going to be very, very tight for us because the problem is that certain of the witnesses who had addressed these issues before have now left the Staff. So it is a problem of getting people to replace them.

That is the main problem. But we are going to try to do it in August, if we possibly can.

CHAIRMAN DEALE: Resolution of the problem by the Appeal Board or the Commission looks too speculative.

MR. BLACK: It looks too speculative at this point. In the timeframe that we are considering for the Skagit proceeding, it is very speculative whether a final decision will be rendered by that time.

CHAIRMAN DEALE: All right.

So Mr. Gotchy in any event will be in August.

And, in response to Mr. Stachon, I think you have heard the response of the staff.

MR. STACHON: Yes.

CHAIRMAN DEALE: And this is radon. We are going to schedule for August, and we recognize that we may

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have other problems.

MR. BLACK: Mr. Chairman, one more response regarding the radon issue is, I think we have all kind of let this area slip by us because as you recall, the Staff filed a motion -- well, you may not recall because you were not working on the case at that time -- but we filed a motion to incorporate the Perkins record into this record by reference.

The Staff feels that the Perkins record in the testimony and the evidence elicited in that proceeding is sufficient to address the radon concern, and we still feel that today. We feel that the Perkins record is adequate.

However, SCANP filed response to that motion indicating that they had some concerns with adoption of the Perkins record in this proceeding, and that motion has never been ruled on by the Board. So that is why we were kind of left hanging for a long time, because the Board never really took a position whether the Perkins record was adequate or not.

And I guess that we would only indicate that we feel that the Perkins record is still adequate, but we still -- in other proceedings we have recognized that the Intervenors -- say for instance in Sterling, where they brought up the concerns that were largely adopted by SCANP, we did recognize that the intervenors in those proceedings

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did have some points that perhaps were not raised and that they should be raised. And the Staff has done that by way of evidence. But those legal battles are still going on before the Appeal Board as to the sufficiency of that record.

CHAIRMAN DEALE: How long, Mr. Black, have they been going on before the Appeal Board, just to orient me?

MR. BLACK: I would say since -- it's been about a year, I believe. Almost a year. Maybe since early winter, '79.

MR. LINENBERGER: It is longer than that, Mr. Black, because I have certain recall here that bring it back, the beginnings of it to the fall of '78.

No, earlier than the fall of '78.

MR. BLACK: I could be missing a year here. It could be that it is almost --

MR. LINENBERGER: It has been more like a year and a half, the fall of '77, by golly, because going back to the Jordan memorandum to the Commission relative to an error in Table S-3, and that started this whole thing.

But with respect to your comments about the two motions before this Board, they were in no way overlooked or the result of any footdragging. It was the Appeal Board proclamation on how such cases should be handled, and Skagit was included, thatreally caused a setting aside of those

mm10 1 motions. They certainly were not ignored by this board.
2 MR. BLACK: I think that is correct, that we
3 have all been kind of lulled by the Appeal Board's action
4 regarding this issue.
5 I think we all expected that those problems would
6 be taken care of by this time, but they have not, and so we
7 are going to have to figure out how to resolve those.
8 CHAIRMAN DEALE: Your point though is that there
9 is a motion before this Board on the radon issue?
10 MR. BLACK: That's correct.
11 CHAIRMAN DEALE: And the matter, let us say, has
12 been treated in a relaxed manner in light of expectations
13 from either the Appeal Board or the Commission. And in
14 light of --
15 MR. LINENBERGER: It was instructions from the
16 Appeal Board, actually.
17 CHAIRMAN DEALE: Instructions from the Appeal
18 Board.
19 MR. LINENBERGER: Which instructions, incidentally,
20 we are going to have to take a look at in the context of
21 your proposals, to not wait for that disposition by the
22 Appeal Board.
23 MR. BLACK: Right.
24 In the same vein too, it is my understanding that
25 SCANP wanted to raise some concerns that were outside the

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concerns raised by the Sterling intervenors as well. And also that they had indicated at that time that they were going to come forward with witnesses to deal with these concerns.

So I guess that I just wouldn't want them to be lulled, too. If they think they are going to put on a direct case insofar as the radon issues are concerned, they should start working on that immediately.

CHAIRMAN DEALE: Your disposition though is to recommend that we address ourselves to your pending motions about the radon issue?

MR.BLACK: I think that is probably the first order of business, at least insofar as the Staff is concerned. We are going to be going forward and we have been going forward to litigate these concerns in these proceedings. And it is going to be rough to try to get it in the timeframe that we are thinking about here, but hopefully we can do it.

MR. LINENBERGER: Mr. Black, one little problem that has come up. ALAB sort of took the heat off, but the Perkins record that was transmitted to this Board was defective. It was a reprinting of the trascript, and much of that record is missing every other page.

So would youplease, as a request from this Board, make a note to get for this Board a full copyof the Perkins

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record, because ours is fatally flawed, with only every other page.

CHAIRMAN DEALE: Mr. Leed, would you want to make any comments on the subject of radon?

MR. LEED: Well, I am not entirely clear what the Staff is proposing, but I do have in mind the fcfact that this August hearing session is three weeks from now, so I would appreciate having the matter clarified as soon as possible.

CHAIRMAN DEALE: Well, I take it that your communications with Mr. Leed are adequate for the purpose of keeping Mr. Leed informed about developments.

We will, too.

Our inclination, and I must say I am not familiar with this pending motion which you have put before the Board which has been, let us say, set aside for the time being. We will look that over, and depending how we come out of it, why we will get out some sort of an announcement or order as the case might be.

MR. BLACK: Another thing that we have thought of, and this is only because we don't know really right now the extent and the detail of SCANP's concern regarding the radon issue. But one thing we have thought of is to make Dr. Gotchy available while here is here discussing coal-nuclear, which does also get into radon issues, that we would make him available for examination by SCANP concerning their issues regarding radon.

And Dr. Gotchy is more than qualified and more than willing to make himself available for that type of examination.

I think that that might suffice, but there again I'm just not certain. It would depend on -- I'm not certain of the extent and the detail of SCANP's concern regarding the radon issue.

If their concerns are somewhat of the generic concerns that have cropped up before, then I think that Dr. Gotchy can handle it. However if there are new concerns that have not been seen by the Staff, we obviously would like to see those concerns to be able to address them.

CHAIRMAN DEALE: Truely, Mr. Black, is this not the kind of question which ought to be able to be answered by some conversation between you and Mr. Leed as to the extent of SCANP's interest in the subject?

MR. THOMSEN: Mr. Chairman, just sitting here

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listening to this, I'm concerned about the sort of nebulous floating definition of "concerns", for one thing. Based on experience, I'm a little pessimistic about the concerns getting timely and adequately identified unless we establish a little more rigorous schedule and procedure than conversations.

But I really shouldn't be injecting myself into Mr. Black's thing here. I mean, for example, maybe Mr. Leed can specify the concerns right here and now on the record, and that's done with. And if that's not true, maybe he could send us a piece of paper by Monday next or something, and do that.

I don't know what Mr. Black would desire on this. But I hate to see this go undefined for very much longer, if the definition is needed. I'm a little rusty on the pending motions and the appeal board instructions and all that myself. So I can't get into that discussion.

CHAIRMAN DEALE: Mr. Leed, it seems that it might be helpful to get the matter resolved if you could set down in a letter to the Board or to the parties, however, what is SCANP's concern about this radon issue.

Does that seem to be a fair approach from your standpoint?

MR. LEED: We'll be glad to do that, Mr. Chairman.

CHAIRMAN DEALE: That would be helpful. I would

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hope so.

And in terms of, again, if you like -- I'm a housekeeper up here more than anything -- could you get out a letter, say, next week?

MR. LEED: Yes.

CHAIRMAN DEALE: Fine.

MR. STACHON: Mr. Chairman?

CHAIRMAN DEALE: Yes, Mr. Stachon.

MR. STACHON: Since I brought the whole thing up, I think maybe I have a couple of things to point out.

One is a little footnote:

We also filed a response to the Staff's motion, and we also have certain concerns. And I guess the best way to handle that is for us to also send a letter.

CHAIRMAN DEALE: Well, that would be very good. I appreciate your bringing it up.

And, believe me, the fact that you weren't called upon does not indicate, you know, any lack of interest. But that would be excellent, because the idea is to meet the issues and get whatever evidence is on the subject, and enable us to make an intelligent resolution.

Admittedly we have been, let us say, all of us have been disappointed that the matter had not been resolved by somebody else. But it hasn't, and so now we're faced with the problem of trying to resolve the matter.

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All right. I think that should at least be -- that is a step in the right direction.

All right. Now on the need for power.

We are aware that there is this motion pending. And we will address ourselves to that motion.

On cost-benefit analysis, have we heard from the parties on this subject? We have a prefiling and we've heard some testimony, I believe, on cost-benefit analysis. But I welcome hearing from the parties on this subject.

MR. THOMSEN: We have nothing further to offer, Mr. Chairman.

CHAIRMAN DEALE: Mr. Stachon, Mr. Leed, on this subject?

We understood that there isn't anything further to offer, but I just, you know, would like to verify it.

Now on this Federal Water Pollution Control Act, we have anticipated no evidence. But SCANP has a possible motion on aquatic effects. I believe this is a subject that we have referred to previously, and it's a subject which Mr. Leed had previously made a comment or two on.

Is this still applicable?

MR. LEED: Yes.

The Board should be aware of the fact that the legality of this permit is being contested in court.

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CHAIRMAN DEALE: I see.

MR. LEED: And there might or might not be a ruling on that subject. And it might or might not invalidate the permit.

CHAIRMAN DEALE: Purely by way of orientation, could you give us any details on the --

MR. LEED: It all depends on when Mr. Thomsen is going to get his brief in.

MR. THOMSEN: September 14th, as we agreed.

CHAIRMAN DEALE: I see.

MR. THOMSEN: It's pending argument before the State Supreme Court now and probably won't be resolved until next spring.

Would that be your guess on the schedule, Roger, something like that?

CHAIRMAN DEALE: At any rate the matter is before another court, and this is something that we don't do anything about.

Well, thank you for the information, Mr. Leed. We were not aware of that fact.

The next item is the Wild and Scenic Rivers Act. We have no evidence there, and we don't anticipate any further evidence.

Now we go down to geography and demography. And the general subject matter has been approached with some

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of the testimony that we have heard. We don't anticipate any other testimony on that subject.

Now we come to an item that has been a subject of controversy, and hopefully the matter has been resolved. This has to do with the nearby industrial military and transportation matters. And we have the note here that this issue regarding evidence on military aviation left for SCANP and NRC Staff to resolve.

Is that a fair statement?

MR. BLACK: Yes. We indicated on the record that we would, if we could, supply additional information regarding the activities at Whidbey Island Naval Air Station.

CHAIRMAN DEALE: Right.

Then we have the premier issue -- it would appear anyway -- and that is the issue of geology and seismology. And presently we're awaiting the Staff to develop its testimony on the subject. And we understand that the Staff is looking to the United States Geological Survey for guidance, assistance, what have you.

Mr. Black, could you give us any orientation as to when some progress in this area might be expected?

MR. BLACK: Yes.

I think I indicated to you and to the parties as well that the UNited States Geological Survey has committed to the NRC Staff to get what they call a geology survey

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letter into the Staff regarding the Skagit site by September 1.

The Staff still has to review that letter, but we are on an expedited review schedule with that letter. And we would hope that the Staff's position would come forth within a couple of weeks after that letter.

We of course are working with the Survey continually throughout this period and hopefully any differences of opinion between the Geological Survey and the NRC Staff will be identified early, and we will be able to address them or resolve them.

In any event, we are still hopeful that we can get into hearing by let's say the second week in October regarding these issues, and I'm hoping that we can set aside at least two weeks for geology and seismology beginning on or around the second week in October.

CHAIRMAN DEALE: In connection with the Board's interest in the subject, Mr. Linenberger has some words to identify interests which the Board has in the subject.

This does not mean that we're trying to spell out all of the interests that you should cover, but we would like to make sure that at least these points are taken care of in your testimony.

MR. LINENBERGER: Let me just read to you a distillation of the Board's thoughts here, and I think Dr. Hooper may have some amplification of these in two areas.

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First, the Board is aware that there seems to be currently at least two methods for deriving horizontal g values from Richter magnitudes. These have been referred to in previous testimony as correlations of Schnable and Seed and also of Trifunac and Brady.

The Board requests the Staff to advise us what the Staff considers to be the pros and cons of each of these so called correlations, and the basis for the Staff's choice and rejection of each of these methods.

We request the Staff to include in those comments site specific considerations as to why one method of arriving at g values is preferable to the other for the Skagit site.

In the second area, we touch on something that has been touched on before. I would summarize it this way:

The Board requests the Staff summarize the extent and depth, summarize the extent and depth of the Staff's construction permit review of the Applicant's proposed aseismic facility design in the context of the safe shutdown earthquake g value accepted for the proposed site by the Staff, including the basis for belief by the Staff that there is any conservatism in the Applicant's proposed design.

That's it.

CHAIRMAN DEALE: Dr. Hooper?

DR. HOOPER: Well, I think Mr. Linenberger has summarized most of my concerns. But I think there is one

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point that I would like to add, and that is that at least this Board member feels that the Board should err on the side of safety in citing the site suitability issue. And that in this regard it's very important to get some sort of a confidence bound for both of these two areas, meaning that there are some very serious questions remaining, not only as to the magnitude of the safe shutdown earthquake, but its implications regarding design criteria at the site and the costs of these designs.

Now that's what I think in both of those areas we need to have some feel for, of confidence or error bound so that we can be sure we are making a decision that's clearly outside this, or on the safe side of this error bound. And I would say in the event that there are serious doubts that remain regarding these points, they can only be resolved by highly qualified witnesses with a good deal of credibility, and which we hope we will find in the future hearing.

Now this Board member at least feels that if matters of substantial uncertainties still exist at the conclusion of the witnesses the Staff and the Applicant are going to present that the Board should seek its own witnesses provided they do not come forth among the parties. And I think that sort of summarizes my feeling about it, that we want to be certain that there is a strong case of evidence one way or the other, and that if uncertainties still exist

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we would like to have -- maybe it might be necessary to call our own witnesses to resolve it.

CHAIRMAN DEALE: While in pursuit of this subject, I'm sure that the Applicant is aware that it has the burden of proof, and whereas we might want to pursue the matter further by calling, let us say, other witnesses of its own, our interest is to reach some kind of certainty presumably one way or the other. But if after an honest effort that certainty isn't reached, I guess as a lawyer I have to say there comes a time when the litigation ought to end. And this would be a footnote to what my colleagues are saying, Well, then, the board must seek its own witnesses.

I say there comes a time when the matter should be at end. And this lends emphasis to our interest in getting adequate data to warrant some kind of a definite conclusion by the Board.

Now I must say in this regard about the whole subject of geology and seismology, the Applicant obviously is heavily involved in this and when we develop the schedule for geology and seismology we would assume the Applicant will have witnesses too.

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MR. THOMSEN: Well, certainly.

CHAIRMAN DEALE: Yes, I mean -- and also, we would assume that the intervenor SCAMP also would have its witnesses. Mr. Leed, I assume that's -- you know -- your intention to have witnesses on -- whenwe come to this area of geology and seismology.

Or perhaps you may wish to make out your case through cross examination.

MR. LEED: We have witnesses.

CHAIRMAN DEALE: What is it, please?

MR. LEED: We have witnesses., Mr. Chairman.

CHAIRMAN DEALE: Yes.

And the timing of this would be, let us say, if you get the information that you're looking forward to from the United States Geological Survey by the 1st of September, you'd be able to have, say, testimony and your position pretty well identified for, say, prefiling purposes by maybe the middle or end of September; is this correct, Mr. Black?

MR. BLACK: I'm hoping that would be the b case, yes; I think late September, 1st of October, definitely would have to be some kind of outside deadline on that.

CHAIRMAN DEALE: But to be -- I'm thinking, you know, of the need for having testimony prefiled within 15 days, and I think that is a -- well, the time shouldn't

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be any shorter than that between the time of the hearing and the time that the parties receive your testimony, so that if, say, 15 days from that, that would be a minimum time. We're into -- oh -- October 15th, the latter part of Ocotober.

MR. BLACK: It could be.

CHAIRMAN DEALE: Yes. All right.

Let's see now, and then the -- Mr. -- there's -- there is this question I'm reminded of.

Mr. Leed, would you be able to meet that kind of a schedule?

MR. LEED: I don't quite understand what schedule.

CHAIRMAN DEALE: Oh, well, I'm talking about the order of magnitude of time; that is, Mr. Black gets his testimony -- his letter from the United States Geological Survey September 1, and the staff pursues that study from the -- on the basis of the staff report and is able to get its testimony on the subject, oh, say, by the middle of September or toward the end of September.

That would be, say, prefiled, and the prefiling must be within 15 days of the scheduled hearing.

And that would be -- bring the scheduled hearing -- and these are the extreme positions -- oh, September -- October, maybe the middle of October.

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MR. LEED: How would we have the opportunity to prefile any testimony on that subject?

CHAIRMAN DEALE: How would you have what?

MR. LEED: I said, how would we have the opportunity to prefile any testimony on a subject such as that?

CHAIRMAN DEALE: Well, this is what we're -- your -- your consideration would be to -- you would -- your testimony would be, say, a rebuttal, if you will, of the staff's testimony.

I was inquiring whether there would be, oh, say, affirmative testimony of your own on this subject or whether basically you would be examining and trying to point out the in validities of the staff testimony and also of course of the applicant's testimony.

The question that I have is really, have you -- do you anticipate any affirmative testimony, brand new testimony independent of these -- of whatever testimony the staff or the applicant might come up with?

MR. LEED: The answer to that is, yes, we do, but I -- you asked me whether I could live with this schedule, and I simply pointed out that it doesn't give us the opportunity to prefile any testimony at all, rebuttal or otherwise.

CHAIRMAN DEALE: The -- well, I'm addressing myself to whether or not you have some independent testimony which you would be able to, say, prefile within those -- within

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that general time frame.

Now, this has nothing to do with your opportunity to, say, cross examine all the witnesses which these people have forthcoming to support their testimony, which presumably would have been prefiled, say, around the first of October.

In the case of applicants, the applicant's testimony has been prefiled, I think, since June or May.

MR. THOMSEN: The bulk of it was in May; we'd be adding some, I expect.

CHAIRMAN DEALE: Yes.

MR. LEED: The report is all I've seen. I haven't seen any testimony.

MR. LITTLE: Section one of the report was written to take the place of testimony; it is intended to be a summary of the report. That was meant to be our prefiled testimony in that large volume of information, but now --

CHAIRMAN DEALE: Those are the three volumes, and then there was this one section which in effect would be the testimony.

MR. LITTLE: Yes, I think we indicated that in the letter.

Now, of course, we've listened to the board's concerns here, and we may well prefile additional testimony in response to those.

MR. BLACK: I would also add that it's not certain

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at this time whether the staff will be filing supplemental testimony, per se, but that our testimony might take the form of the letter from the Geological Survey as well as a brief staff report.

I also,insofar as SCANP is concerned, I do remember that one letter that Mr. Leed sent in, indicating -- I think it was in response to discovery requests from the applicant -- that Dr. Cheney's most recent revision on his geological report would not be ready until November.

Obviously, that's not going to fit within the time frame of -- we're speaking of here, and I guess Dr. Cheney is going to have to apply a little bit better effort if we're looking for it at the October hearing.

If that's what his concern is about not being able to have an opportunity to file testimony, then I'd say that Dr. Cheney's efforts have to be expedited a little bit.

Other than that, I don't understand why he's saying that he doesn't have an opportunity to file testimony within the time frame that we're looking at here.

Obviously, we're all running into time problems, but everybody has to make their best efforts to meet those time frames.

But that's the only thing I can think of why he indicates he might have problems. Perhaps there are some other problems that he hasn't identified.

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MR. LEED: It's, if I understand the board, the board is suggesting the staff and applicant prefile their testimony by the end of October.

MR. THOMSEN: No, no, no.

MR. LEED: And tat we have a hearing beginning the 15th.

MR. LIEBENBERGER: The end of September.

MR. LEED: The end of September.

And judging from our experience in this hearing, any testimony that we do not prefile 15 days prior will be excluded. And if I do my airthmetic correct, that shows that we haveno period in which to prepare or file any rebuttal testimony to staff or applicant.

Maybe Mr. Black understands something I've missed.

MR. BLACK: Well, first of all, we have --

MR. LEED: I should point out, nor do I have any opportunity to do discovery with reference to any staff testimony.

MR. BLACK: There are a couple of points. First of all, we haven't excluded all the testimony that was filed late.

MR. LEED: I don't want to be late.

MR. BLACK: What's that?

MR. LEED: I don't want to be late.

MR. BLACK: Well, I think, first of all, it's --

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if it really is rebuttal testimony, there isn't a filing date that's necessary, if it really is rebuttal testimony.

The testimony that was excluded here can hardly fall under a definition of rebuttal testimony, because it really was the SCANP's direct case on most of these issues, and rebuttal testimony to me indicates -- to me -- under a strict definition of rebuttal testimony, is rebuttal to that which comes up under cross examination, not that which is an intervenor's or any other party's direct case with regard to an issue.

So I think that SCANP has opportunity to get their direct case in; it can prefile just as easily as the staff and the applicant can.

I also think that SCANp has had -- has had years with which to file discovery requests insofar as the staff positionor the USGS position is concerned on these various geological and seismological issues.

And I would just finally say that all parties are familiar with what the issues are here, and the differences of opinion regarding those things.

And it -- I think it's a little late now to say that adequate time isn't available for discovery, because it's been available for years.

So I think that SCANP -- SCANP is just kind of

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blowing up a smoke screen here. It's certainly not very much time to prepare a case, and I -- as an attorney, I wish I had more. Wish I had about a year to develop this issue, just for my own education on this issue. I wish I had a year.

But we are on -- we're trying to do our best to get these concerns put to rest, and we all have to make the effort to do it.

So what's good for the goose is good for the gander.

MR. THOMSEN: I guess maybe I should add a comment: I see no reason why SCANP can't prefile its principal evidence at the same time applicant and staff do, and that certainly would include Dr. Cheney's upcoming revision of his previously presented report. He's been working on it, presumably, for months; he's had our principal data for months.

I see no reason whatsoever why he can't meet a mid-September date or whatever date the staff and the applicant meet. Maybe -- maybe the submission by staff and applicant create a need for something further from the intervenors. Well, we can deal with that.

(Board conferring.)

MR. THOMSEN: I am assuming here that the final schedule for this won't be set today.

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CHAIRMAN DEALE: That's right.

MR. THOMSEN: This is an exploratory discussion.

CHAIRMAN DEALE: This is correct.

MR. THOMSEN: I'm also hoping and assuming its probable that by -- before the close of the August session, you know, that's to run to August 31 -- that's the day before the USGS letter has been promised -- we might have a pretty good report on either that letter is in the mail or it's delayed one week or whatever.

Maybe it's already received. I would, therefore --

CHAIRMAN DEALE: We may even know what's in the letter before the letter arrives.

MR. THOMSEN: We might. So I would look forward eagerly to fixing a firm andfinal schedule for that hearing sometime during the August hearing session when we're all together again.

And I would a urge the board and all parties to keep their schedules such that we can accommodate this hearing at least some time in October, which sounds to b me to be a reasonable time frame, whether it be the fir week, second week, third week, or what. We can't reall[illegible] yet, I guess.

CHAIRMAN DEALE: Well, it is clear that we can't schedule any kind of a hearing for the geology and seismology matter until, at the earliest, the August hearing.

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And as you suggested, this is really exploratory.

Now, on the suitability for development of evacuation plans, we -- that has been a subject which has been postponed, and that I think is a subject which Mr. Moser who has been here for SCANP --

MR. MOSER: Skagit County.

CHAIRMAN DEALE: Skagit County, rather; he's been sitting there patiently and has not had the opportunity to hear -- develop the subject which Skagit County is essentially interested in.

But from the session in August, this would be a subject which -- now, who are the proposed witnesses?

Mr. Black?

MR. BLACK: For the staff it would be Mr. Marten.

CHAIRMAN DEALE: Marten.

MR. BLACK: And the testimony has been prefiled.

CHAIRMAN DEALE: Fine. And does the applicant have any testimony on this?

MR. THOMSEN: NO, except, you know, probably we'll have rebuttal testimony from Mr. McIsaac.

CHAIRMAN DEALE: Fine. We'll wait until we see Marten and I assume Mr. Darland.

MR. THOMSEN: We'll see what we've got on the list here. But we have no additional direct testimony in mind, Mr. Chairman.

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CHAIRMAN DEALE: And SCANP?

MR. LEED: We have testimony. But I just have a question here. Mr. Black said that rebuttal testimony is only supposed to address matters brought out on cross examination, and I am curious as to whether that's the position that the applicant is taking with respect to offering rebuttal testimony.

MR. THOMSEN: No, it is not. I regard rebuttal testimony as answering testimony of the other parties, whether it be direct, cross, or whatever.

MR. LEED: All right, so -- rebuttal --

MR. THOMSEN: I think that's the traditional concept, at least. That's my concept of rebuttal testimony. We put on our case. Everybody else does theirs and then we rebut.

MR. LEED: Well, for once, I say, Mr. Thomsen, you and I agree.

MR. THOMSEN: All right. This is indeed a memorable occasion.

(Laughter.)

CHAIRMAN DEALE: Maybe we ought to take a recess.

(Laughter.)

It's 10:30. Let's see. You have Mr. Darland. Now, his testimony has been in. That's fine.

Well, this is a good time for a break. Let's have

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a break. Okay. Say, 10 minutes.

(Brief recess.)

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CHAIRMAN DEALE: Okay. Please come to order.

We are at page 4 of this order of the Board of June 29. We are down to financial qualifications.

Mr.Thomsen, whom are you going to have testify, or have you decided yet?

MR. THOMSEN: Oh, yes. Their testimony has been prefiled.

I didn't think we had finished the previous item. I wanted to go back to it.

CHAIRMAN DEALE: All right. We will go back to -- you didn't think we had finished the previous item. This had to do with site criteria.

MR. THOMSEN: No, D, suitability for development of the evacuation plan.

CHAIRMAN DEALE: Oh, Mr. Martin, Mr. MacIsaac, and Mr. Darland.

MR. THOMSEN: That's as far as I had gotten. And then we heard that Skagit County had something in mind, and we didn't get up to that.

CHAIRMAN DEALE: Oh, Mr. Moser.

MR. THOMSEN: And I also wanted to note that the Siting Council wanted to make a statement on that. They have been in and out of here numerous times expecting us to be on that subject. So I would anticipate they would have something to say. Not a witness, as I understand it,

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but some kind of a statement.

CHAIRMAN DEALE: Allrright, we would be glad to know about both of their interests; Skagit County and Siting Council, and Mr. Martin, Mr. Darland, and Mr. MacIsaac.

MR. THOMSEN: We would like to have Mr. Moser identify what he is going to do, if he is going to call witnesses. But I see he is not here. He may return. We will ask him.

CHAIRMAN DEALE: All right.

That takes us down to radiological health and safety.

First is site criterion. This presumably -- well, obviously relates to geology and seismology which we have discussed earlier.

MR. THOMSEN: Right.

CHAIRMAN DEALE: Now we go into the financial qualifications. And you pointed out your testimony has already been prefiled.

Who are the witnesses?

MR.THOMSEN: They are Olson, Pack, Coberley and Coombs.

Their testimony is all dated June 1, 1979.

CHAIRMAN DEALE: Fine.

Staff, are you going to have any witnesses on that?

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MR. BLACK: Yes. Prefiled already, Gittleman.

CHAIRMAN DEALE: All right.

And SCAMP?

MR. LEED: Yes. We will have testimony from Mr. Lazar.

CHAIRMAN DEALE: Has his testimony been prefiled?

MR. LEED: No, it hasn't. It is in preparation.

MR. THOMSEN: Excuse me, you filed some. Or is that outdated now?

MR. LEED: You got, I'd say, a first cut. So I guess the answer is yes, it's been prefiled, but we intend to amend it.

CHAIRMAN DEALE: And the amendment of the prefiled statement then will be available say, 15 days before the beginning of the scheduled testimony?

MR. LEED: All right.

CHAIRMAN DEALE: Loose parts monitoring -- excuse me, FOB, I'm sorry.

MR. STACHON: We won't have any.

CHAIRMAN DEALE: Loose parts monitoring, has that been settled or is there still something that's outstanding?

MR. THOMSEN: I think the discussions are continuing. It has not been settled, so I would say if it is not settled, we would prefile and presume the Staff would

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within the constraints, I suppose, of -- where does the 15-day rule take us?

CHAIRMANDEALE: Yes. Filing within the 15-day rule, if not sooner.

And then we have quality assurance. Where do we stand with that matter?

MR. THOMSEN: Well we have prefiled by the four witnesses, and that being a Board request item, I solicit further guidance from the Board.

I, frankly, had thought they were finished when they came. But I realize now that perhaps they were not. So all we need to know is who you would like back.

We have prefiled. Well, it is already in the record, their prepared statements. And if you wish to question one or more of them, why let us know and they can come in August. I haven't asked them whether they are going to be on vacation or what.

Who did you want?

MR. LINENBERGER: As I recall, Mr. Thomsen, I think it was your suggestion in the interests of time constraints this time, to concentrate on Mr. Ellis for this session.

MR. THOMSEN: Indeed it was.

MR. LINENBERGER: Which was a good suggestion. butthe Board did not mean to imply it wasn't interested in

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the testimony of the other three gentlemen. We are, and we will have some questions for them.

MR. THOMSEN: Fine.

MR. LINENBERGER: Mr. Chairman, on this point I have a question for Mr. Black regarding quality assurance.

I believe, Mr. Black, the Staff's last words on quality assurance were in the main body of the SER, nothing in the supplement of the SER. And the main body of the SER goes back what, two years, September '77.

My comment here is that I would expect that a considerable amount has happened on the Applicant's side since September of '77 with respect to the hiring of quality assurance personnel in preparation for the construction phase, training of them, and probably a considerable amount of procedural updating and preparation of paperwork to support the quality assurance construction phase.

So my question to you is, does the Staff propose to present any kind of updated appraisal of what the Applicants have done since the main body of the SER was published?

MR. BLACK: I guess just based on my current knowledge, the answer would be no.

We did have several quality assurance people out here while the Applicant was testifying, and they did not indicate to me that they heard anything that they did

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not expect to hear, and so therefore they would not change the conclusions that are in the SER.

And I'm not certain if there has been anything that the Applicants have done since this subject matter was first reviewed that would dictate that the Staff would have to go back and reraview it. But there again I am just working on my own knowledge of the issue and can't really say for sure that this is the case.

MR. LINENBERGER: Incidentally, speaking of the SER, does Staff have a new estimate with respect to publication of the final supplement thereto?

MR. BLACK: .No.

The publication of the final supplement is totally dependent on the state of review of the geology and seismology, and it is certainly too early to tell what the state of that subject matter is.

If all these concerns can be addressed sometime this fall, then I would also think thatthe final supplement would be published sometime this fall. Because largely what goes into Chapter 2.5 of the SER hinges upon that, the final state of review.

But as of right now I just don't know. I suspect it might be sometime later this fall.

MR. LINENBERGER: I think the Board and you both anticipated thatthe final supplement would include items.

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in addition to the geology and seismology considerations. And therefore, I think from the Board's point of view, we will certainly need to have access to the final supplement before we can complete our work.

MR. BLACK: Oh, I think that's true, particularly if you are looking for any type of CP issuance, that final supplement has to be up.

If we are just looking at LWA issues, it is not so certain that it is obviously important.

I think it is the current staff thinking now, that if we are looking only toward an LWA type issuance, then it is not so certain of when that SER final supplement will be published and on the street, because there is quite a lead time involved with that, printing and what have you.

If we are looking to an issuance of a CP, then obviously we are going to have to publish that final supplement.

MR. LINENBERGER: Thank you.

CHAIRMAN DEALE: Then, come August we will, presumably, have Applicants' testimony, less Mr. Ellis. On C-3, sSCANP's contention re: adequacy of Applicants' emergency plan, is there a distinction between Applicants' emergency plan and the development of an evacuation plan so far as the testimony is concerned?

The Applicant and the Staff have prefiled -- or

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have you prefiled?

MR. THOMSEN: The same --

CHAIRMAN DEALE: The prefilings were due June 29th.

MR. LITTLE: I believe that is the same testimony we previously listed.

MR. THOMSEN: It is Martin, Darland and MacIsaac rebuttal, as far as I know.

CHAIRMAN DEALE: This is really the question so far as testimony is concerned. This is basically the same as the evacuation.

MR. THOMSEN: That's my understanding.

CHAIRMAN DEALE: Yes.

And how about you, Mr. Black?

MR. BLACK: That is Mr. Martin, already prefiled.

CHAIRMAN DEALE: Fine.

And SCANP, you take the same position? I think you have Mr. Darland.

MR. LEED: Yes.

But as I understand it, the issue is whether the site is suitable for the development of an evacuation plan.

CHAIRMAN DEALE: Right.

MR. LEED: Not really at this point whether the Applicant's emergency plan is adequate.

And there really is no detailed emergency plan that I'm aware of that has been prepared nor evaluated by the

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Staff and we do not intend to waive any contention that the plan, when prepared, is inadequate. We just want to observe then, that we reserve that contention to address it at the appropriate time, and that our testimony, Mr. Darland's testimony, is directed towards the suitability of the site insofar as it is -- has limitations which would preclude development of the plan, rather than a specific plan at this time.

CHAIRMAN DEALE: Mr. Darland's testimony, under these headings generally, site suitability, and then suitability of developing evacuation plans. Mr. Darland will have testimony on that subject, as I understand it?

MR. LEED: Right.

As I recall the PSAR at the present time, the evacuation plan is contained in a couple of paragraphs, and I believe it consists of the Applicant calling the Sheriff and calling the Office of Emergency Planning of the State of Washington.

And I assume that there will be something rather more detailed than that developed at some point.

CHAIRMAN DEALE: We are relating now to the SCANP contention re: the adequacy of Applicants' emergency plan.

Now are you going to have testimony on that again, or not?

I just want to make sure I understand the focus.

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MR. LEED: As I understand it, there will be an emergency plan developed in detail. When that happens it will be presented to the Board and at that time we would want to address that specific plan.

MR. THOMSEN: It should be clear that that means at the operating license stage, not in this proceeding.

That is my understanding of what we are talking about here.

DR HOOPER: Mr. Black, I am not so clear as to what the Staff responsibilities are in this regard. I have heard other proceedings where there has been at least some sort of a plan put into the record. Now, I'm not exactly sure as tothe details of that plan, but at least they were formulated, at least there was some preliminary work done on theplan.

Can you help me with that problem?

MR. BLACK: Definitely, the details of an evacuation plan are not required until the OL stage.

DR. HOOPER: What is required at the CP stage?

MR. BLACK: I believe there are certain criteria that have to be looked at at the CP stage, and mainly those criteria are of population density, road access, certain components of the plan like that. But the details of the plan are not worked out until the OL review.

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Now I chink in some instances, many components of an evacuationplan have been worked out at an early stage. And I think even to the extent of the Skagit facility, certain of the components that aren't really necessary at this stage,have been developed.

And tothe extent that we can identify those and discuss them at the CP stage we do so. But they are not necessarily required in all instances.

CHAIRMAN DEALE: I think the regulations spell out what is required at this stage as distinguished from what is required at the operating license stage.

MR. BLACK: Yes. I think those requirements are set forth in 10 CFR Part 50 Appendix E, if I'm not mistaken.

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MR. LINENBERGER: Fine.

Presumably, though, a question about site suitability insofar as there may or may not be a major feature of the site that would preclude a feasible plan is the topic for the CP review, is that correct?

MR. BLACK: It certainly is, that's right.

DR. HOOPER: If there are any restraints of evacuation from a particular site they must be addressed at this hearing.

MR. BLACK: Yes. I think, for instance, if you had a coastal site with limited access that those peculiar instances would have to be addressed at the CP stage, something that would preclude a reasonable evacuation plan at a later date.

CHAIRMAN DEALE: Basically are there any negative features of the area which would preclude, as you say, a decent emergency plan.

MR. BLACK: That's correct.

CHAIRMAN DEALE: Well, now the thought of the Board is to set up a time framework for handling proposed findings of fact on some of the subjects where the testimony has evidently been in and the matter has been concluded.

We are focusing on subjects in which, say, the testimony has for all practical purposes been closed. And I think we could again just run down the line to check off

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what is available for proposed findings of fact. And as I would see it it would be environmental matters. It would be A. It would be B. It would be --

MR. THOMSEN: Mr. Chairman, excuse me for interrupting.

CHAIRMAN DEALE: Yes.

MR. THOMSEN: Just a thought.

Would it be conceivable to say findings on everything except, and describe the other side of this coin, since we have now been through the list and identified those on which additional evidence will be received.

It's just a thought.

CHAIRMAN DEALE: Yes. I appreciate the thought.

MR. THOMSEN: I'm sorry I interrupted.

CHAIRMAN DEALE: I'm kind of focusing on specificity here and at the same time being interested that everybody understands what is covered.

I respect what you're saying and I recognize that this ultimately comes down to going through the list twice.

You point, though, would be that if the list is covered, and then you identify what must be taken and everything else is the subject of proposed findings.

MR. THOMSEN: It's just a suggestion. But the thought was, yes, that all parties would be directed to

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submit proposed findings on all issues, meaning to include not only LWA issues but CP issues by such and such a date and so on, all issues except, and list the things that are excepted to.

It comes out even. It's two sides of the same coin.

CHAIRMAN DEALE: Yes.

MR. THOMSEN: I had been sitting here while we went through it the first time and made a list of what I heard to be the exceptions. We can go through it either way.

CHAIRMAN DEALE: Well, let's hear your exceptions. I'd like to double-check the exceptions.

MR. THOMSEN: I certainly think we should be very clear on it.

My list of the exceptions are six items:

One, geology, seismology.

Two, health effects of the nuclear cycle, including the radon matter, which I think is a subdivision of alternative sources, if my logic serves me right. On the Board's order it's --

CHAIRMAN DEALE: What's the item on the Board's order?

MR. THOMSEN: It's page 3, Item F, Alternative Energy Sources.

So I would expect we should just leave out that

mpb4

whole subject of alternative energy sources when drawing our findings.

CHAIRMAN DEALE: Go ahead.

MR. THOMSEN: Then the third item was evacuation planning or emergency planning, all aspects of that.

CHAIRMAN DEALE: Let's see.

MR. THOMSEN: That's D on page 4, Suitability of the Site for Development of the Plant.

And then if C-3 on page 5 adds anything, which I guess it doesn't, in all the adequacy of our plan, at least that's part of the exception.

CHAIRMAN DEALE: And the next one is?

MR. THOMSEN: The fourth item I had was financial qualifications, which is IIB on page 4 of the Board's order.

Number five was quality assurance. That's item C-2 on page 5.

MR. LINENBERGER: Excuse me, Mr. Thomsen. Financial qualifications was item?

MR. THOMSEN: II-B on the bottom of page 4.

MR. LINENBERGER: II-B.

MR. THOMSEN: Right.

MR. LINENBERGER: No, there's something wrong there. We have II-B up above.

MR. LITTLE: III-B.

mpb5

MR. THOMSEN: I'm sorry, I can't read. III-B.

MR. LINENBERGER: Right.

MR. THOMSEN: And the next one, my five, is quality assurance, which is C-2 on page 5. It's III-C-2.

And the last one I had was loose parts monitoring, which is C-1 there.

Those are the exceptions I had, the six exceptions.

CHAIRMAN DEALE: The emergency plan and evacuation plan you consider as one?

MR. THOMSEN: I just called them one. They are at two places in the Board's order.

CHAIRMAN DEALE: Well, let's go through it the other way.

(Pause.)

MR. THOMSEN: I guess the Board's doing what I'm doing.

In going through it the other way you come out with F on page 3 as the first one.

CHAIRMAN DEALE: Yes.

MR. THOMSEN: And then C, geology-seismology on page 4 is the next one.

CHAIRMAN DEALE: Yes.

MR. THOMSEN: And then D right below it is the next one, suitability for development of an evacuation plan.

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And then A under 3, geology-seismology again is the next one. It is sort of a repetition.

And then B, financial qualifications.

And all three on page 4, C-1, C-2 and C-3.

CHAIRMAN DEALE: Yes.

It would appear this item of need for power -- actually I don't feel that it would be fair to ask the parties to make a proposed statement of fact until we, say, decide the motion.

We recognize that in the posture, need for power has been decided and it's been closed. Well, that's all fair enough. But still there is a motion before the Board. And if the Board should reopen the record, why, quite clearly the idea of making proposed findings would not be relevant at this time.

So in view of the fact that the Board has not made a ruling on that motion, I feel that a call for proposed findings on need for power would not be fair at this time.

We anticipate deciding that motion, but for present purposes I think that we ought to exclude that subject too, pending the Board's decision on the question.

MR. THOMSEN: That certainly seems reasonable to me.

CHAIRMAN DEALE: So I have here geology-seismology, alternate energy sources, suitability of site for

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development of evacuation plan, adequacy of Applicant's emergency plan, financial qualifications, quality assurance, loose parts monitoring and site criteria and need for power.

MR. THOMSEN: As to schedule, if you wish to get to that --

CHAIRMAN DEALE: Let's get the matter of the subject.

We're proposing that we would set up requirements for a schedule for proposed findings of fact on these subjects which are set forth in the Board's order of June 29th except -- and we've listed the exceptions a couple of times now. You've heard them.

Now what is your disposition, Mr. Black, of moving forward with proposed findings of fact?

MR. BLACK: Well, I think that that should be done as long as the time frames are reasonable. I believe I heard Mr. Thomsen indicate that Applicant could come forward with its proposed findings by August 31st, and I'm certainly not in a position to commit the Staff to that date.

I think that it might be somewhere around that date, but I'm not so certain that August 31st will give me much chance to work on them.

CHAIRMAN DEALE: And the idea of having proposed findings on all of the subjects listed in this memorandum except the ones we've identified, that's the idea

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we're talking about.

I take it you're amenable to that idea? And your only qualification is the time period.

MR. BLACK: That's correct.

We have done so in the past before in this proceeding and I think it's appropriate in this instance as well.

CHAIRMAN DEALE: Mr. Leed?

MR. LEED: I don't think I have anything to add.

CHAIRMAN DEALE: Mr. Stachon?

MR. STACHON: I have just a couple of things.

One, Staff compliance with the Executive Order 11988, I believe it is, I think I remember Staff saying they were going to come forward in August and present something to the effect of how the Staff applied -- the floodplain management guidelines. So I would assume that that would be another exception that we would add in there.

MR. BLACK: I think that's true with the one condition that if upon our reading of the Executive Order and the regulations implementing the Executive Order that that type of evidence was necessary to show compliance with the floodplain management criteria, then we would do so.

If it were not necessary then we would explain to the Board what was necessary and seek compliance in the

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appropriate manner.

CHAIRMAN DEALE: In any event, you would have a report and/or testimony, depending on your judgment of what is required.

MR. BLACK: That is correct.

MR. STACHON: I had just one other matter, and that's the cost-benefit analysis.

Now it may be that a different SSE after the geology and seismology portion, a different SSE plays into that and may affect the cost-benefit analysis. Now I don't know whether we should go ahead with the record as it now stands and supplement it after the geology, or wait.

CHAIRMAN DEALE: I think your point -- the Board thinks your point is well taken; that could be an adjustment.

On the other hand, it might not be.

But your point is, well, why go through the exercise now and find out that an adjustment, a serious adjustment might be required.

If a serious adjustment is required, well, then, quite clearly the matter would have to be done over. And then on the other side, if, say, a slight adjustment would have to be made, why, I presume that that matter could be taken care of promptly. This is the thought.

So then your position, you know, generally,

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would be that at this time, let's see, whether the cost-benefit matter ought to be made an exception subject to the outcome of the geology and seismology.

MR. STACHON: Yes, that's my point.

I think any additional effort that would be needed to, say, submit findings now on the possibility of having to substantially modify those findings would be a burden we'd rather not -- we'd rather avoid if possible.

CHAIRMAN DEALE: All right. Fine.

Now I think we have the general gist here. And at the same time we have an understanding of what testimony will be forthcoming at the August hearing. We've gone through that in developing this case.

We have Mr. Gotta on -- well, that's the radon.

And the need for power is a judgement that we must make.

Geology and seismology, that's the Applicant and Staff.

And SCAMP will develop the schedule probably in the August hearing.

And on evacuation planning, why, we'll hear in August from Mr. Martin and Mr. MacIsaac and Mr. Darland.

And site criteria, geology and seismology, why, of course, that will be scheduled after the August hearing.

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And then Mr. Olsen, Mr. Peck, Mr. Coberly and Mr. Combs will be testifying at the August hearing on financial qualifications. And Mr. Lazar will be testifying for SCANP.

And the loose parts monitoring, that's a matter that's a little bit indefinite because the parties are still negotiating. But if their negotiations appear fruitless, they will make filings within the 15 day rule.

And on quality assurance, the Applicant will produce his witnesses, less Mr. Ellis, at the August hearings.

And on the contention of the adequacy of the Applicant's emergency plan, we have -- well, SCANP -- well, I understand your position but I'm just trying to identify whether there will be testimony on this subject.

What we have, of course, is Mr. Darland on the evacuation planning, or would you have testimony on this contention of adequacy of Applicant's emergency plan?

I'm querying whether there is a distinction there so far as testimony is concerned.

MR. LEED: There is no additional testimony.

But the point I was trying to make earlier was I didn't want our failure to offer testimony beyond what Mr. Darland has presented to amount to a waiver of the contention that the plan, when it ultimately is developed, is inadequate.

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CHAIRMAN DEALE: We understand.

MR. LEED: I guess I should mention one other subject, the military aviation. Presumably the Staff will be forthcoming with some additional information, then, insofar as there might be some findings on that. It would seem to me we should await that additional information before scheduling findings on that subject.

CHAIRMAN DEALE: All right. Your point, yes, is that you're awaiting information from the Staff, and at least at this point presumably the Staff will be able to get you the information that you want and until you receive that information you would rather not go into this item of site suitability, 2B, namely nearby industrial, military and transportation, is that correct?

MR. LEED: That's correct.

CHAIRMAN DEALE: Okay. Fair enough.

Unless somebody has any further information that they would like to contribute to this general discussion, this is what we have in mind doing:

We'll get out an order next week covering our belief on what we have agreed to here, that there will be proposed findings of fact on subjects which we have identified. And also at the August hearing there will be certain subjects considered and certain witnesses will be forthcoming.

And then I might ask Mr. Thomsen to do what he

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had done before, and that is to get an order of presentation out for us.

MR. THOMSEN: We'll be glad to do that.

Do you wish a discussion now of possible dates?

CHAIRMAN DEALE: Yes, yes.

I just wanted to make sure that we're taking one step slowly at a time.

MR. THOMSEN: I'll be glad to get an order of presentation proposed to the parties.

CHAIRMAN DEALE: And we wish you better luck in your preparation of your order of presentation.

MR. THOMSEN: Thank you.

CHAIRMAN DEALE: All right.

Now let's talk about this question of time with respect to proposed findings of fact.

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MR. THOMSEN: Ordinarily --

CHAIRMAN DEALE: Go ahead. Yes.

MR. THOMSEN: -- applicant goes first, so I guess that's step one.

We've been appraising the job that lies ahead of us, and can commit that we will do this on or before September 7. Had it not been for the last week inAugust being occupied by the hearing, we would have committed to August 31. But in view of that hearing I think we'd better make it on or before September 7 with the understanding we may still make the August 31 or some earlier date.

And I would like to propose to the other parties that they file within three weeks after we serve our proposed findings so that if we make it, for example, on August 31, then theirs would be due September 21, I guess, or whatever.

And I would propose that although ordinarily the staff has 10 days after intervenor, that perhaps in this case the staff could do it concurrently with intervenor. So I'mreally suggesting a commn date for all intervenors, staff, et cetera, of three weeks after the applicant serves his proposed findings with the dealine on us of September 7.

CHAIRMAN DEALE: What is the customary time for --

MR. THOMSEN: The rules -- my recollection is they provide 20 days for applicant; then 10 more days for all other parties. Then 10 more days -- 30 for all of the

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parties and then 40 for the staff and then 10 for applicant's reply.

It's 20 applicants, 30 everybody else, 40 staff, 50 applicant reply, I think, after the record -- you know -- the board says -- where are the rules?

CHAIRMAN DEALE: Maybe just --

MR. THOMSEN: I think that's the rules. Right, Mr. Black?

CHAIRMAN DEALE: Well --

MR. THOMSEN: And the chairman has the authority to vary those rules.

CHAIRMAN DEALE: Yes.

MR. THOMSEN: We'll give you the citation of the rule here.

CHAIRMAN DEALE: That's Appendix A?

MR. THOMSEN: No, it's part two of something.

MR. STACHON: It's 2.754.

MR. THOMSEN: I think that's correct. We've lost our rules.

MR. LEED: Do we have your rules?

MR. THOMSEN: We'll find it.

MR. LEED: You can borrow mine, if you want.

MR. THOMSEN: Well, we've got another copy here. Here we are: 2.754. 20 days applicant, 30 days all other parties except staff, 40 days, and applicant 50 days, you

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know, to reply, or 10 days after service of everybody else.

CHAIRMAN DEALE: Yes.

MR. THOMSEN: So we are proposing a departure from that in view of the extent of the record here, and the fact that we're having five days of hearings sort of in the middle of this.

CHAIRMAN DEALE: You're suggest than your material would be in by September 7.

MR. THOMSEN: Yes, sir.

CHAIRMAN DEALE: And --

MR. THOMSEN: And we sincerely expect we might be able to beat that. But that's intended to be a safe date. We won't be asking for extensions of that unless somebody gets ill or something.

CHAIRMAN DEALE: Well, you have the Labor Day Weekend.

MR. THOMSEN: It will be a happy weekend at the office, I'm afraid.

CHAIRMAN DEALE: And then the other parties would -- you're proposing to cut down the 20 days to 14 days.

MR. THOMSEN: NO, I was proposing 21 days; three weeks after we do it, they do it.

CHAIRMAN DEALE: So then that would be the 28th.

MR. THOMSEN: Yes, sir. And I was meaning to include the staff in that. That will be all right. It's up

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to Mr. Black.

CHAIRMAN DEALE: And then we have -- and then you have some more time.

MR. THOMSEN: To respond.

CHAIRMAN DEALE: To respond; and that would be 10 more days.

MR. THOMSEN: That's what the rule provides, and we'll live with that. If it turns out we can't, we'll ask good cause for an extension. But for the moment, we'll say that's fine.

CHAIRMAN DEALE: This throws it to October 8.

MR. BLACK: Mr. Chairman, I think also in that same context, I think that the way the rules are presently set up, it allows the staff to file findings based on everybody else's findings; the way that we have the schedule set up now, we have no opportunity to respond to anybody's findings except the applicant's.

And so, therefore, I'm not saying it's going to be necessary --

CHAIRMAN DEALE: No, but this is. We're in the discussion area here. Mr. Thomsen gave his ideas, and we welcome yours and Mr. Leed's and Mr. Stachon's too.

MR. BLACK: I would like at least an opportunity to reserve a time to fine rebuttal findings if necessary.

We would propose to live within that 10 day rule

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that is on the applicant's, in which case it would be October 8, but knowing the way the mails go between the east and the west coast, we probably might have to come out with more time than that to respond to any, let's say, intervenor's proposed findings that we felt needed to be responded to.

So it might be necessary to tack on a little bit more time on that October 8 date.

Of course I think we get five days for mailing in there, so it might be October 13. That might be a more appropriate time to respond to that.

CHAIRMAN DEALE: The other days -- the other parts of the schedule are all right for you, but you'd like to have additional time for rebuttal.

MR. BLACK: At least at this time, yes, I would like to reserve that, and I would like to reserve October 13, I think.

I don't know what type of day that is, but --

CHAIRMAN DEALE: That's a Saturday.

MR. BLACK: Let's make it --

CHAIRMAN DEALE: Let's instead of making it the beginning of the week, let's make it the end of that week.

MR. BLACK: October 12th.

CHAIRMAN DEALE: October 12th, that would be, which would basically be two weeks from the time that material

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should be filed by the staff and the intervenors. And we're talking about filing dates and we have to live with the mail.

I'd rather peg the filing date and trust to the mail because if we add to the -- really add to the filing date, by the time that's -- you know -- that's five days more because the mail doesn't get to us any faster if you file it -- it still takes the same amount of time for the mail to travel across the United States.

MR. THOMSEN: What was the October date, then?

CHAIRMAN DEALE: Well, October 12 is the staff -- that's their filing.

MR. THOMSEN: Could we -- I'm thinking here of our reply; could we also fix that then for our reply in the spirit of having fixed dates here?

CHAIRMAN DEALE: Yes.

MR. THOMSEN: The rules contemplate five days plus -- I mean 10 days plus that would be 15 and why don't we just fix applicant's reply on October 12 also, in view of the size of the anticipated documents here.

CHAIRMAN DEALE: Now, let's see. Let'sstart off with September 7; that would be the applicant's proposed findings.

And three weeks later -- September 7, applicant's proposed findings. Three weeks later the staff and intervenor's

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proposed findings, and then October 12 would be staff and applicant's rebuttal.

Is that the general proposal from applicant?

MR. THOMSEN: Almost.

CHAIRMAN DEALE: All right.

MR. THOMSEN: I can see now that this sliding doesn't work at all; you're fixing calendar dates, so you know it might as well be September 7 for applicant. There's no point in our being earlier, because you can fix calendar dates at the other end, and that's all right.

CHAIRMAN DEALE: No, no. I'm conceding that the three weeks from your time, but --

MR. THOMSEN: I'm just saying: why don't we forget it in the interest of simplicity and make it September 7, September 28,October 12,and forget this sliding business. We'll all go crazy at it.

CHAIRMAN DEALE: Especially if you try to give consideration to the mailing dates.

MR. THOMSEN: Right.

CHAIRMAN DEALE: We're talking about filing dates, whatever they are.

MR. THOMSEN: Put in the mail dates, as I understand this to be.

CHAIRMAN DEALE: Yes, filing dates.

MR. THOMSEN: Yes, filing dates. So I sort of

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suggest fixed dates then of September 7, September 28, and October 12 to get it over with.

Is that what it comes to?

CHAIRMAN DEALE: That's -- now, we'll go to the intervenors.

Mr. Leed, what's your disposition about this whole thing?

MR. LEED: Well, I must say I am concerned about the -- our time limitations imposed by the already identified schedule for hearings in the last week of August and in October.

It's difficul t to say how -- how much that will interfere with time available on these findings, but I didn't hear anybody address that.

And I -- I know we're going to be stretched very, very thin. I imagine Mr. Black will be as wel, and probably Mr. Stachon, trying to contend with all these things at once.

MR. THOMSEN: I,you know -- if you want any respcnse on my part to that, I think the proposal I've suggested does give the intervenor lots of extra time beyond that contemplated by the rules, which I think is, you know -- we've made a reasonable proposition here.

He doesn't have to wait to get ours to start work. It's -- you know -- August 1, and he's not due until

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September 28.

CHAIRMAN DEALE: Let's just check the rules to sveryify the point, as I understand it, you're making; that is that there is no special consideration given here to a party other than the applicant and staff.

MR. THOMSEN: To be specific about that, looking at 10 CFR 2.754 --

CHAIRMAN DEALE: Yes.

MR. THOMSEN: If the board were to declare at 5:00 p.m. today that the record is closed on the subjects except -- except for these exceptions -- then under that rule the intervenor's findings would be due -- today is the 31st -- on August 30th, in 30 days on August 30.

Instead of that, we're suggesting September 28.

CHAIRMAN DEALE: And you are bringing in your material September 7.

MR. THOMSEN: Yes, sir. And under the rules, ours would be due on August 20, and so we're getting from the 20th to the 7th extra, bearing in mind a weeks hearing in there and the intervenor is getting from the 30th to the 28th extra. And he's got the week hearing to put up with too.

So it seems to me a reasonable proposition.

CHAIRMAN DEALE: I assume your point underlying the thought is that the intervenor does not have to wait

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until he receives your proposed findings to make proposed findings of its own.

MR. THOMSEN: Correct.

CHAIRMAN DEALE: And that if we march forward from today, well, we have all of August and the four weeks of September as distinguished from just all of August.

MR. THOMSEN: Correct.

CHAIRMAN DEALE: Mr.Leed,do you have any problem with those considerations?

MR. LEED: Well, I -- my difficulty at this time, Mr. Chairman, is I dont think I can say for certain that the schedule presents insurmountable problems. I'm just saying that there are -- there is the possibility of some conflicts, and I think maybe future things might develop.

Staff or applicant may come in with very substantial testimony for the October hearings, and depending on when that's available, it, you know, would create a time problem that may or may not happen.

I'm prepared to try to live with the schedule if the other parties are.

But I'm apprehensive that there may be difficulty in adhering to the deadline if some other things inject themselves that have to be dealt with also.

So I just wanted to be -- wanted the board and the parties to be aware that there are some tradeoffs involved

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at some point if we're going to have schedules with respect to hearings which interfere with schedules with respect to findings.

It seems to me we have to decide which we give priority to if a conflict develops.

MR. BLACK: Mr. Chairman, I think the point that Mr. Leed brings up is well taken. I think the schedule that we're developing here -- not only for hearing, but also for proposed findings -- has some potential problems to it.

But I think that to the extent Mr. Leed is going to go forward and make a reasonable shot at abiding by these schedules, we can do so. If problems develop, we can take care of them and address them at the times they crop up.

But I think these, at least insofar as the staff is concerned, the schedule right now seems reasonable. We certainly have a shortage in legal services because of TMI right now. This is going to be a tremendous effort for us to get these findings out because of the extent and the complexity of this record. But we intend to do it, and I think that we can do it as long as nothing else crops up in the intervening period.

But if that does happen, we can address it at that time.

CHAIRMAN DEALE: Mr. Stachon?

MR. STACHON: Yes. I'm not real comfortable with

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the schedule, but I think that we can live with it. My only concern -- and I want to make sure that this gets cleared up -- is that we can read section (c) of 2.754 -- and it could be construed that we would limited in filing findings confined to matters which affect our interests, and I would assume that would be limited to our contentions.

However, I brought this point up not to be -- it was either the Januar or the April prehearing conference regarding our wanting to file findings on subjects that are other than our contentions.

And I didn't hear anyobjections to that, andI wanted to state that's our intention.

CHAIRMAN DEALE: To file findings across the board?

MR. STACHON: Across the board.

CHAIRMAN DEALE: As distinguished from findings that related only to your --

MR. STACHON: Contentions.

CHAIRMAN DEALE: -- contentions, which have been checked into.

I don't --

MR. THOMSEN: It says "may." I certainly have no objection to that. It looks like what the rule means.

Do you know any different, Mr. Black?

MR. BLACK: No.

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CHAIRMAN DEALE: Proposed findings of fact. I'm reading, I believe, from what you're concerned about: that's regulation 7.754 (c). It says, "Proposed" -- "Conclusions of proposed findings of fact and conclusions of law submitted by a person who does not have the burden of proof and who has only a limited interest in the proceedings, may be confined to matters which affect his interest."

I personally have no problem. You can make any findings that you want. I mean, I don't want to get involved in the suggestion that there is a little ambiguity here with respect to this.

But I have no problem. I don't think any of my colleagues have any problem with respect to the findings you might wish to make and submit to us.

MR. BLACK: Mr. Chairman, the appeal board has made it clear in the past that an intervenor may file proposed fidings on all issues raised, so they are not confined to their contentions.

CHAIRMAN DEALE: Fine. Thank you very much. Very glad to learn that the appeal board has agreed with us.

MR. STACHON: So am I Mr. Chairman. Thank you.

MR. LEED: Mr. Chairman, I wanted to remind other counsel that if this record extends to 15,000 pages, exclusive of exhibits, as it probably will do and may already have done, it will require at the rate of 50 pages per hour

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300 hours to review the record.

MR. THOMSEN: Well, we have not been -- we haven't sealed the transcript for the last four years. We've read some of it several times, as a matter of fact, already.

CHAIRMAN DEALE: I'm assuming that counsel has allocated a couple of hours a night to reading the transcripts.

MR. THOMSEN: To be sure.

CHAIRMAN DEALE: All right, now in these proposed findings and conclusions we want a reference to the transcripts or the -- or the exhibits that are appropriate. I think, Mr. Leed, you had a problem with this before, and let's -- you know -- let the past bury its dead, or however the saying goes, and move on from here.

But counsel are admonished, if you will, that their proposed findings and conclusions should relate to this substantial record.

Now, is this subject generally covered? We'll live with this September 7, September 28, and October 12 dates. And we recognize that in between then and now, why we have another hearing. That's the hearing that is scheduled to begin on the first Monday of -- the last Monday of August.

All right. All right, there being no further matter on this subject, I will cover this in a written order

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which will be next week.

But I would assume that somebody -- I assume that it's the applimnt who will not be waiting for the written order before preparing his proposed findings.

MR. THOMSEN: We'll go forward on all fronts post haste.

CHAIRMAN DEALE: All right.

MR. STACHON: Mr. Chairman?

CHAIRMAN DEALE: Yes?

MR. STACHON: Just one small question: am I correct in assuming we won't be meeting that Saturday,September 1st?

CHAIRMAN DEALE: Let us say that we had planned not to meet, and when we say that, I can also say the best laid plans of mice and men often go awry.

But yo're asking about our plans, our intentions. It's not to meet theSaturday -- is it the last Saturday of August?

MR. STACHON: It's actually September 1st.

CHAIRMAN DEALE: September 1st.

MR. LINENBERGER: Mr. Chairman, I make the observation here that that is going to be an almost impossible weekend to change travel reservations on short notice. So we should keep that in mind in trying to hold our schedule for that week.

CHAIRMAN DEALE: All right. Let's call the luncheon

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recess now.

MR. THOMSEN: Mr. Chairman, on the record.

Before that, if I might --

CHAIRMAN DEALE: Yes?

MR. THOMSEN: We do have prepared rebuttal testimony of Mr. Knight that we can pass out on the theory that people could look at it over the lunch hour, possibly. He will be presenting it this afternoon. So I'd like to do that now.

(Counsel distributing documents.)

And I have one other minor matter.

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MR.LEED: This is very timely, Mr. Thomsen.

MR. THOMSEN: Oh, for rebuttal testimony this is super-expedited.

CHAIRMAN DEALE: Is that it, Mr. Thomsen?

MR. THOMSEN: The other subject was, we do have some pending discovery of SCANP on geology-seismology items that we served on May 31. And we would like to get answers.

We were thinking in terms of fixing a mutually acceptable or a board-directed deadline as the case might be.

We can discuss this with Mr. Leed over the lunch hour.

CHAIRMAN DEALE: VEry good.

All right.

MR. THOMSEN: That's all I had.

CHAIRMAN DEALE: All right.

We are recessed for lunch and will come back at 1:30.

(Whereupon, at 12:00 Noon,the hearing was recessed to resume at 1:30 p.m. this same day)

AFTERNOON SESSION

1:30 p.m.

CHAIRMAN DEALE: Please come to order.

Mr. Thomsen, the agenda calls for your witnesses to take the stand.

MR. THOMSEN: Yes. We first call Mr. Mikels, recall him.

Mr. Little will handle the examination.

CHAIRMAN DEALE: Mr. Mikels has already been sworn in?

MR. THOMSEN: Yes. He has testified previously.

Whereupon,

FREDERICK C. MIKELS

was recalled as a witness on behalf of the Applicants, and having been previously duly sworn, was further examined and testified as follows:

DIRECT EXAMINATION

BY MR. LITTLE:

Q Mr.Mikels would you please state your name and business address?

A Frederick C. Mikels, M-i-k-e-l-s, P.O. Box 6387 Kennewick, Washington.

Q And you have previously testified in these proceedings?

A Yes, I have.

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Q Could you briefly review for us your professional experience with Ranney collectors?

A Well, I graduated from Rose Polytechnic Institute in 1949. I have a bachelor of science degree in civil engineering. I am a registered professional engineer in five states.

Upon my graduation from Rose, I started to work at the Groundwater Branch of the United States Geological Survey. This would be in 1949.

In 1951 I went to work for Ranney Method Water Supplies, Inc. in Columbus, Ohio. My job with Ranney Method was conducting hydrogeological investigations, hydrogeological surveys to determine the feasibility of installing Ranney collectors.

I continued in that position until 1957 when I moved west and went to work for Ranney Method Western Corporation.

At Ranney Method Western Corporation I continued running these types of investigations and got further into the actual construction of the Ranney collectors.

In 1964, I became president and chief engineer of Ranney Method Western Corporation and have continued that until the current time.

Q Thank you.

Have you had an opportunity to review the

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transcript of testimony given by Paul Weber on the Ranney collectors proposed for the Skagit project?

A Yes, I have.

Q Now there are three different aspects of Mr. Weber's testimony that I would like you to address.

The first concerns his testimony on the applicability of Darcy's Law to pumping through coarse-grained material.

Have you had a chance to review -- and I believe he identified a reference by Cedergren. Have you had an opportunity to review that reference?

A Yes, I have.

Q As well as the transcript testimony given by Mr. Weber on this subject?

A Yes, I have.

Q What comments would you have on this aspect of Mr. Weber's testimony?

A In Mr. Weber's testimony he questions the reliability of the calculations based on several factors.

One is the high permeability; two is the high gradients, the high volume of pumpage and -- I guess basically those are the three factors. And, the nature of the material that we have on the jobsite, the nature of the sands and gravels. And I would like to kind of go through those one at a time.

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First of all, regarding the permeabilities at the Skagit site, the permeabilities at that site are 5790 for site No. 4, 8900 for site No. 3, and 28,400 for sites 1 and 2. And these are all expressed in gallons per day per square foot.

In order to compare these permeabilities with other permeabilities we have experienced, I reviewed our job files as well as literature on permeabilities where existing groundwater supplies have been installed, and I have kind of summarized that on a sheet there to refresh my memory.

First of all, as far as our Ranney test concern; on the American River at Carmichael, California, we observed permeabilities ranging from 24,500 to 38,000 gallons per day per square foot.

Q Those were greater than the permeabilities measured at the Skagit site?

A Yes. The lower one is slightly lower, the 38,000 is somewhat higher than the 28,000 that was observed.

At Crescent City, California on the Smith River, we observed a permeability of 96,700 gallons per day per square foot.

On the Columbia River at Wallula, Washington, we observed a permeability of 30,300 gallons per day per square foot.

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And at Eugene, Oregon, on the Willamette River, we observed permeabilities ranging from 23,000 to 29,400 gallons per day per square foot.

In addition to our tests, I reviewed some other permeabilities that have been determined by others in the Pacific Northwest.

And at Junction City, oregon on the Willamette River, the United States Geological Survey determined the permeability on an existing well there of 101,000 gallons per day per square foot.

Q Again for point of reference, the maximum permeability at Skagit was what, about 28,000?

A The maximum permeability at Skagit was 28,400, right.

Q Thank you.

A And further, on the Columbia River at Vancouver, Washington, again the U.S. Geological Survey in studying the Alcoa Aluminum wellfield down there, observed a permeability of 150,000 gallons per day per square foot.

There is one more I would like to cite, and this is probably, you might say, the grandaddy of them all. The City of Tacoma constructed a vertical wellfield on the north fork of the Green River, and permeabilities at that site ranged from 344,000 gallons per day per square foot to 459,000 gallons per day per square foot.

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I might add that this wellfield that was installed there by the City of Tacoma consists of six vertical wells, 30-inch diameter wells, and the six wells are pumped at a rate of 72 million gallons a day which is somewhat more than we are designing the Ranney collectors at the Skagit plant for. The maximum water requirement for the Skagit plant is 68 million gallons per day.

Incidentally, those wells produce that quantity of water with drawdowns of only -- in the best well 1.9 feet, and in the worst well, about [illegible] feet.

This, of course, is a permeability of 10 to 15 times the maximum permeability we have at the Skagit plant. In other words, the only point I want to make here is that while our permeabilities are high, they are not unusual or permeabilities that have been seen for the first time.

MR. LINENBERGER: Sir, while you are on this point, you made a comment about the drawdown figures, I believe the Green River.

Is that correct?

THE WITNESS: Yes, sir. These are not Ranney collectors, these are vertical wells.

MR. LINENBERGER: Right.

Am I correct in thinking that the amount of drawdown has some kind of inverse relationship with permeability.

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In other words, the higher the permeability, the less the drawdown?

THE WITNESS: Yes, the less the drawdown.

Now then, because of these high permeabilities in the testimony it is suggested that perhaps the computed -- our calculations should be reduced by some factor.

And in citing this reference, the book entitled, Seepage, Drainage and Flow Nets by Cedergren has been used. And specifically, the reference was to page 196 --

BY MR. LITTLE:

Q To page 96. I think it may have meant 196.

A Oh.

Q The transcript said 96, but I don't think the page 96 reference has anything to do with the subject.

A The testimony was discussing a method by which you could reduce your computations due to high flows and turbulent flows.

And on page 196, Cedergren gives a table which is for crushed American river gravel containing no fines. In other words, these were manmade materials which had been screened and washed to where there was no sand, no fine material left inside them.

This table has two columns. In one column it gives a hydraulic gradient; in the other column it gives what is called a D-10 size. And this is what is known as affective

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grain diameter, which means that it is a grain diameter where 10 percent of the material is finer than, and 90 percent is coarser than that grain size.

And this grain size has a sort of relationship to permeability.

Now in arriving at this table, Cedergren goes back and discussed the tests he made, he was involved in, in working up this table.

He took three different sizes of American river crushed gravels in which the fines had been removed. The smallest size he used was three-eighths of an inch. The intermediate size was one-half inch, and the top size was three-quarter inch.

He percolated water through these open gravels which had been washed clean of the fines and go t measurements in order to convert these values or these factors of C, which are his correction factors.

The permeabilities of these materials that he used to run these tests, his smallest size American river crushed gravel, which was a three-eighth size, had a permeability of 224,000 gallons per day per square foot, which is about eight times our permeability at sites 1 and 2, and 25 to 40 times our permeabilities at sites 3 and 4.

The largest gravel that he used in his test

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was the three-quarter inch size which had a permeability of 897,000 gallons per day per square foot, which is 30 times the permeability we have at collectors 1 and 2, and over 100 times the permeability we have at collectors 3 and 4.

In his table he doesn't get up to any correction factors whatsoever until he gets above a gradient of 10 percent, and above an effective size of about a quarter of an inch. He filled in his table somewhat from his actual test data. He has expanded in both directions.

The significance of all this is that Cedergren was using this table to design filter drains. He was using manmade materials, crushed gravels which had been crushed to a given size, washed clean of all fines, in order to collect seepage under dams.

Now, as related tothe Skagit, our type of material is not at all manmade material. It is a naturally deposited sand and gravel formation. It is quite similar to sand and gravel formations I have seen in river valleys all over the United States. Its composition -- it is composed of materials ranging all the way from fine sand up to six-inch diameter cobbles.

The material contains probably about something on the order of 30 percent sand and 70 percent gravel. It is what we would describe as a sandy gravel.

mm11 1 The gravel itself ranges up to a maximum size
2 of six-inch. Predominant material in the gravel is what
3 we would classify as pea gravel, or perhaps pebble gravel
4 which goes up to 2 1/2 inches.
5 These materials, of course, are not in any way
6 comparable to the artificial materials that Cedergren has
7 describedin his table. They are much lower in permeability
8 and much finer incharacter, and they are typical of the
9 types of gravels I have seen in Ranney collectors in my
10 last 28 years of experience in the business.
11 So that the condition that you have in open gravel
12 where you might reach the high velocities and need to apply
13 the correction factors given in the Cedergren table, do
14 not apply to our aquifer at Skagit.
15 In my previous testimony at the last hearing, I
16 prsented a graph showing a Reynolds number plotted against
17 the fanning friction factor. And it is my conclusion that
18 this graph definitely shows that we are in tha
19 laminar flow range, and therefore Darcy's law does prevail
20 and we can accurately predict the collector yields at the
21 site.
22 Q Thank you.
23 The next line of Mr. Weber's testimony that I
24 would like to have you address, concerns his comments on
25 the relocation of the caissons for the Ranney collectors.

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I believe his claim was that by moving the caissons 50 feet further inland under the proposed redesign, that the drawdown cone would also move 50 feet inland.

A That's correct.

Q Have you reviewed Exhibit 178 which depicts, which illustrates generally his principle about which Mr. Weber has testified?

A Yes, I have reviewed that.

Q Now, I would like to begin with a general discussion of the cone of depression from the Ranney collector system.

MR. LITTLE: Mr. Chairman, we have an exhibit I would like to distribute.

(Counsel distributing document to Board and Parties)

MR. THOMSEN: This would be Exhibit 209, I believe.

(The document referred to was marked Applicants' Exhibit 209 for identification.)

MR. LITTLE: What we have marked as Exhibit 209 is a drawing, a one-page drawing made on legal-sized paper containing four different sketches showing a cross-section of a Ranney collector with its cone of depression.

BY MR. LITTLE:

Q Mr. Mikels, did you prepare this exhibit 209?

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A Yes, I did.

Q And the term "cone of depression," is that also sometimes called a drawdown cone?

A Yes, it is also called a drawdown cone.

Q Okay.

Now, what you have depicted here, is this the Skagit collectors?

A No. This is just an illustrative example of any Ranney collector across any river. It is not intended to represent any specific installation.

Q And perhaps we could turn to Sketch A.

Could you describe to us what Sketch A depicts?

A In Sketch A I have shown some horizontal laterals and a vertical caisson located at the riverward end of these laterals. We show the river on the left, we show the static water level which is the light dashed line, and we show a cone of depression which is what the cone would look like when you start pumping the horizontal laterals.

To illustrate what does happen here, the area immediately above the laterals is completely lowered to the horizontal heavy dashed line we see along the full length of the laterals.

Once you leave the end of the laterals, this cone of depression curves upward on its characteristic curve in

mm14 both directions until it reaches the static level or the zero level out at some given point.

That essentially is what is depicted in Sketch A.

Q Now, as you go to Sketch B, what have you changed?

A In Sketch B I have left the horizontal laterals precisely the same as Sketch A. I have used the same pumping level, the same drawdown as in Sketch A -- that is the dashed line on the cone of depression. But I have moved the caisson from the riverward end of the laterals to the center of the laterals.

Here again, in this instance, all the groundwater immediately above the laterals is pulled down to a horizontal line over the laterals, and then the cone of depression commences at each end as you leave the laterals.

Q What is the purpose of the caisson?

A The caisson is merely used to install your pumps to the water to the system.

It is also used in the construction way to install them in our particular method. Although they could be dug in and excavated in.

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Q Perhaps you could go to Sketch C and tell us how that compares with Sketches A and B?

A In Sketch C, again I have kept the horizontal laterals in exactly the same position as they were in Sketches A and B. And I've moved the caisson completely to the landward end of the laterals. Again, the groundwater level in the area overlying laterals is pulled down to a level area extending entirely along the length of the lateral. And once you reach the end of the lateral and go into the aquifer the cone of depression starts its characteristic return to the zero point.

Q Does the cone of depression as shown on Sketches A, B and C in Exhibit 209 change from one sketch to the other?

A No, they are identical in all sketches. We assumed we were pumping precisely the same amount of water in each one of those three sketches.

Q And finally could you describe for us what you are showing in Sketch D of Exhibit 209?

A In Sketch D again I have left the horizontal laterals in the same position they were in Sketches A, B and C, and I have moved the caisson at some -- you could say any distance from the horizontal laterals and connected the horizontal laterals with a pipeline to the caissons.

Again, the cone of depression is drawn down to a horizontal line over the horizontal laterals, and once you

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leave the area of the perforated laterals it moves on its characteristic curve back to the starting point.

Q And Sketch D, does the pipeline have any perforation in it?

A No, the pipeline is a solid pipeline. And Sketch D, incidentally, would be a rather difficult construction feat and I'm not suggesting that is a reasonable design because you would have to install that by open excavation. And at the depths we're talking about, this is not reasonable. I merely included it to show that the location of the caisson does not have any particular effect on the cone of depression. as long as the horizontal laterals remain in the same position.

Q Next I would like to hand you Exhibit 178, which is the sketch drawn by Mr. Weber showing the drawdown cones for the prior and the relocated caisson locations.

(Handing document to the witness.)

What would be your comments on Exhibit 178?

A I think, as I recall the testimony, this exhibit was used in connection with the plan of the original design and alternate design of the horizontal laterals, and I think it might be good to have that sketch as a plane of reference for this drawing.

(Document handed to the witness.)

As I understand it from reading the testimony, this drawing was made by placing this over the plan and

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drawing the cone of depression for condition one, which was the original design, which is the green line, and condition two, which is the red line, for the situation where the caisson was moved 50 feet inland.

Q For the record, you're laying Exhibit 178 on top of?

A On top of Exhibit 164.

Q Thank you.

A What Mr. Weber has done here, he's drawn these cones of depression as commencing at the caisson and starting their upward concave curve at that point in both one and two. And this of course would be the type of drawdown curve you would expect if you had no horizontal laterals.

In other words, this would be the drawdown curve if we just considered that the caisson was a vertical well, with no horizontal laterals whatsoever.

(Distributing documents.)

MR. LITTLE: We're distributing what we have marked as Exhibit 210, a drawing again showing a cross-section through a Ranney Collector system with cones of depression for an original design and a proposed design.

(Whereupon, the document referred to was marked as Exhibit Number 210 for identification.)

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BY MR. LITTLE:

Q Mr. Mikels, did you prepare what I have marked as Exhibit 210?

A Yes, I did.

Q And could you describe the manner in which that was prepared?

A I prepared this exhibit using Exhibit 164 to scale as a base, and by laying it over the top to locate the caissons and the horizontal laterals. In other words, I used the same scale as was used on Mr. Weber's drawing. And I have two cross-sections depicted here. One is the original design with the caisson located more or less in the center of the horizontal laterals; the second one is what is now called the proposed design with the caisson located 50 feet further inland.

Q And what is the effect on the cone of depression of moving the caisson 50 feet inland?

A There is no effect whatsoever. The cone of depression in both situations is identical. Again, the groundwater level being flat over the area of the horizontal laterals and the cone of depression commencing once you leave beyond the end of the laterals.

Q The third topic in Mr. Weber's testimony that I'd like to have you address is that part of the testimony in which he questions the use of the permeability characteristics

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from the site of collector number one, which is the site most upstream. He questions the use of those permeability characteristics to calculate the yield for collector number two, which is the next collector downstream.

Now have you had an opportunity to review Exhibit 177 as well as Mr. Weber's testimony on the subject?

A Exhibit 177?

Q Yes. I'll give you a copy of that.

(Document handed to the witness.)

A Is that the aerial photo?

Q Yes.

A Yes, I have looked at that.

Q What would your comments be on this aspect of Mr. Weber's testimony?

A Well, I would refer to page 15 of the hydrogeological survey report.

Q Just one second, please.

That is Appendix G in the Environmental Report.

A On page 15 I state that:

"Because of the similarity in depth, character of materials and the result of small rate test pumping, the site of Test Hole 18 appears comparable to that at Site F. Although no detailed pumping test was conducted at this site, it is considered reasonable to assume

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that a Ranney Collector constructed at this site will have identical yield characteristics to those at Site F, that is an average yield of 49.7 mgd and a minimum yield of 38.3 mgd."

Q Now for the record, can you tell us the location of Site F and the location of Test Hole 18?

A The location of Site F is at the proposed location for Ranney Collector number one, and Test Hole 18 is at the site of proposed Ranney Collector number two.

To go a little further into the reason for making this statement, I would refer to the figure shown for logs of the test holes in area four, and that's figure SW67-5. The logs of Test Holes 18 and 20 are shown on this sheet and are shown to be quite similar, although the alluvial aquifer at Test Hole 18 is slightly deeper than Test Hole 20.

I was on the job site when these test holes were drilled and did have the chance to observe the materials encountered. I consider them to be very similar.

I would also refer -- on the test holes here there are small rate pumping tests. At Test Hole 20 the observed drawdown on the small rate test was 11/100ths of a foot at 100 gallon a minute. This incidentally is a very high capacity to have only .11 feet of drawdown for 100 gallon a minute.

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At Test Hole 18 it was 0.18 feet for drawdown at 100 gallon per minute, again a high capacity. Then as we move down to sites three and four which are represented by Test Holes 16 and 17, we see this drawdown becomes over two times, two to three times as much at Test Hole 16 where it's 0.42 feet of drawdown at 100 gallons per minute, and at Test Hole 17 where it's 0.37 feet of drawdown at 100 gallon a minute.

It's from this data that I conclude that the conditions at Test Holes 18 and 20 -- or let me put it this way:

The conditions at Test Holes 18 and 20 are similar to Test Hole 20 rather than to the conditions at Test Holes 16 and 17.

We had an opportunity to confirm this conclusion at a later date. Test Hole 18 was the site where the 16 inch well was constructed that was pumped for the six month period. The observed drawdown of the 16 inch well was 3.8 feet for a pumping rate of 1325 gallons per minute. And we can compare that pumping with the drawdown of the pumping site F which was collector number one, the pumping well FPW, which had a drawdown of 3.2 feet at a pumping rate of 937 gallons per minute.

In other words, the 16 inch well was pumped at a rate of about 50 percent higher and had a drawdown of

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only 20 percent more, which would indicate in effect that it was a better site than site F, which is the site of collector number one. We feel this definitely confirms that the two sites are very similar and that an identical permeability can be used at both sites.

Q Let me see if I understand the timing of this.

The Appendix G to the ER was prepared prior to the 16 inch well pumping test?

A That's correct. The 16 inch well was added at a later date. I'm not sure I can remember exactly the date.

Q Just the relative time period.

A This report was written in March of 1974, and I think we constructed the -- well, now, I don't know. It was December, but I don't remember if it was December '74 or '75.

But it was built after this report was written.

Q Do you have any further comments to make?

(No response.)

MR. LITTLE: That's the extent of our direct examination.

CHAIRMAN DEALE: Thank you.

Mr. Black?

MR. BLACK: I have no questions.

CHAIRMAN DEALE: Mr. Leed?

MR. LEED: Mr. Weber.

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CROSS-EXAMINATION

BY MR. WEBER:

Q Mr. Mikels, as I understand it, you directed the studies, analyses and design for the proposed Ranney Collector at the Skagit Power Plant, is that correct?

A That's right.

Q And that means that you devised, supervised the field pumping tests at Collector site number four, is that correct?

A You're speaking of area four?

Q Area four, yes, sir.

A Yes, sir.

Q Were you personally present for the conduction of the field operation?

A I was in and out of the job site. As I recall I was present on all three of the pumping tests, and I was off and on. I wasn't permanently on the job site. I had a superintendent twho was.

Q And did you select the details of the pumping test in the pumping test operations? By "details" I mean such things as the casing size, depth, zone of slotting, pump size, number and location of observation wells, method of measuring the observation wells?

A That's correct. I had a superintendent. Sometimes we would talk on the phone and I would advise him

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as to where to perforate the well. But I did all this, yes.

Q Did the well casings penetrate the aquifer at each of the pumping site locations?

A For the most part, all of the test wells were drilled until they hit the impermeable base of the aquifer. Insofar as the observation wells are concerned, some of them we would stop short of the base of the aquifer.

Q How were the observation wells established?

A Are you speaking of the location and depth, or what?

Q No, how the well itself was established. How was the observation well constructed? Of what was it constructed?

A Oh, it was eight inch casing.

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Q Slotted?

A Perforated.

Right. After we -- after we install it, we put Mills knife in it and perforate it.

Q Was the casing developed?

A Do you mean was the well developed?

Q Was the observation well developed?

A Yes, of course, they were all developed by pumping.

Q How was the water level in the well recorded?

A The water level in the well was recorded continuously by means of Stevens type F automatic water level recorders.

Q Tape? Tape output?

A No, this was a fluid operated automatic water level recorder.

Q The output is recorded how?

A It's recorded on a graph.

Q That's what I meant by asking if it's tape recorded.

A Well, what I meant was it was recorded on a graph. I assumedwhen I said a Stevens type F water level recorder that this would be understood.

Q Mr. Mikels, there was an original design concept for the Ranney well collectors involving a cason at 100

david2

feet from the river bank and a circular pattern of laterals. Then at a subsequent time, due to an environmental consideration, the well casing was moved to 150 inland and a new pattern of laterals was established; is that correct?

A That's correct.

Q Could you describe the geometry in some detail of first the original layout and then, second, the revised layout of the Ranney collectors?

A I have Exhibit 164 here, which refers to collectors number one and two, and it shows -- it shows the original design and the revised design.

The original design is a circular pattern, consisting of -- maybe this would be easier -- consisting of 16 10 inch diameter horizontal screen laterals, ranging in length from 91 feet to 140 feet.

MR. LITTLE: You're referring to which exhibit number?

THE WITNESS: This is Exhibit 164.

Do you want the revised design?

BY MR. WEBER:

Q Please.

A The revised design consists of -- now consists of 10 16 inch diameter laterals, ranging in length from 49 up to 154 feet.

The two lateral patterns cover the same area of the aquafer.

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Q What was the depth ofthe cason?

A The depth of the cason below ground surface?

Q Yes.

A These are shown on figure SW-67-24 of the Hydrogeological survey report.

And for collector number one from ground level to the cutting shoe, is 46 feet. For collector number two, from ground level to the cutting shoe is 48.5 feet.

Q When you said "one and two," did you mean the original design and the revised design?

A No, the depth of the collectors is the same. I was -- in both designs.

The depth of the rainforced concrete cason is the same.

Q Okay, that's what I wanted to know.

And at what depth is the invert of the laterals?

A I can give you a center line depth here.

Q All right, center line.

A The center line is five feet above those -- above the cutting shoe, which would for collector one -- would make it 41 feet and for collector number two it would make it 40 -- 48.5 feet.

Q Did you say 48.5?

A Let's -- no, 38.5. Excuse me. I was subtracting 51.5. 38.5 feet.

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Q And what about comparable numbers for collectors three and four?

A For -- you want the depth of the center line of the horizontal laterals below ground surface, right?

Q Yes.

A For collector number three, that is 36 feet; for collector number four, that's 40 feet.

Q How is that depth determined?

A How is the depth determined?

Q Yes.

A We sink the cason until we encounter the impermeable base of the aquafer and in shallow collectors like this we have a fixed distance of five feet from the cutting shoe to the center line of the laterals.

So basically the center of the laterals lie five feet off the impermeable base of the aquafer.

Q What are the laterals constructed of, what material?

A The laterals are mild steel. 0.365 inch thick wall mild steel with machine made slots.

That is the 10 inch laterals. The 16 inch laterals would have a slightly thicker wall, and I can't recall that figure right now.

Q It would be somewhat larger than the .365 -- somewhat thicker.

A I think it's a half inch wall level for the 16 inch.

david5

Approximately.

Q What's the slot dimension on the 10 inch diameter casing?

A The slot dimension is 3/8th inch in width and 2 inches in length.

Q And the 16 inch diameter?

A The same slot size.

Q Isn't it true that it requires a certain number of laterals to fully develop these circular zones around the cason?

A We based our design of the laterals on an entrance velocity through the screen slots. We have a design requirement where we -- based on experience, we find it's not desirable to exceed an average entrance velocity of more than 0.05 feet per second through the slot.

This criteria, then, gives us the basis to determine how many lineal feet of horizontal screen laterals we would put in the collector.

MR. LINENBERGER: Mr. Weber, excuse me, but I think the record would be assisted here by knowing what you mean by "fully determined" -- "fully developed."

What does fully developed mean to you in the context in which you asked that last question?

MR. WEBER: The assumption is made that the drawdown cone encompasses a circular -- a circular doughnut,

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for a better term -- around the cason or around the center of the pumping, as the case may be.

I'm referring to the fact that widely spaced laterals may not fully develop that cone of -- or that doughnut of drawdown cone, and therefore the efficiency of the well collection system would be less.

MR. LINENBERGER: Wel,. then, by "fully developed" you refer to achieving the largest possible drawdown cone for --

MR. WEBER: Achieving a fully developed drawdown cone.

MR. LINENBERGER: Meaning the largest possible?

MR. WEBER: Yes.

MR. LINENBERGER: For a given configuration of cason laterals, the number of laterals?

MR. WEBER: Yes.

MR. LINENBERGER: Thank you.

BY MR. WEBER:

Q So I'll ask the question again: is it not true that the laterals -- that it is required to space the laterals a certain distance apart in order to fully develop the Ranney wells?

A There are two designcriteria involved here. One is in our computations we assume that we are going to develop an effective radius of 100 feet so that then we need

david7

a certain -- certain horizontal level pattern to develop that radius.

The second design requirement is that we do not want the entrance velocity through our slots to exceed 0.05 feet per second. This is so we'll have a long-lived structure. We won't have well loss, encrustation, clogging up.

We don't want a big pressure drop in moving through the slots.

DR. HOOPER: Mr. Mikels, it's very difficult to follow this cross examination, if you don't answer his question yes or no.

You give another answer and then you qualify it. Would you go back and please answer his question yes or no and then qualify it.

Then we have some way of following. It's very difficult to follo when you start out on you without answering his question.

Could you do that please?

THE WITNESS: All right. Maybe -- maybe I should have the question repeated.

DR. HOOPER: Can you repeat it?

BY MR. WEBER:

Q is it not true that the horizontal laterals must be spaced a certain distance apart in order to fully develop

david8

the Ranney well?

A Well, yes, that's true.

Q Are 10 laterals connected with the Ranney wells as designed for the Skagit site sufficient to fully develop the Ranney well?

A Yes, it's fully sufficient to develop the effective radius of 100 feet.

Q How do you know that?

A I know it from experience.

Q Then will you cite your experience.

A Well, I've been in charge of constructing well over -- I would say well over 100 Ranney collectors in the United States.

We make our designs on the assumption that we're going to develop a given effective radius;after the collector is built, we run our test to see if it establishes if we have indeed created that effective radius.

We know more or less what sort of patterns we need to get given radii. We know more or less what sort of degree spacing we need to get them and what sort of lengths of lines.

Q Can you cite a specific example under similar circumstances where 10 laterals fully developed the intended product?

A Yes, I can. I can cite one that's very familiar.

david9

My -- because it's fairly different. It's the Sonoma County Water Agency.

In that instance we have eight laterals at 45 degrees to develop the effective radius of 100 feet.

Q At what yield?

A This was designed for 20 million gallons a day.

MR. LINENBERGER: Excuse me, gentlemen; maybe the problem is mine. I don't know, but I think I hear the two of you talking about two different things.

Dr. Weber, you were talking about fully developing the well, and I asked you for a definition and you said "achieve a maximum size cone drawdown for that well," if I understood you correctly.

Mr. Mikels, I think I hear you saying something else, that you were not designing these for a fully developed mode of operation in the sense of the largest possible drawdown cone, but for a specific size of drawdown cone, and not to exceed a specific entrance velocity of intake into the laterals.

Is that true?

THE WITNESS: Yes, sir.

MR. LINENBERGER: Well, sir, I think the two of you are talking about two different operating conditions, and I'm just worried, lest the record get confused here, I -- Mr. Weber, it's your ballgame, but when you talk about

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a fully developed well, that's not what Mr. Mikels is talking about as his objective for the Ranney collectors at this site.

He's talking about an objective of 100 foot cone and not to exceed a half a foot per second as entrance velocity into the laterals. That may not be the same as what you're asking him about, so I just wanted to note that difference.

MR. WEBER: Thank you.

BY MR. WEBER:

Q When you make the calculation for the yield based upon 10 laterals for this Ranney well, youassume a fully developed cone of drawdown, do you not?

A No, sir. We assume a 100 foot effective radius as one of our basic assumptions in making the calculations.

(Counsel for Intervenor SCANP conferring.)

Q But in that 100 foot effective radius, you assume a uniform cone of drawdown, is that not correct?

A Thereis no cone of drawdown within the 100 foot effective radius. The water surface is assumed to be flat within that radius.

Q IN making the yield calculation, you assume a uniform cylindrical body of -- of dewatering, is that not correct?

A That's correct, a 100 foot radius, right.

davidll

Q And do the 10 laterals as designed for this Ranney well for this project fully develop that cylinder of withdrawn water in producing the calculated yield?

A Yes, they will.

Q HOw do you know that?

A I know that based on my experience.

Q The case that you cited, is it operating?

A Oh, my, yes.

There are two down there. They're identical, actually. There are two 20 million gallons per day units.

Q How are the laterals installed?

MR. LITTLE: Mr. Chairman, I think many of these questions have been beyond the scope of the direct. I'm not sure where we're going with the preliminary question, but I wondered if we could try to contain it, perhaps, to the subject brought up by Mr. Mikels.

(Board conferring.)

MR. LITTLE: I believe we also have perhaps a movie explaining the installation of the laterals.

CHAIRMAN DEALE: The board really has no objections to Mr. Weber's probing at this point. Go ahead, Mr. Weber.

MR. WEBER: Thank you.

BY MR. WEBER:

Q Do you have the question?

david12

A I have the question, right.

The first step in installing the horizontal screen laterals is to grout a cast iron port into the wall. On the port we place a rubber stuffing box ring which is held in place by a steel annular ring. This provides a rubber seal so that when we break the cason wall we can contain the water.

The screen pipe -- a digging head is welded to the first section of the screen pipe; inside of this digging head there is a conical shaped casting of which a small diameter pipe -- if we are using 10 inch, it would be a four inch diameter solid pipe -- abuts up against this casting.

In between the outer screen and the inner solid line there are a series of rubber packers that seal the annular space between the inside pipe and the outside pipe to prevent water from entering the cason through that manner.

This assembly is then placed inthe jacking assembly and the screen is jacked through the wall of the cason.

At that time, water starts flowing from the aquafer through the solid line, spilling into the cason floor. We have a pump running all the time while this operation is going on.

Water enters the digging head carrying sand and

David13

finer material into the cason, permitting a -- sort of a path ahead for thepipe to be advanced into;as each seven foot section of line is put into place, another section of line and another sand line is added.

This process continues until we get the line out to the desired depth.

Keep in mind, all the time that the material is removed, as we're projecting -- and it comes from the digging head, not from the slots along the pipe.

After the line is completed a gate valve is installed at the end of the line and the inner solid sand line assembly is removed. At this point in time, of course, with that condition, water can come in through the perforations along the entire length of the horizontal lateral.

After all the laterals have been projected, we go back individually into each line with a restricting device which concentrates the development in about an 18 inch length of pipe, moves thisout andback, and forth in the line until we've collected all -- any sand remaining that we might not have removed during the original projection process.

Q What's your control on alignment?

A We check the level of the pipe every so often by means of a U-tube monometer.

Q The lines are installed horizontally, level?

A Substantially level. We allow them -- we usually

david14

permit a slight deviation. We usually have that specified in our contract because nobody can project everything 100 percent level.

Q In your consideration of the elevation of the laterals, you indicated that you had a stand five foot elevation rise above the bottom of the cson. Is that the only factor that enters into the position of the lateral, the depth position of the lateral?

A That's correct.

Q The position of the river bottom doesn't enter into the location of the lateral?

A NO.

Q Did you consider whether the lateral could be removed by scour from high flow in the river?

A I have not investigated scour from the river, no.

Q Mr. Mikels, in your excellent paper that's attached to your earlier testimony -- I'll give you a reference here in a second --

(Pause.)

"Application of Ground Water Hydrology to the Development of Water Supplies by Induced Infiltration."

You say it is necessary -- I'm readin gn page 237 and following on to page 238: "It is necessary to install lines of observation wells in several directions to properly evaluate the permeability and the effective distance to the

david15

line source."

Didyou do that in this case?

A No, I didn't.

Q A little further on page 238, I quote another section from your paper.

"The methods,"and the methods are those referred to in the earlier paragraph about calculating yield -- "The methods yield good results where the water bearing formation is reasonably uniform in character and thickness and in such instances two lines of wells parallel to and normal towards the surface source are generally adequate."

Is the water bearing formation of the Ranney site reasonably uniform in character and thickness?

A Yes.

Q What do you mean by reasonably uniform?

A Reasonably uniform might be anything. If we are talking about the specific site here, I would say -- well, insofar as my experience is concerned, I would consider any alluvial gravels I've seen to be reasonably uniform, unless we have such a major change to complete sand, complete gravel or a clay layer.

These are the sort of things that I would consider not to be reasonably uniform.

Q Do you consider a difference in permeability of several magnitudes reasonably uniform?

david16

A You're talking about a difference in permeability between two different sites, I guess -- I gather.

Q Just in general.

A Well, my experience along the river valleys has been that you can find permeabilities varying quite a lot from site to site along the same river, right.

Q Do you consider the variation of permeability of several magnitudes within the area number four reasonably uniform?

A Well, I would consider the permeability is reasonably uniform there.

I think in the sentence that that -- the context of that sentence is taken -- I think it's talking about the uniformity of materials out of pumping test sites.

Q Isn't permeability one of the characteristics of the aquater?

A Yes, it is.

Q You also say in your paper on page 236, "If major irregularities in the formation exist, these should be readily apparent from the test drilling and proper consideration of the variations can be made."

Are there major irregularities in the formation at this site?

A No.

Q Is there a meander channel of an old river bed

david17

cutting through this site?

A Not that I know of. I've seen a slough area there; I couldn't say that that's a meander of an old river channel there.

Q What if an experience geomorphologist told you there was an old meander channel running through the site; would that be a significant variation or irregularity?

A Well, if there was an old channel running through the site and depending upon what the old channel was filled with, this would be considered an irregularity.

end 19

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MELTZER

Q Is it your practice to run production pumping tests on completed collectors?

A Yes,sir.

Q How do you do that?

A We install pumping capacity equal to the design of the collector and test pump it at its designed rate.

Q Is it just for yield?

A We take water quality samples also.

Q Are any observation wells installed?

A Not generally on the production tests. Sometimes there are some observationwells that have been left from the original hydrogeological survey that are used.

Q And do you do that, do you observe those as well?

A If we had observation wells, we would observe them, yes.

Q Have you donethat?

A Yes, I have.

Q Do you have that data in the record?

A Do I have that data in the record?

Q Yes, sir.

A You mean for all the Ranney collectors we have ever tested?

A Any that you have measured observation wells on during production tests.

A They are not in the record, no.

mm2

Q Referring you to Exhibit 210.

What assumptions go into producing the graphs that you have shown on Exhibit 210?

A Pardon?

Q What assumptions are involved in the production of the graph on Exhibit 210?

A Well, the assumptions are that the horizontal laterals are sufficient horizontal laterals to lower the water level immediately above them in a substantially flat plain.

Q Anything else?

A Well, the cone of depression as depicted is steeper towards the river, which shows that water is coming toward it from the river.

But this is just a generalized cone. It is not an actual computed cone --

Q It is idealized, isn't it?

A It is just sketched similar to the one that you sketched in Exhibit 178.

Q Did you assume any head loss between the pumping source and the heads of the pipes?

A You are talking about head loss through the screen?

Q Yes.

A Well I haven't shown that. That would be shown

mm3

by the water level in the caisson. The dashed line is the water level in the ground. And that would be only the friction loss in the pipes which would be on the order of one or two-tenths of a foot.

Q But the configuration you have shown here is an assumed configuration, isn't it?

A It's a sketch based on my experience as to what this cone would look like.

Q That's assuming what it would look like.

A That's right.

I have drilled observation wells within the pattern of the horizontal laterals, and I do find that the water level in the ground within the zone of laterals is the same as the water level within the caisson, within just a few tenths of a foot.

Q That's an important factor.

Could you furnish the data that backs up the production of this graph?

A Yes, I could furnish you data on that.

Q Thank you.

Mr. Mikels, this is a complicated problem in geohydrology, isn't it?

MR. LITTLE: Could we be a little more specific with "this".

mm4

BY MR. WEBER:

Q The calculation of yield of a Ranney well?

A Well, I think I have been doing it long enough that I don't really consider it all that complicated.

The methods we have developed we have proven to be accurate. And as long as we follow thoseprocedures, I don't consider it to be that complicated.

Q The analysis is based on idealized formulas using many simplifying assumptions, though, isn't it?

A Yes. The analysis is based on the form generally recognized formulas in the field of groundwater hydrology, and there are assumptions made to develop those formulas.

Q Are there other numerical or analytical techniques available for calculating the yield of complex situations like this?

A Yes, I think there are.

Q You did not use the advanced techniques for this analysis though, did you?

A No, sir.

MR. LITTLE: Could we have some specification?

I'm fearful of getting into some testimony by the interrogator, once again.

MR. WEBER: The witness knows what I'm talking about.

MR. LITTLE: But the rest of us don't.

mm5

CHAIRMAN DEALE: I think the subject matter -- could you be more specific with respect to the comprehension of the term "advanced techniques."

BY MR. WEBER:

Q Mr. Mikels, there are numerical techniques available using numerical computer methods for calculating hydrologic responses in complex situations -- complex being variations of permeability, variations in stratification, variation in geometry.

Is that not correct?

A Yes, sir.

MR. WEBER: Does that make it any clearer?

MR. THOMSEN: A little.

BY MR. WEBER:

Q Then you did not feel that this situation warranted more advanced techniques of analysis?

A No, sir.

Q Thank you.

MR. WEBER: That will be all.

CHAIRMAN DEALE: All right.

Mr. Stachon?

MR. STACHON: I have nothing, Mr. Chairman.

CHAIRMAN DEALE: Mr. Moser?

MR. MOSER: Just a few questions, Mr. Chairman. Bear with me.

mm6

BY MR. MOSER:

Q Mr. Mikels, you prepared Exhibits 209 and 210, is that correct?

A Yes, I did.

Q And 210, also?

A Yes, I did.

Q When did you prepare these?

A Over the weekend.

Q All right.

The proposed design, as opposed to the original design of these Ranney well collectors, when was that change effected by your company?

A I can't recall that. We brought it up at the last hearing a year ago.

MR. LITTLE: Are you looking for an approximate date?

MR. THOMSEN: Last April or May.

THE WITNESS: It would be a year ago, April, May, I think.

BY MR. MOSER

Q And all that is being done here -- I realize the record might be clear, but I am trying to catch up here -- the only point that is being shown here is that caissons can be moved further upland without affecting the placement of the horizontal laterals, is that correct?

mm7

That's all that's being shown?

A What's being shown here is that the caisson can be moved. And as long as the horizontal laterals cover the same area of development, the cone of depressionand the center of pumping will remainthe same.

Q Will remain the same. All right.

These ten laterals -- I'm sorry, I missed some figures on that -- they range from 40 feet to how long? What's the maximum length?

A 154.

Q 154.

A That's 49 feet.

Q 49 feet. Thank you.

A To 154.

Q Can you give me an approximate distance the closest lateral would be to the edge of the riverbank? Not depth, but horizontal distance upland.

A I think the horizontal distance would be on the order of 20 feet.

MR. MOSER: That's all I have, Mr. Chairman.

Thank you.

CHAIRMANDEALE: All right.

Mr. Linenberger, do you have questions? Further questions?

MR. LINENBERGER: Yes, sir.

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EXAMINATION BY THE BOARD

BY MR. LINENBERGER:

Q Let's see, Mr. Mikels. We started out with these figures which were Exhibits 209 and 210.

MR. Weber most recently asked you about Exhibit 210, and you indicated that you could prepare that exhibit primarily based on your experiance with respect to the performance and drawdown measurements made on other wells.

A Yes, sir.

Q Now, sticking with Exhibit 210 for just a moment, I presume that represents a system where, essentially your same objective, performance objectives that you have for the Skagit wells, were also objectives -- I'm sorry, I'm getting off here.

These are schematics and don't refer to specific wells. But let me ask the question this way:

With refernce to Figure 210, do these schematics represent graphically the way the drawdown cone would look in a system where your performance objectives were that of let's say, a 100-foot diameter drawdown depression and not to exceed .05 feet per second input flow rate to the laterals?

A Yes, sir.

In other words, when we made our computations we assumed a 100-foot effective radius. And in this hypothetical

mm9

drawing there, that would be the point -- in this case it would be from the center of the caisson out to the point where the drawdown cone starts in the aquifer.

Q All right.

Now the thing I want to inquire a little bit now about is, suppose in a system that is performing in a manner that is graphically represented in Exhibit 210, you were to increase the -- attempt to increase the water -- the rate of withdrawal of water pumped from the caisson.

Then how would things change? How might this sketch change if you tried to increase the total withdrawal rate from --

A In the sketch I haven't given myself much room to do that. But this horizontal dashed line would go on down closer to the laterals.

In other words, if you increase the pumping rate this level would drop.

(Indicating on document.)

Q So you say that level would drop.

A Yes.

And then the cone of depressionwould then start at a slightly lower point. It would be a steeper cone of depression now because you are pumping more water, and the end point of it would be the same.

Q (Indicating) Are you saying in this figure that

mm10

the sides of the cone would become more nearly vertical if you are pumping more rapidly, or less vertical, more nearly horizontal if you were pumping more rapidly?

Which?

A The more water you pump the steeper the cone is going to be.

The end point of the cone would be hinged. This point out here would be hinged out to the river. That's where your recharge is coming.

(Indicating document)

This line would drop more uniformly so that the cone would actually steepen. In other words, it just gets back to Darcy's law that the flow is proportional to the gradient.

Q All right, sir.

Now again, referencing a question by Mr. Weber related to page 238 of attachment B of the Mikels' testimony of FEbruary 1978.

Let's look at the same sentence just above the middle of the page that Mr. Weber talked about. That sentence said, the methods yield good results where the water bearing formation is reasonably uniform in character and thickness. And in such instances two lines of wells parallel to and normal towards the surface source are generally adequate.

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I am interested in the part of that sentence dealing with the parallel to, and normal toward the surface source.

Is that the situation that will obtain at the proposed Skagit collectors, parallel to and normal toward the surface source?

A At the Skagit collectors we have only a parallel line of wells.

I might go further if I may on that.

Q Well, that answers that question.

Now then, please tell me your basis for confidence that that is all one needs to do at the site of the proposed Skagit Ranney system.

A Yes, sir, I can do that.

At the time I started towork for the company -- and this was not too many years after,our procedure in those days was to construct a line of parallel wells and a line of wells normal towards the river just as described in this article.

Now the reason for the two lines of wells was not to try to measure directional permeability, because you would get the same permeability no matter . w your wells were made --

Q I do have trouble with that statement.

Let's come back to that a little later.

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A Let me follow on and then come back to it.

Q Come back to it, please.

A The reason we wanted the two lines of wells was that we know that-- we wanted to find out for sure that we have infiltration from the river. And we know if we have a line of wells towards the river, then we are going to have a hinge point and this line is going to get steeper than the parallel line and this will be conclusive evidence that we are getting water from the river. And that's all the line did.

Now in the early -- I would say in the early 1960s with the costs of everything rising, we were looking for ways to keep our survey costs down and we decided really that we weren't getting our money's worth on that line of wells towards the river.

We had other ways of determining by the water level fluctuations that we were getting a recharge from there. We had other ways of determining this.

So in the early 1960s we stopped using the six observation wells and went down to the single parallel line and that's the way I have been running my surveys ever since. I am running one like that right now in Utah while we are sitting here. We have been through this before.

Q I guess I can be accused of leading the witness here, but so be it. I need it for the record.

mm13

Is it proper to characterize your testimony as saying that experience has shown you that it is not necessary to go normal to the source in order to get the production you are looking for?

A I would say based on my experience that a pumping well and a line of three observation wells parallel to the river give us the answers we want.

This is the type of test we have been using for the last -- since the early '60s, and I would say based on experience there are other ways of determining the recharge.

Q Let's go back to your statement that you made along the way in answering that previous question.

What you said -- you don't need to go perpendicular to the line of the source in order to determine what has happened to the permeability. AT least I thought you said that.

Conceptually that gives me a problem because I can visualize a river as a line of flowing water with symmetry about the soil -- symmetry of soil properties at equal distances paralleling the river.

But conceptually, it is easy for me to visualize these soil properties possibly changing rather rapidly as one moves perpendicularly away from the river. That's why I have a concern about your statement that you don't need

mm14

to go perpendicular to the river to get the permeabilities you want because in this case in Skagit, it is proposed to move the caisson and the farther away from the river, I realize that the center of pumping concept we are talking about presumably doesn't change, but I can't quite be so confident as you that permeabilities might not change as you shift this configuration.

Can you please speak to that, sir?

A Well, there were two questions there, I think, sir?

Q Yes, I think so.

A Let me cover the second one about shifting the caisson first, because I seem to think that that is probably the easiest to understand.

We have moved this concrete caisson, but our horizontal laterals are still in the same zone. We haven't moved them anywhere. They are still in the same zone.

DR. HOOPER: Excuse me, though. There are different lengths and different diameters and different numbers of them in that zone, sir, are there not?

THE WITNESS: Yes, sir.

They are different shaped configuration, but they are still covering the same zone of the aquifer.

At any rate, let's go back to the one I have had trouble for, and maybe -- let me start on this slightly different approach and maybe this will get us somewhere.

mm15

Let's forget that we have got a river. Let's take the classic case where all we have is a well, and an aquifer that goes in all directions.

Now it can be, as any alluvial aquifer is, it can be non-uniform. We will have a layer of sand here, a layer of clay there -- let's don't get any clay in it, that may complicate it -- but let's get fine sand and coarse sand, all sorts of gravel. And these vary all directions, north, south, east, west.

Now, you might say, well, if I wanted a real, 100 percent answer, I should put a pumping well in the center and I should have maybe eight or ten lines of observation wells going in all directions.

But the fact of the matter is when you pump this pumping well, you will observe a drawdown of water level that you have lowered. And lowering that water level is the result of what is happening all over that aquifer. In other words, water is flowing regularly to that well. And this is a composite of the net effects of all these little bits and pieces out there that might be changing things. And that is what a pumping test does and that's why pumping tests work so much better than laboratory samples, or from test wells.

And what I'm saying is, you will get a bunch of -- a series of concentric circles of equal -- I got rid

mm16

of the river so we have got this distortion out, these are concentric now -- circles varying in the classic DuPuits way, the logarithmic picture.

What I am saying is, in theory we could get two wells and draw a straight line between them. But the problem is that any two points will determine a straight line. And we like to have three to give us a little leverage on there.

What I am saying is, you could have one well 50 feet in this direction, a second well 100 feet in this direction, a third well 200 feet in this direction, and you would get substantially the same solution.

You might have a few tiny percent -- if you had three wells in line one way.

Q All right, sir, now referring to that same body of testimony, let's go to Attachment B, which is a plot comparing Fanning Friction Factor with Reynolds number. And it has been represented in your testimony and that of others, that as long as an empirical data point falls on the straight line portion of that curve which represents a log-log plot, the straight line portion of that curve represents a performance region in which Darcy's law is valid.

A That's right, that's the 45-degree slope.

Q All right, sir.

The empirical data points shown on that curve begin to deviate from the straightline portion in the

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region where Reynolds numbers approach 10 and larger?

A Right.

Q Now then earlier in this session, a question was raised as to whether or not in a composite of various sizes of aggregate through which water is being drawn into the laterals, very close to any given piece of rock or gravel, one might get a departure from laminar flow -- and, incidentally, I neglected to lay the foundation that the area of applicability of Darcy's law is an area where laminar flow takes place, but that very close to particles of gravel or rock there might be high velocities, and a departure from laminar flow that would upset the applicability of Darcy's law, and particularly upset the extrapolation from pumping tests to what you could expect in a full-scale well.

Now then, I note on attachment B to the February 1978 testimony, that the Skagit pumping test data points are shown, and they fall in a range of Reynolds numbers from, say possibly two to five or something of that order.

A Yes. I think that top figure is about three. Because this is in a logarithm scale. As I recall the number was three point something or another.

Q Let's speculate for the moment that even at a Reynolds number of three, one is beginning to get to a

mm18

regime where laminar flow may be not universally applicable, may not be completely applicable, there may be some turbulent flow around rock particles, gravel particles and so forth.

I would infer that if that is the case, the Skagit pumping tests may show a slightly lower yield because of the turbulent flow situation than would be the case if there were ideally all laminar flow.

Is that a proper inference on my part?

A That would be in theory, because as you go into turbulent zone, rather than varying directly with velocity, you start varying with some exponents of the velocity.

Q All right, sir, let's proceed.

So we have a situation where the Skagit pumping test may be under conditions where there is some departure from laminar flow. Therefore, the tests may yield a little lower or somewhat lower yield than if there was, strictly speaking, all laminar flow.

Now then I also look at this curve and see that the calculated performance data points for the Ranney collector system in terms of operational Reynolds numbers, are all at Reynolds numbers less than one.

A Yes, sir.

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Q Smaller than the Reynolds numbers for the pumping tests. Here is where I want your help:

I would infer that the extrapolation from the pumping test would be a conservative extrapolation if there is departure from laminar flow in the pumping test, because the actual wells are at a considerably lower Reynolds number where you would be much more nearly in full laminar flow regime.

Therefore if the Skagit pumping test gave too low a number, the extrapolation to full-scale production in a region of very nearly full laminar flow would be greater than expected.

Is that a proper way to look at this?

A On the basis of those statements, that would be correct, yes, sir.

Q In terms of your actual experience with other wells where a similar kind of extrapolation has been made -- and here I mean flow rate-wise from pumping test to actual performance -- have you seen any evidence of this phenomenon of a deviation from laminar flow causing a problem with the extrapolation from the pumping test to a full-scale performance?

A No, sir.

And to go further on that, if you remember, if I might refer to Attachment C, I guess, of my affidavit, this is the one where we have compared pumping tests to actual

mpb2

performance.

MR. LITTLE: This is the February 22nd, 1978 testimony that we have previously been referring to.

MR. THOMSEN: There is an Attachment C.

THE WITNESS: We have a pretty good track record, and in general we've overproduced from our calculated yields. And this might follow along with the theory that you are talking about.

MR. LINENBERGER: I see. Thank you.

I have no further questions, Mr. Chairman.

CHAIRMAN DEALE: Mr. Little, I think we owe you at least to say I'm sorry. Normally it would be your turn and I injected the Board into the interrogation. And you should really have been invited to carry on with redirect after the cross of everybody else.

So please proceed.

MR. LITTLE: I have no further questions.

(Laughter.)

CHAIRMAN DEALE: All right.

Dr. Hooper, please.

BY DR. HOOPER:

Q I have only one area of concern. That's in Figure 164. And I want to be sure I understand it.

First of all, do you or do you not agree with the idea that these two configurations exploit the identical

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water areas? Is that what you're saying?

A I'm saying they do, yes, they exploit the same portion of the aquifer.

Q Well, let me take a case and see if this will -- give you a test case here and see if I understand it.

Let's take the caisson when it's farthest from the river, and we have two laterals going out from it labeled 91 at the end of them.

A Yes, sir.

Q All right.

Now we have two laterals going out from the other caisson labeled 98 at the end.

A Yes, sir.

Q Now what I want to know -- now wait a minute. I have to put another condition in here.

Assuming that the farther you go away from the river the less river water. In other words, going out away from 91, 49, 91, there is an increasing amount of non-river groundwater.

Then my question to you is:

Does the -- if you measured the water quality and thereby determined the amount of groundwater versus river water in laterals 98 and 91, would they be identical?

A The water quality in 98 and 91?

Q Yes. We're using your own methods now. This

mpb4

is a percentage of water. You have put that all in your testimony.

Would you suppose using your theory and using your ideas here, would the water quality, percentage of river water in those two laterals by the time it reaches the caisson, two sets of laterals, would that be identical or would you expect it to be?

A I would expect it to be, yes, sir, because the ends of those laterals are about the same distance from the river.

Q And they're a different length and this doesn't have anything to do with it?

A Well, you can have a little pipe friction in there, but this is maybe a tenth of a foot or something. Well, actually in one case we were talking ten inch and in the other case we were talking 16.

Q They're different diameters. And also there is a different distribution in that area. In other words, there are different numbers of laterals for a given unit of area there, isn't there?

A Yes, this is true.

Q And you would still say that if you made measurements of doing the alkalinity procedure you did you would expect the same water quality in those two locations?

A Yes, sir.

mpb5

Q Thank you. Now I understand that.

BY CHAIRMAN DEALE:

Q Mr. Mikels, I have a general subject of interest, and that is the damage to the wells by floods. Could you speak to that?

We have heard reference to the 100 year flood on the Skagit River, and, oh, 25 year flood on the Skagit River. Could you give us a sense of the integrity of the Ranney Wells against floods?

A Well, Chairman Deale, I could say this --

Q Oh, I'm sorry, were you a witness on this?

A I'm not an expert in that area, but I would like to reveal our experience as far as my knowledge of Ranney Collectors go, if you would like to hear this.

Q Surely.

A There are some -- I've kind of lost count now, but I think there are some over 400 Ranney Collectors between those in the United States and Europe and various places, and the bulk of them are on river floodplains. And I would say we've never lost one in a flood.

Now to go evenaa little further, I know of a series of one, two, three, four that went through the so called 100 year flood in northern California, the ones at Sanoma County Water Agency, at Cresent City, California, Carmichael, California and the one up in Oregon in the

mpb6

Clackamas River at Gladstone.

Now I think they're still arguing whether this was a 100 year flood or not. Some people say it was, and maybe it was on some streams and not on others.

In any event, in all of these particular Ranney Collector installations we had flood levels that had not previously been recorded. And they all survived without any damage whatsoever.

So I guess I can't comment on the scouring of the Skagit River, I can just give you our experience.

BY DR. HOOPER:

Q Mr. Mikels, on the Chairman's question, were these rivers where the collectors were riprapped or protected in some way?

A No, sir. Most of them were out on gravel bars.

Q In other words, they were exposed, then?

A Yes. I would say -- well, you recall the one up at Marysvills; they were a similar type situation, except that one sticks up in the air and Marysville is at ground level. Most of these stuck up in the air like a bridge pier.

Q But in that case there wasn't -- I'm not really sure about the situation, whether they need to be protected or not. Were these all ones that needed to be protected by riprap or if they were exposed it wouldn't make any difference or not?

mpb7

A Well, these rivers still have scour.

Q And were these rivers that have the same kind of scour as the Skagit?

A Well, I can't really comment on that. I havent studied the velocities and so forth of various rivers.

Q Right.

So you're not able to say anything about the relative scour --

A Between the rivers, no.

Q -- versus other rivers?

A Right.

BY CHAIRMAN DEALE:

Q Well, again, I just want to get in focus here a little bit.

When you put in Ranney Wells, let us say, the proposed Ranney Wells for the Skagit site, is the subject of the integrity of the wells a consideration?

A I would say so. If I would build a bad one I would hear about it for the next 100 years, you know, as far as our company's reputation.

Is this what you're speaking of now?

In other words, if we build one that doesn't work?

Q No, no.

I'm just concerned about the extent to which

mpb8

it could resist floods. This is what it amounts to.

A Oh. I completely misunderstood your question.

Q Well, that's the general concern here, the extent to which the Ranney wells can resist floods.

You have indicated some, oh, data that you knew about from experience.

A Yes, sir. And certainly a reinforced concrete structure can be designed to resist any given flood. You apply the loads and you do what you need to to design it in that manner.

BY MR. LINENBERGER:

Q Well, continuing the flood topic just a little bit farther, floods can bring in silt and leave the bottom and sides of the riverbed charged with silt when the flood waters subside.

Isn't this a potential threat to the performance capability of the well?

A You're talking about silting of the riverbed now?

Q Yes.

A No, we haven't noticed this. And the reason we haven't noticed this, the main channel of the stream remains clean. The silts that you talk about get deposited on the downstream in the low velocity areas and on the overflow flood areas. And we haven't experienced any decrease in

mpb9

yield due to the flooding.

Q Thank you.

CHAIRMAN DEALE: Fine. Thanks very much, Mr. Mikels.

(The witness excused.)

MR. THOMSEN: Next I'll call Mr. Knight, who I think is in the wings. And Mr. Beighle.

Maybe we should have a slight break before we start that.

CHAIRMAN DEALE: Fine.

(Recess.)

CHAIRMAN DEALE: Please come to order.

Mr. Little, if I'm not mistaken, there are some exhibits which haven't been introduced into evidence.

MR. LITTLE: That's correct. Thank you for reminding me.

Exhibits 209 and 210, I believe, and we would offer both of those into evidence.

CHAIRMAN DEALE: I would like an identification, please.

MR. LITTLE: 209 is the drawing by Mr. Mikels showing four sketches.

And 210 is another drawing showing the two sketches applicable to the Skagit site.

553 154

CHAIRMAN DEALE: Fine.

mpb10

Well, hearing no objections, they are received into evidence.

(Whereupon, the documents previously marked as Exhibits 209 and 210 were received in evidence.)

MR. THOMSEN: Before we proceed with Mr. Knight, I wanted to respond to Mr. Linenberger's question of the other day on the Ranney Collectors.

You asked me for the provisions from the State agreements relating to Ranney Collectors.

(Handing documents to the Board.)

MR. THOMSEN: I've just handed you pages 14, 15 and 16 from the -- what we call the Site Certification Agreement which is in evidence in this proceeding as Exhibit -- I have to look up the number. That I believe is the only, or the principal provision of the Site Certification that deals specifically with the Ranney Collectors. And that Site Certification Agreement is Exhibit 83.

So what I've given you are certain pages from Exhibit 83.

MR. LINENBERGER: So you don't plan to mark this?

MR. THOMSEN: No, I don't think it's necessary. It's just for convenience.

mpb11

MR. LINENBERGER: Thank you very much.

MR. THOMSEN: Now you asked me whether the NPDES permit had any provisions in it.

MR. LINENBERGER: Right.

MR. THOMSEN: And that of course is also an exhibit here. But the answer is it does not. That deals with discharges, not the intake.

MR. THOMSEN: Then, although Mr. Beighle will conduct the examination of Mr. Knight, I would do the preliminaries to speed it up, perhaps.

CHAIRMAN DEALE: Very good. All right, Mr. Thomsen.

MR. THOMSEN: Mr. Knight has been previously sworn.

Whereupon,

DAVID H. KNIGHT

was called to the stand as a witness on behalf of the Applicant, and, having been previously duly sworn, was examined and testified further as follows:

DIRECT EXAMINATION

BY MR. THOMSEN:

Q Mr. Knight, please state your name and business address.

A I am David H. Knight. I am Vice President, Power Supply for Puget Sound Power & Light Company, located

mpb12

at 10608 Northeast Fourth, Bellevue, Washington.

Q And you've testified previously in this proceeding?

A Yes, I have.

Q Now do you have a copy of your prepared statement entitled Testimony of David H. Knight on Staff Alternative Site Comparison that consists of 15 pages plus a final page titled Qualifications of D. H. Knight?

A Yes, I do.

Q And do you wish to make any corrections in that statement, Mr. Knight?

A Yes, there are some corrections.

Q And would you give those to us slowly with page references so we can follow what you're doing?

A The first correction is on page 3, at the bottom of the page between lines 27 and 28, the 1987 number should be, instead of 145,613,000 barrels, should be 156,613,000 barrels.

Q Okay.

And the next correction?

A On page 4, line 23, opposite 1990-91, the 14,678,000 barrels should be 14,978,000 barrels.

Q And next?

A On page 5, line 2, the 84,255,000 barrels should be 84,295,000 barrels.

mpb13

Q Next?

A On page 12, line 1, the word "including" should be "excluding".

Q Okay.

Next?

A On page 14, line 11, the "and NOx" is repeated. One should be struck.

Q Okay.

Next?

A Line 19, the same page, the last word "subjected" should be "subject".

Q And in line 14 -- No, I'm sorry, strike that.

A Oh, yes, I'm sorry. I do have line 14. "Effect" should be "affect".

Q I beg your pardon, it's right the way it is. Oh, it's a quote. I beg your pardon. "Effect" should be "affect". All right. Line 14, excuse me.

Next?

A And that is all on that.

CHAIRMAN DEALE: I'm sorry, Mr. Thomsen, I didn't get the last one.

MR. THOMSEN: That "effects", "affects", page 14, the last word in that line is "effects". It apparently should be "affects" even though it should be "effects" because it's a quote.

mpb14

(Laughter.)

CHAIRMAN DEALE: Yes.

MR. THOMSEN: Is that clear?

MR. LINENBERGER: You want to insert "sic"?

MR. THOMSEN: All right.

BY MR. THOMSEN:

Q Now secondly, do you have a copy of a two-page document entitled "Supplemental Testimony of David H. Knight"?

A Yes, I do.

Q Okay.

Do you have any corrections you wish to make to that statement?

A Yes, I do.

Q Could you give those to us, please?

A On page 2, line 3, strike the words "less than 40 percent" and replace those words with "about one-half".

Q All right.

Any others?

A No.

MR. THOMSEN: Now, then, Mr. Chairman, referring to page one of the two-page supplemental testimony, I would like to complete the blanks there.

CHAIRMAN DEALE: Right.

MR. THOMSEN: In the second line in the question where it says "Table 1" we insert there instead of an

mpb15

exhibit, it really was part of the testimony, the words "Table 1 which follows transcript 14,008." That would identify the Table 1.

CHAIRMAN DEALE: And then the next sentence goes on "In that Exhibit" and it should say "in that table".

MR. STACHON: Could you give us the transcript page again?

MR. THOMSEN: Transcript page 14,008.

MR. STACHON: Thank you.

MR. THOMSEN: It follows that page.

Then down in the answer, the third line of the answer, there is a blank for the exhibit. He is referring there to Exhibit 200. So 200 goes in that blank.

BY MR. THOMSEN:

Q All right, Mr. Knight. With those corrections are these two previously prepared statements true and correct to the best of your knowledge and belief?

A Yes, they are.

Q And do you adopt them as your testimony in this proceeding?

A Yes, I do.

MR. THOMSEN: Mr. Chairman, we ask that these be printed in the transcript as if read and be received in evidence.

CHAIRMAN DEALE: Hearing no objection, so ordered.

(The documents referred to follow:)

SUPPLEMENTAL TESTIMONY OF
DAVID H. KNIGHT

QUESTION: Mr. Carstens, in his testimony yesterday, introduced Table 1, Exhibit ____ herein. In that Exhibit, he assumed in Column 3, titled "40-year Ave. Production Capability MW" production capability of 2342 Ave. MW without Pebble Springs or Skagit. During his cross-examination, Mr. Carstens stated that of the 2342 Ave. MW, 1579 MW were hydro. He identified the 1579 MW of hydro as follows:

Company owned	175 MW
Mid-Columbia Purch.	984 MW
CSPE - Storage	210 MW
Can. Purchase	100 MW
Rock Island Add.	110 MW

Do you have any comments on this testimony by Mr. Carstens?

ANSWER: Yes. Puget's total hydro energy capability under adverse or critical water conditions is shown on lines 4 through 7 of Table A, Exhibit ____ herein. The total hydro available is shown on line 8. As can be seen on p. 2, line 8, Puget Power will have 873 MW of average energy available in 1988-1989. This is the total firm hydro energy available to Puget Power at that time and includes the energy available from the Canadian storage and the additions to the Rock Island Dam. Mr. Carstens was in error when he added to the hydro energy 210 MW of CSPE storage and 110 MW of Rock Island Addition as the amount shown for Mid-Columbia purchase already includes that energy.

QUESTION: Mr. Carstens suggested that instead of using the energy available from hydroelectric projects under critical water assumptions, that the hydro resources should be restated to show the energy available under water conditions over 40 years. What is your opinion of that suggestion?

ANSWER: First of all, the quantity of energy available under average water conditions to Puget Power is only 200 average MW. This is less than 40% of Puget's share of the energy output of only one of the two Skagit units.

Second, it is easy to add up the maximum energy available under the 40 water years of record, but it is another thing to attempt to carry the fall and winter energy load with this average. An average is simply that. The problem is that most of this non-firm energy shows up during the spring run-off on the Columbia River and is not useable to carry the winter energy load because we do not have the reservoir storage capability to be able to move it from the spring months to the late fall and winter months where it is needed. We are able to exchange some of this energy out of the area in return for energy in the fall and winter, but the amount that we are able to exchange depends upon the particular water year and the conditions in the Southwest.

BEFORE THE UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the matter of	)	
	)	
Puget Sound Power & Light Company	)	
ET AL	)	Docket Nos S7N 50-522
	)	S7N 50-523
Skagit Nuclear Power Project	)	
Units 1 and 2	)	

TESTIMONY OF DAVID H. KNIGHT

On Staff Alternative Site Comparison

Q. Please state your name and position.

A. My name is David H. Knight. I am Vice President, Power Supply for Puget Sound Power & Light Company located at 10608 Northeast Fourth Street, Bellevue, Washington. A summary of my qualifications is attached.

Q. Have you reviewed the transcript of the Direct and Cross-Examination of Dr. Winters on Alternative Site Comparisons?

A. Yes, I have.

Q. Please refer to page 107, Table 10, of the Staff Testimony. Do you agree with the amount of energy that would need to be replaced in event of a three-year delay in the Skagit units?

A. No, I do not. The Staff assumes that the replacement energy would amount to 2,898 megawatt-years of energy, which represents the energy generated during the first three years of the plant's current schedule. This amount of energy is only one-half of the amount of energy lost if each of the Skagit units are delayed for three years. The current schedule for Skagit No. 1 is November, 1986, and for Skagit No. 2, November, 1988. A three-year delay

of these units would bring Skagit No. 1 into operation in November, 1989, and Skagit No. 2 in November, 1991. The energy lost because of this delay would be as follows:

1986-87	515 megawatt-years
1987-88	902 megawatt-years
1988-89	1,481 megawatt-years
1989-90	1,353 megawatt-years
1990-91	1,030 megawatt-years
1991-92	451 megawatt-years
1992-93	64 megawatt-years

The sum of the energy lost would amount to 5,796 megawatt-years and would require an equivalent amount of energy.

Q. Using the Staff assumption, what would the cost of replacement power be if critical water conditions occured?

A. Based upon the assumptions that the Staff has used in determining the hydro estimate the cost to the rate payers would be $3,600,000,000 rather than the $1,800,000,000 as shown on Table 10. This is due to the fact that the Staff used only half of the amount of energy that would need to be replaced, 2,898 megawatt-years, instead of 5,796 megawatt-years of necessary replacement.

Q. What would the cost to society be under critical water conditions using the Staff's assumptions?

A. Again, using the Staff assumptions, the cost to society would be $2,800,000,000 rather than the $1,400,000,000 shown in Table 10, because the Staff only used half the amount that would have to be replaced.

Q. Would you suggest any change in the Staff's low estimate which makes certain assumptions concerning use of nonfirm (Secondary Hydro) derived under a median water condition?

A. Based upon the assumption of the Staff that 402 average megawatts of hydroelectric energy would be available to the Skagit participants during median water to carry load during the delay of the Skagit units, the total amount of energy that would have to be replaced would amount to 3,320 megawatt-years rather than 1,692 megawatt-years shown on Table 10. Using the Staff assumption that only 185 megawatt-years of oil-fired generation would be included in the replacement energy for the 3,320 megawatt-years then the Staff's low estimate, as revised, would amount to $1,255,000,000.

Q. What is your opinion concerning the Staff's low estimate of the cost of replacement energy to society?

A. The $92,000,000 as shown in Table 10 is grossly understated. This is derived on the assumption that under median water conditions only a small amount of oil would be needed in the Northwest in order to carry the load formerly carried by the Skagit units. The cost to society is the same for either critical or median water as the same amount of oil would be operated under either condition.

Q. Would you please explain why the same amount of oil would be required because of the delay of Skagit whether or not you had critical or median water conditions?

A. On page 29, Exhibit 202, it is shown that the Western System Coordinating Council (WSCC) Region will consume the following quantities of oil under median hydro conditions:

1986	147,231,000 bbl.
1987	145,613,000 bbl.
1988	159,631,000 bbl.

Although this amount of oil is approximately 30 million barrels per year less than would be required under critical water conditions, a reduction of any nonoil-fired generation, such as delay of Skagit, would require an equivalent amount of oil-fired generation to be operated in the WSCC area. As has been explained to this board previously, any hydro available in the Northwest above the critical level is first used to carry Northwest deficiencies; second, to reduce generation from oil-fired plants; and third, to reduce generation from coal-fired plants. The coal-fired plants are then loaded to the maximum for delivery to the Southwest for the displacement of oil-fired generation in those areas. Thus, any reduction of the contemplated generation from the Skagit units would require additional oil-fired generation either in the Northwest or Southwest portions of the WSCC area.

If the energy equivalent of the Skagit units 1 & 2 is removed from page 29, Exhibit 202, oil use would increase by the following minimum amounts assuming the 602 kilowatt-hours per barrel used in the Staff's Direct Testimony.

1986-87	7,500,000 bbls.
1987-88	13,117,000 bbls.
1988-89	21,536,000 bbls.
1989-90	19,675,000 bbls.
1990-91	14,678,000 bbls.
1991-92	6,558,000 bbls.
1992-93	931,000 bbls.

The reason for my opinion that these are minimums is because I am confident that the bulk of the generation would be required on single cycle combustion turbines, which will only produce approximately 534 kilowatt hours per barrel.

This amounts to a total increase of oil consumption in the WSCC area of 84,255,000 barrels of oil.

This is the cost to society. The impact on this country's oil supply of slipping the Skagit units is the same under median or adverse water conditions. The only variable is whether the oil will be consumed in one area or spread between both areas.

Q. Referring again to Table 10, page 107 of the Staff's Direct, would you please explain the high estimate of Puget Sound Power & Light Company under footnoted, which amounted only to $1,100,000,000?

A. Apparently there was a miscommunication with Mr. Mecca who transmitted this information to Mr. Regan by letter of June 12, 1979. That number was developed by members of my staff on the assumption that Mr. Mecca was requesting the cost of the delay to Puget only and not the cost of the delay to all the participants. That cost was developed on the basis of a three-year delay of each of the two Skagit units and based on the assumption that during the seven years that would be affected Puget would have on its hydro system 200 megawatts of secondary energy available to reduce the financial impact to the Company. The amount of secondary hydro used in the replacement of Skagit calculation was limited to that amount of the 200 average megawatts of secondary energy in excess of that already needed to meet our firm load requirements because of a deficiency in resources.

The hydro that was used to replace the Skagit generation was assumed to have the value to our customers based on a

split-savings rate for the displacement of oil in the California market, which value amounted to approximately $247 million.

The remaining system energy load requirements would require oil-fired generation. This was costed on the assumption that the cost of oil in 1979 was $20 per barrel and would escalate at 6 per cent per year through the time of the Skagit power reduction. It was also assumed that this generation would take place on single cycle combustion turbines with a heat rate of 11,000 B.T.U.s per kilowatt-hour. The total cost of this replacement power would be approximately $853,000,000 and when added to the value of the secondary energy that would be used, the total cost to Puget Power would be $1,100,000,000.

Q. Since it appears that the Staff was interested in the total cost all of the participants, have you made that calculation?

A. Yes, I have. Based on the same assumptions I have just outlined with regard to the cost to Puget, the cost to the four companies, using the average of the 40-year water conditions, would amount to a total of $2,819,000,000, of which $528 million would be the value of the secondary hydro used to displace the Skagit deficiencies. On the assumption of a critical water year, when there would be no hydro available to reduce the oil exposure to the four companies, the cost amounted to $3,300,000,000. The cost to Puget under similar circumstances of adverse hydro, would amount to $1,320,000,000.

Q. In the cross examination of Mr. Winters, Mr. Lazar introduced selected pages from the Western Systems Coordinating Council publication entitled "Ten Year Coordinated Plan Summary - 1979-1988". That publication in its entirety is now Exhibit 201 in this proceedings. Are you familiar with that summary?

A. Yes, I am familiar with that publication and have participated in the WSCC since its inception in 1967. From 1967 to 1969 I was the company's representative on the Planning Coordination Committee whose responsibility it is to prepare this data and since 1969 I have been the company's representative to the Council. I served on the Council's Executive Committee for six years from 1973 through 1978.

Q. The first page of that study (Exhibit 201) that was considered was page 14. Do you have any comments on page 14 and the testimony with respect to it?

A. Yes. This graph shown as Figure 2 on page 14 represents the actual and forecasted firm peak load from 1968 through 1988 for the total WSCC region. It also depicts the generation and firm transfers that were available or were estimated to be available within the area on a capacity basis only. It does not show either the energy load requirement or the energy capabili[illegible] of the resources of the WSCC area.

Q. Now, turnir[illegible]ge 22 and Figure 6, would you describe what is shown on

A. Yes. The top curve shows the actual generation and firm transfers available within the Northwest Power Pool (NWPP) through 1978 and the estimated amount of generation and firm transfers to be available through 1988. Again, this curve

represents only the peak capabilities of these resources. The second curve from the top represents the firm peak load for 1968 through 1978 and the estimated peak load from 1978 through 1988. The bottom curve shows the energy load for the Northwest Power Pool from 1968 through 1978 and the estimated energy load from 1978 through 1988. The chart does not show the amount of energy that is available to meet that expected energy load.

A. Please turn next to Tr. 13,278 and page 22 of Exhibit 201. At Tr. 13,278, lines 8 to 10, the questions suggest that this graph on page 22 shows reserve margins over firm energy loads. Next, turn to Tr. 13,280, line 13, through Tr. 13,282, line 25. Do you have any comments on the questions, answers and representations that were made to the Board by Mr. Lazar?

A. Yes, as I previously described, the graph on page 22 shows only three things: total peak resources, total peak load and firm energy load. It does not show firm energy resources. You cannot determine firm energy resources by looking at peak resources. The bulk of the peaking resource is hydro capacity that does not have any energy capability behind it at all. For example, the 1979 West Group Forecast (Exhibit 185) shows that the region is adding 1708 megawats of hydro peaking capacity from 1979-80 through 1989-90, but that this additional capacity adds only 44 megawatts of average annual energy. At Grand Coulee Dam, 2 additional 805 megawatt units are being added for the purpose of meeting peak load only. These units will not develop any additional energy because

there is already installed sufficient generating capacity at Grand Coulee to handle all the available water.

You cannot simply draw lines across peak resources and assume, therefore, that those resources can cover an energy requirement such as Mr. Lazar asked the Board to do at Tr. 13,280. A suggestion that all peak resources would have 100% energy capability or, for that matter, any energy capability whatsoever, would be very misleading.

Q. How can one determine the firm energy resources in the NWPP region during the 1979 through 1988?

A. As mentioned previously, this information is not shown on the graph (Figure 6, Exhibit 201) but can be found on pages 74, 78 and 82 of WSCC's Summary of Estimated Loads and Resources, date as of January 1, 1979, issued April 1979 (Exhibit 202). For example, taking the year 1988, the peak load of 57721 megawatts can be found on page 69 near the top of the page, under the column December and the net total resources available of 69135 megawatts to meet that peak load near the bottom of the page, under the column labeled "December." The energy load as shown on the graph can be obtained from page 74 for 1979, page 78 for 1980, and page 82 for the years 1981-1988. These amounts are reflected in the three curves shown on Figure 6, page 22. As an example for the year 1988, the load of 330,193 GWH can be found near the top of the page under the column titled 1988 and the total energy resources available to meet that load near the bottom of the page under the same column in the amount of 313,216 gigawatt-hours resulting in a deficit of 12,368 gigawatt-hours. I have

plotted the resources that are available to the Northwest Power Pool to meet the energy requirements, as shown on pages 74, 78 and 82, on Figure 6, which shows that the Northwest Power Pool is deficient in being able to carry its firm load requirements for the ten year period of 1979 through 1988. Figure 6 with this additional information is Exhibit ___ herein. Plants such as Skagit, Pebble Springs and Colstrip 3 and 4 are being installed primarily to meet the energy requirements of the Northwest, not for the purpose of meeting peak requirements. Without any one of these units, which have yet to complete their licensing, the deficiencies of the Northwest Power Pool will be substantially greater than as shown on the curve that I have plotted on Figure 6.

Q. Turn to page 82 of Exhibit 202. Do you have any further comments on what that tabulation depicts?

A. As I mentioned this sheet on the top indicates the total load of the Northwest Power Pool for the period 1981 through 1988. That is the total of the estimated energy loads in the Northwest Power Pool. The next to the bottom line of that sheet shows the amount of energy that is available to cover the projected load. These are the amounts that I previously described plotting on Figure 6, Exhibit 201, which is now Exhibit __ herein. The page also shows, on the last line of numbers, the amount of deficiency that the Northwest will have under adverse water conditions. It should be noted that the existing combustion turbine and oil-fired generating units are all operating wide open during these years. A review of the last line of page 82 shows that the maximum

deficiency occurs in 1984 of 28764 gigawatt-hours and the smallest deficiency occurs in 1988 and amounts to 12,368 gigawatt-hours. Incidentally, if Skagit is delayed by three years, that deficiency in 1988 would become 24,245 gigawatt-hours.

Q. At Tr. 13,284, Mr. Lazar introduced tables for other areas in the WSCC similar to Figure 6 for the Northwest Power Pool. Please turn to Tr. 13,288 lines 21 through 24 where Mr. Lazar makes the following statement in response to a question from the Chairman: "Not only is there apparently power available in the Northwest Power Pool, but apparently the other regions who are undergoing the same underload or overforecast as the Northwest is." Would you please comment on that representation to the Board?

A. Again, the problem with the representation is that the tables that Mr. Lazar presented do not reflect what he represents, that is, energy resources. Information with respect to energy resources is shown in the companion volume, Exhibit 202. Page 57 of Exhibit 202 shows the energy resources of the WSCC region for the period 1981 through 1988 and page 58 shows the quantities of oil and gas that must be consumed in the region under adverse hydro conditions. The last line on page 57 shows a deficiency in energy resources during the entire period (1981-88) with Skagit 1 and 2 on schedule. The last line of page 58 shows that the WSCC region will be consuming 190,055,000 barrels of oil in order to meet its energy load in the year 1988 under critical water conditions, assuming Skagit 1 and 2 remain on schedule. This amount of

oil will be necessary to meet area loads, including the energy deficiency depicted on the last line of page 57 of 12,368 gigawatt-hours. It should also be noted that of the total energy resources assumed to be available in the year 1988 to produce the 644,944 gigawatt-hours of energy, 60,400 megawatts are planned additions. Of the planned additions 28,615 megawatts are resource additions that are not authorized or licensed. Page A-18 of Exhibit 202 shows the status code for planned additions. The status code "P" represents units "planned for installation but not (utility) authorized." The code "K" represents units for which regulatory approval is pending but are not under construction. The status of all planned additions in the WSCC region during the period 1979 through 1988 is shown on pages 243 through 261 of Exhibit 202. For ease, all units listed on those pages with the above referenced status codes have been tabulated on Exhibit _ The tabulation shows that within the Northwest Power Pool area 8,206 megawatts of planned resource additions are either not authorized or do not have the necessary regulatory approvals. Likewise, in the Rocky Mountain Power Pool area, there is 3,560 megawatts of these planned additions and in the Arizona-Mexico Power Pool area, 3,585 megawatts. In the Southern California-Nevada Power Pool area, 9,517 megawatts of planned additions are of this status and there are 3,747 megawatts of planned additions in the Northern California-Nevada Power Pool area that are not authorized or do not have the necessary regulatory approvals. Of the 8,206 megawatts of

planned additions in the Northwest Power Pool area, 5,226 megawatts are base load energy resources. This represents 64.3 percent of the total planned additions of this status in the Northwest Power Pool area. Of the total 28,615 megawatts of planned additions with this status in the entire WSCC area, 21,628 megawatts are base load energy resources, which comprises 75.6 percent of the total planned additions of this status.

Q. If Skagit units 1 and 2 are delayed three years, where would Puget Power find replacement energy?

A. It should be clear by now that the Northwest Power Pool area has large firm energy deficiencies and that the only available replacement in the NWPP for Skagit units 1 and 2 would be from additional oil or gas-fired combustion turbine installations. It should be noted that with Skagit assumed on schedule the Northwest Power Pool is faced with the distinct possibility of burning 2,445,000 barrels of oil to carry its load in the 1988. This can be determined by looking on page 83 of Exhibit 202 on the bottom line under the right-hand column 1988. With the occurence of adverse hydro conditions and a three-year slippage on Skagit we would add to this oil requirement 19,400,000 barrels of oil in 1988. Replacement power if available and purchased from outside the NWPP, would be oil also as we previously noted in looking at the WSCC region as a whole on page 58 for the year 1988 wherein 190,055,000 barrels of oil are required under adverse hydro conditions. Median hydro conditions only reduce this oil requirement of the WSCC slightly to

159,631,000 barrels indicating that even under median hydro conditions required replacement power purchases would be from oil-fired generating sources. Replacement purchases for Skagit units 1 and 2 from oil-fired generating sources in the Pacific Southwest is at best a very questionable situation, as exemplified by comments on page A-11 of Exhibit 202 with respect to fossil oil and gas generation in the Southern California-Nevada Power Pool area (S.CA-NV): "Energy production is limited by long-term scheduled maintenance, total and partial forced outages, short-term or deferred-forced outages, and NOx and NOx dispatch requirements. Surplus energy may be available from these units, but since most are located in the South Coast Air Basin, such energy production would have detrimental effects on local air quality and may be subject to regulatory restrictions." Quoting again from page A-11, paragraph 7, titled Fuel Oil. "Any surplus energy from S.CA-NV would be from oil-fired generation, and the availability of oil for extraordinary needs beyond that forecasted would be subjected to many factors and could only be determined by an analysis of the specific requirements and conditions as they then exist." Similarly, for the Northern California-Nevada Power Pool (N.CA-NV) area on pages A-12 and A-13, under the section titled "Comments on the Availability of Excess Energy in the N.CA-NV," I quote as follows: "Surplus energy available from N.CA-NV would be from its unloaded fuel oil units. The amount available would vary with hydro conditions and is estimated to be near zero under adverse hydro conditions."

It should also be noted that under either median or adverse water conditions, oil used in generation will increase between 1979 and 1988. The President's recently announced energy program proposes that electric utilities reduce by 50% their oil usage over the next several years. Implementation of this proposal would seriously impact the availability of oil as a replacement to Skagit.

Q. Please refer next to the 1979 West Group Forecast that was introduced as Exhibit 185. What is the West Group forecasted increase in energy requirements in the ten year period through 1989-90?

A. The West Group of the Northwest Power Pool (the Northwest Power Pool area excluding British Columbia, Eastern Montana, Wyoming, Utah and parts of Southern Idaho) forecasts an average annual increase in energy load of 3.9% per year.

Q. How does that compare to the 1978 increase in energy loads in the Northwest Power Pool and WSCC, and to the increase in energy loads for the past twelve months of Puget?

A. In 1978, the NWPP's load increased 7.7% over 1977, and WSCC's increased 6.3%. Puget's average energy load for the twelve months ending July 1979 show a 10.6% increase over the same period in 1977. By contrast, Puget's current 1979 West Group Forecast load estimate for the period 1979-80 through 1989-90 is 4.8% per year.

QUALIFICATIONS OF D. H. KNIGHT

Mr. Knight received a Bachelor of Science Degree in electrical engineering from Washington State University in 1947. In August of 1947 he joined Puget Power as a Student Engineer and then became its Intercompany Pool Representative in Spokane beginning in May, 1948. He then moved to Puget Power's Power Systems Operations Department in Bellevue after nine yars in Spokane, and from November 1958 to August of 1969 was Manager of the Power Systems Operations Department. In August of 1969 he became Vice President of Power Supply for Puget Power. In this position, he is the Company officer responsible for the operation of the Company's generation and for all matters of bulk power supply, sales, transfers, and interchanges of energy between Puget Power and other utilities, and for coordination of Puget Power's operations with those of other utilities. He served six years on the Executive Committee of the Western Systems Coordinating Council. He is a member of the Board of Trustees (and currently President) of the Canadian Storage Power Exchange, and a member of the Engineering Advisory Board of Washington State University. He is a member of the Northwest Coordination Agreement Contract Committee and served twice as its Chairman, and a member of the Operating Committee of the Northwest Power Pool.

mpb16

MR. THOMSEN: Now I just for the record wanted to identify two exhibits.

I would mark for identification as Exhibit 211 a one-page document entitled Western Systems Coordinating Council, and at the bottom it's identified as Figure 6, and in the upper-left it has the number 22. That's 211. And we distributed these before the noon break.

(Whereupon, the document referred to was marked Applicant Exhibit 211 for identification.)

MR. THOMSEN: And I am marking for identification as Exhibit 212 a five-page document entitled WSCC Resources Planned, which again we distributed before the noon recess.

(Whereupon, the document referred to was marked Applicant Exhibit 212 for identification.)

MR. THOMSEN: And referring to 211 for identification, that is the same as Exhibit 187, and of course it is page 22 from Exhibit 201, except that we have added, as Mr. Knight will explain, on the graph you will see typewritten the words "Firm Energy Resources" and an arrow drawn up to a dashed line.

We have added that caption "Firm Energy Resources",

mpb17

that arrow which appears on the right-hand of the graph and the dashed line that it points to.

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That's what we've added to that figure, and the witness will talk about that.

I think that's all the preliminary matters. Mr. Beighle has the floor.

CHAIRMAN DEALE: Mr. Beighle?

MR. BEIGHLE: I have no further questions of Mr. Knight at this time.

CHAIRMAN DEALE: Mr. Black, do you have any questions?

MR. BLACK: Yes, I do.

CROSS EXAMINATION

BY MR. BLACK:

Q Mr. Knight, referring to page 3 of your testimony dealing with the staff alternative site comparisons, on line 5 you have a -- this is dealing with the staff's low estimate as indicated on table 10 of its testimony on alternative sites. You have a number there 3320 megawatt years, and I would like to know how that figure is derived.

A That figure was derived by taking the energy loss for each of the seven years that there is an energy loss due to a delay of each of the Skagit units, reducing that by 420 megawatts in each of the years, except the last year when the reduction of Skagit is only 64 megawatts.

Q And what's the reduction of 420 megawatts, what's that based on?

david2

A The 402 megawatts?

Q The 402 megawatts.

A The 402 megawatts is the number that the staff used for hydro availability.

Q And the 402 megawatts is the staff's number for the secondary hydro?

A Yes.

Q And what's really the definition of second hydro?

A Secondary hydro is hydro that is in excess of the amount of water you have to generate the minimum amount of firm within the pool area.

In other words, it's water that you can generate generation from in conditions better than the adverse conditions.

Q Is it -- is it safe to say that secondary hydro is hydro available above critical water assumptions; is that another way of saying that?

A Yes, periodically; it's not always there.

It varies.

Q Now, I believe one of your general criticisms of Dr. Winters' estimates is -- gets down really to the point that Dr. Winters assumed that this -- the Skagit units were not on-line but suffered a three year slippage in time, that only the West Group areas -- the West Group utilities would be impacted.

david3

Is that basically the assumption used in Dr. Winters' testimony?

A That's correct.

Q And I believe that your analysis or criticism of Dr. Winters' testimony indicates that there is a larger area that's impacted,and therefore the cost to society will be larger than that depicted in Dr. Winters' testimony.

A That is correct.

Q And I assumed that the basis for your analysis with regard to a larger impact area is this -- is the state of energy between all utilities in the Western Systems Coordinating Council, as opposed to just the assumption used by Dr. Winters, which would be just the West Group forecast?

A That is right.

Q There is this interchange of energy?

A That is correct.

Q Is it not true that your assumption is one that the whole Western Systems Coordinating Council is energy deficient during these six years or seven years that we're dealing with the slippage here?

A As a whole, that is correct.

Q And so under your analysis, then, the -- if the Skagit facilities were slipped, then the -- this nuclear energy that Skagit would generate, assuming that we're

david4

online, would have to be replaced by some other energy.

A That is correct.

Q And what is this other energy that would have to come online?

A It would have to be oil fired generation.

Q And where is that oil fired generation?

A The oil fired generation, depending on the water situation, would be either in the northwest or the southwest.

Q What's the water situation that it depends on?

A Well, if it was a critical water situation, we would have to here in the northwest supplement the whole amount of the reduction with oil fired generation.

If we had water in excess of the critical water a portion of that then would -- would be run in the northern California area or southern California area because we would be able to replace some of it with the additional hydro generation.

Q Now, I take it the sequence as set forth on page 4 of your testimony dealing with which generation would be available, depending on hydro conditions is basically what you have just indicated there; that first you look to hydro; second, you reduce generation from oil fired plants; and third you reduce generatio from coal fired plants.

A That is correct.

david5

Q Now, I take it that your basis for saying that if Skagit is delayed then -- well, is it true that if Skagit is delayed that all of the makeup energy, let's say, is going to be derived from oil fired generation?

A Yes.

Q And what's the basis for that?

A Well, the basis for that is when that generation is not available, then additional oil fired generation must take place to meet the same load area load because -- maybe I can explain it.

If Skagit is operating, it takes a certain amount of oil being fired at all times, regardless of water conditions; if you back off Skagit, then it takes that much more oil.

Q So in other words you are saying your assumptin is that even with Skagit running, the whole western System Coordinating Council is going to be using oil fired generation?

A Yes. 1988, even under median water, the Council is running over 159 barrels per year.

Q And if Skagit is delayed, that makeup energy has to come from oil fired generation?

A That is correct. Additiona oil fired generation.

Q There are no new nuclear plants coming online that could also replace that energy?

A Well, there are none schedule.d

david6

Q Between now and --

A That is making the assumption that every thing that is currently scheduled or assumed in on the line and operating, and many of those are not even licensed or authorized b- the utilities yet.

Q So it would be your testimony that if Skagit were delayed, it would be -- the makeup energy would absolutely have to be supplied by oil fired generation.

A That is correct.

MR. LINENBERGER: Excuse me, Mr. Black. I thought I missed something.

You said earlier -- I thought I heard you say during --with Skagit delayed during good water years a portion of that makeup could be made -- could be supplied by hydro.

THE WITNESS: No. What I meant to say is that the portion of it -- if we had a bad year, it would all be operatedin the northwest. If it was a good year, only a portion of it would be operated in the northwest, and the remaining in the southwest.

It would still be the same amount of oil. It's just a matter of which area had to pay for the oil.

MR. LINENBERGER: I see.

BY MR. BLACK:

Q So even under median water conditions, there is

david7

going to be oil fired generation in the Western System Coordinating Council?

A Yes.

Q Turning to page 6 of your testimony, what is the basis for the figure on line 20 of $2,819,000,000?

A That is the calculation I made on the cost of replacement power for the four company applicants.

Q And down below on page -- line 25 you have a figure of $3,300,000,000; what's the basis for that?

A That is cost -- the cost to the applicants if the area was subjected to critical water during that period of time.

And the total replacement would be on oil in the northwest.

Q Well, isn't -- you have a figure on line 21 of $528 million,which would be the value of secondary hydro for the four companies.

I'm guess I'm asking if you add the $528 million to the $218 billion it seems to me that you should come up with a figure that would be reflected on line 25. But for some reason I -- my figures don't add up to that.

Now, tell me where I'm wrong.

A Well, the calculation to develop the 3.3 billion is taking the deficiency of the -- rather the reduction of Skagit of 5796 megawatt years and replacing that with oil

david8

fired generation with -- assuming you had a water supply during that seven years equivalent to the 40 year average for the four applicants.

That amount of water amounts to about 600 megawatts of the four applicants in the years that that is available to displace Skagit. It was used to displace Skagit at a split savings rate, which is a marketable rate to California with half the difference between the value of it or the cost of it here and the value in California.

And so you really can't add the two numbers together and get that because there's a different amount of oil and a different cost on the hydro.

Q I see.

A See, presently our customers all receive the benefit of any sales outside of our customer area.

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

CHAIRMAN DEALE: All right. Mr. Leed?

MR. LEED: Mr. Lazar will --

BY MR. LAZAR:

Q Mr. Knight, you made the assumption that the coal fired plants will always be loaded to maximum capacity to displace southwest oil fired generation, correct?

A Correct.

Q Could you describe the 1976 water year for us a little bit? Pardon me, calendar year 1976 for hydro conditions.

david9

A Well, I -- the calendar year was, the first half, as I remember, was close to median, and the last half deficient in water supply.

Q Were you making secondary sales to the southwest during that year?

A In '76?

Q Yes.

A Yes.

Q Were they going for more or less than the fully allocated cost of the most expensive plant you were baselining?

A They were going for less than fully allocated cost on coal -- above the fully allocated cost on hydro.

Q But at greater than the incremental cost.

A Oh, yes.

Q Was there ever a time during that year when -- when the tieline was fully loaded and you couldn't get any power and you had to discount it?

A There may have been in '76. It was not in '77 and it was not in '78, nor has there been in '79.

Q So should we assume that the '76 -- you would have baseloaded your coal plants pretty much to the limit of availability?

A Yes.

Q We've been using a 75 percent capacity factor for that assumption.

david10

A That's correct.

Q For a smaller plant, can we use a different capacity factor?

A You may be able to .

Q Would -- would you suggest using a different capacity for say, a smaller coal plant like Colstrip 1 and 2 or Dave Johnson?

A I think in many cases you can. It depends somewhat on the characteristic of the individual plant: whether you have scrubbers, what type of pollution control equipment you have on the plant.

If it's a strip plant -- in years gone by, the lower rated plants generally tended to have a little better capacity factor. Or rather availability factor than the larger plants, but not significantly different.

Q What about calendar year '77 for water.

A Very poor.

Q Is that being a little generous, perhaps?

A Yes. But I'm not supposed to use four letters words here. But it was very bad.

Q Worst you have on record?

A Yes, I believe that was the case.

Q Those were the words you used to the utility and transportation committee last September?

"Worse than the '36-'37 critical year."

davidll

A Well, the characteristics are different than the '37-'37; '36-'37 was -- is the worst single year, operating year we've ever had. But because of additional storage, that does not become a critical year anymore.

Q But the '77 year was the worst refill you've ever had?

A The worst refill, but September though April it was far better than '36-'37.

Q During '77 did you have to run your oil turbines?

A '77?

I ran them, yes.

Q Looking at your uniform statistical report for '77, I show less than 1 percent capacity factor for Whitehorn and South Whidbey both. You were just running them mainly to keep them alive?

A The Whitehorn unit was run for other utilities, run for the city of Seattle.

Q All right.

A The Whidbey Island unit was operated for reliability on the island.

Q And -- but there was no problem of a shortage of capacity on the tieline going -- if you had had secondary power you could have sent it to California in '77?

A If I had any surplus, it would have been gobbled up in the northwest. It would never have gotten on that

david12

tieline.

Q But you only ran Colstrip at 65 percent and Centralia at 70 percent that year?

A You must remember those were new plants, and they had a lot of problems, shakedown problems getting them online. It is not because we didn't try to run them more.

Q Wasn't it the third year of operation for the Colstrip?

A One came in in mid-75 and the other came in in mid-76.

Q So the first unit, based on the operating rules should have run at 75 percent capacity factor on the first one and at 60 percent for the first several months and then at 75 percent thereafter.

A Should have, but they didn't.

Q Didn't.

Were the oil industries curtailed at all in the northwest during '77?

A Well, I know they were curtailed as far as their interrupt was concerned from Bonneville. Whether or not they were able to buy outside power or not to meet their load, I do not know.

Q But they didn't ask you to run your oil turbines for them?

A They did not ask to operate my oil power turbines.

david13

Q So presumably, they did --

A However, they did ask me to operate my baseload oil fired plant.

Q And you didn't do that?

A I did not.

Q Why didn't you?

A Why? Because I've got a 50 year old plant there I have to maintain for reliability of the system and for interrupt load we've taken the position we will not operate that plant.

We have to keep it going as long as we possibly can.

Q But the turbines, they didn't ask you to run?

A NO, they did not.

Q So presumably they found either some other source of power in the lowest water year on record that was cheaper than a turbine, or else they preferred curtailment to oil fired power.

A They took a substatial amount of curtailment on the interrupt load.

Q They preferred curtailment to turbine power?

A I assume they did.

Q It must have been that they thought they couldn't make a profit with high cost power.

A Could have been. I don't know.

david14

Q What about '78?

A Near median water situation.

Q You had record secondary power salesin that year?

A Yes.

Q What kind of rates were you getting for your secondary?

A Approximately 12 mills per kilowatt hour.

Q Is that the rate you have filed with the FPC now? Or with PERC ?

A I have a higher rate fired with the FPC now.

Q What was the highest cost resource you were baseloading in 1978?

A Approximately 15 mills.

Q In '78 you said there was no shortage of capacity on the tieline.

A That is correct.

Q But you ran Centralia at 52 percent and Colstrip at 65 percent that year.

A I don't know whether those figures are right or not.

Q I'm looking at the uniform statistical report for the year ending December 31, 1978.

A What's the question, sir?

Q I'm asking you to confirm that they were run at less than 75 percent capacity.

david15

A Well, I'll confirm they were probably running less than 75 percent capacity, but I cannot confirm those numbers.

Q If they run at more than this, you would have been able to presumably displace oil in the southwest.

A Yes, if I'd had the coal supply to do it.

Q But you couldn't get your plants to -- you couldn't get the plants to run well or couldn't find a market for the power.

MR. BEIGHLE: Was that a question or a statement? If it was a statement, I move it be struck, andif it's a question, it ought not to be answered.

MR. LEED: The witness is the one that's supposed to answer the questions.

MR. BEIGHLE: I wasn't sure.

CHAIRMAN DELAE: He was asking whether Mr. Lazar asked a question.

MR. LEED: Mr. Lazar asked a question, yes.

MR. BEIGHLE: I took it as a speech. I wasn't sure it was a question.

MR. LAZAR: I asked if you could have run the plant, gotten the power from it, could you have displaced more oil?

THE WITNESS: If I could have ooprated the plant more, yes, I could have displaced more oil.

david16

However, relative to Colstrip we have a transmission limitation set at -- during a lot of hours we're not able to load the plant up because there's not enough transmission to bring it over here.

BY MR. LAZAR:

Q You're getting into a clockwise distribution pattern?

A Loop flow-through. Then we have to back the generation off in order to keep the stability of the system.

Q Is something being done to correct that situation?

A Yes.

Q Can you tell me how you would plan to get the power from Colstrip and perhaps Colstrip three and four to California in the future.

A Well, if -- if three and four are constructed, then it will be accompanied by a double circuit 500 kv line all the way from Colstrip to Hot Springs, Montana, which will not only move generation of Colstrip Three and four, but will relieve this bottleneck we have for Colstrip one and two.

In the interim we have ordered phase shifting transformers to go on the ties between Billings and Yellowtail to control the loop flow into the area.

Those will not be in for in excess of a year.

david17

Q On page 6 of your testimony you used a 6 percent escalation rate for the cost of oil. Do you feel that's a reasonable rate of escalation?

A I think it's probably too low.

Q The staff used 10 percent.

A That's correct.

Q How do you feel about 10 percent?

A I think that's probably closer t- the real world than our six percent.

Q If the cost of oil were to rise that high or you were to have to substitute higher cost for the nuclear plant, wouldn't you expect a reduction in demand for the higher cost power?

A I really doubt it.

Q You don't see that there's an elasticity in demand for the power?

A I think the opposite happens because of the increase in price of oil. We will probably have more people converting from using oil heat, going into electric heat, because this kind of a price for oil is far in excess of electric rates in the northwest.

Q How does it compare with the incremental cost of electrical power?

A The incremental cost?

Q The cost of a new plant.

davidl8

A Well, that I don't know, but I know our customers now, relative to their rates, you would have to -- you would have to have approximately 50 cent oil to be equivalent.

(Counsel for Intervenor SCANP conferring.)

Q Can you explain the basis for that conclusion, the 50 cent a barrel oil -- 50 cent a gallon oil?

A Yes.

It's very simple. Run a calculation. Diesel oil is approximately 140,00 BTUs per gallon. A kilowatt hour is 3414 BTUS per gallon -- per kilowatt hour.

You have an efficiency of an oil furnace of approximately 65 to 70 percent efficiency. It takes about 26 kilowatt hours to -- equivalent to a gallon of oil, at our price, around 2 cents a kilowatt hour.

That's about 52 cent oil that would be necessary.

Q And the staff has estimated 55 -- 54.5 mill power from Skagit.

A I'm -- we're not -- we're charging our customers 2 cents a kilowatt hour now, righ currently. Oil -- diesel oil is probbly seeling for 85 cents to the home owner.

If he could get it for 52 cents, it would be equivalent to if he was heating his house with dectricity.

Q Which means that at a dollar and a half it would be equivalent to --to 50 mill power.

david19

A I didn't do the arithmetic.

Q I'm just roughly multiplying by a factor there.

Mr. Ellis testified in the last rate case that you did not like electric heating loads. Do you agree with that position?

A I agree with it.

Q Has the company done anything to discourage electric heating loads, though?

A To the degree we're capable of discouring, but we don't have any authority to discourage it.

Q Have you adopted a rule restricting hookups to electric heating?

A No, we have not, nor are we authorized to adopt such rules.

(Counsel for Intervenor SCANP conferring.)

Q Turning to Exhibit -- I think it's 202, the Western System Coordinating Council 10 Coordinated Plan Summary.

CHAIRMAN DEALE: It's 201.

MR. LAZAR: 201.

BY MR. LAZAR:

Q On page 23, the bottom righthand corner, do you seethe forecast deviation for the year for the northwest power pool?

A Yes.

david20

Q Were they below forecast?

A Yes.

Q On page 27, the Rocky Mountain Power was also below forecast?

A As a total, yes.

Q I assume you've looked through thedocument. Were any of the power areas in the western system at or above the forecast for the year?

A Yes.

Q They were?

A Well, maybe I -- the question is: Have I looked at the document.

Yes, I've looked at the document.

Q The question is: were any of the power areas -- Arizona, California -- southern California, northern California -- at or above forecast for the year?

A I would have to review it to see.

Q Page 31.

A I do know that as I stated in the text, that there was individual peaks, and everything that was exceeded forecast -- individual months exceeded their forecast.

Q But for the year all the regions were below forecast.

A I'd have to review it to verify that.

I do know that the total region had a 6.3 percent

david21

annual load growth as far as energy was concerned. The northwest had a 7.7 percent increase over '77.

Q And even with that, we find ourselves 3.7 percent below forecast for the year, according to this document.

A According to that document. It may be involved in the interrupt loads and whatnot.

Q We have the 1976 West Coup forecast as Exhibit 72. I imagine very few people have kept it around.

(Counsel handing document to witness.)

I just ask you: doe sthe '76 forecast show a deficit during the '76-'77 and '77-'78 years?

A '76-'77 did not show a deficit as far as total load -- firm load. But it did as far as the total load was concerned. The '77-'78, a slight deficit on the firm load.

And '78-'79, a deficit.

Q But you managed to meet your firm load in '77, even with a record low refill, and with your plants operating at less than theoretical capacity.

A Yes. But the water condition was critical -- was better than average in the critical because in the fall of '77 it broke and we had substantial increase in rainfall.

Q If you were able to hold your load down between now and the years we're speaking of delay, would that reduce the -- the need for costly replacement power?

A It would reduce the deficiency, but if you think

david22

you can reduce the load to the point where we wouldn't need the energy, I think it's impossible.

Q Would a restriction on electrical heating be one way that you could deal with the deficiency?

A If you had a restriction, you may reduce the deficiency, but if you didn't have any more electric heat, you wouldn't get rid of the deficiency.

Q Isn't the electric heat a rather substantial part of your load at the present time?

A No.

Q On your Exhibit 212, you've -- this is a list of resources for the western system; you've identified these as being not authorized or licensed on the southern California-Nevada power area.

You've identified San Onofre two and three as being not authorized or licensed.

Can you tell me what the status of those plants is at the present time?

A This data was taken from 202, and all I know about it is how it's listed in the sheet here.

Q Are they under construction at the present time?

A I do not know.

Q What about the rest of these? Do you have any idea which of them are under construction and which are not?

A No. I assumed that that table is correct.

david23

Q That none of these are being built?

A That the WSCC staff that put this together has put it together correctly.

Q You assume that none of these are being built at present?

A Yes. I assume that.

Q But you haven't reviewed, say, the form 10K of the southern California Edison to determine their estimate of completion date for their plants or any other documents to that effect?

A No, I have not.

And it wouldn't change the situation if there are a few errors in this table; when you look at the degree of the units that are not licensed or authorized for construction.

(Counsel for Intervenor SCANP conferring.)

Q In 1976 did BPA have secondary hydro available?

A I believe so.

Q Did your company buy that secondary?

A We probably bought some from them.

Q Q Did you buy it to replace the generation from your own units, Colstrip and Centralia?

A If it was available at the time I was operating those plants, I would have bought it then.

Q I will read a couple of lines from the transcript

vid24

last September before the Washington Utilities and Transporation Commission.

"I have never been able to get them to buy three mill power and back off Centralia. I mean, Wyoming generation. I suspicion their incremental costs for those plants are less than the cost for low rate power."

Is that a correct transcript of your statement to that commission?

A Yes.

Q So you had the opportunity buy power and then sell off your own as secondary.

A Wait a minute. There's no relation to what you're saying now with what the question was before. The context was whether or not I could get Wyoming to buy power from me to shut down coal plants at three mills.

No.

Q Could you get California?

A That has nothing to do with whether I buy power from Bonneville to shutdown Centralia or Colstrip. Does it?

Q That's the way I read that transcript. Could --

A It's talking about whether I'm selling power to Wyoming or not, not whether I'm buying power from Bonneville.

end 13

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MELTZER

Q Has there been a discussion of installing turbines in the Canadian storage dams, Mica or Douglas?

A There are units in Mica now.

Q I haven't seen them shown as power resources. Are they producing power as they draft those reservoirs?

A Yes, on Mica.

Q What about the others?

A Which ones?

Q Well the storage reservoirs. Douglas I know is one, I believe.

Duncan?

A No, there is no Duncan in generation.

Q Is it planned?

A I do not know.

Q Would it be worth investigating to see if those could be brought on line as power resources during the period of relocation?

A I'm sure B.C. Hydro are investigating. They are building Revelstoke right now, trying to get it on to meet their own load growth.

Q But there hasn't -- you haven't pursued the idea of bringing those units on early?

A Which units?

Q On the storage reservoirs in order to fill this --

mm2

the deficit that you would forecast if the Sakgit units were delayed?

A Well, B.C. Hydro, they are trying to construct enough plants just to meet their own load. They are not having any capability of constructing plants in their own area to export power. They are having plenty of trouble with license of their own plants.

Q Haven't they exported power every year?

A No firm power, only secondary when they had it available.

Q In '77 when we were so very short of power, weren't they able to help us out?

A For some secondary power, yes.

Q Well I would think that in a critical year, or a lowest refill of record, that secondary power would not exist.

A Well, you must understand that their watersheds are not the same as our watersheds. The only reason that they had it then was primarily because the Peace River is in a different watershed.

Now if you remember the drought a bit, the normal rainfall went far north and they had good water on the Peace River even though it was poor water on the Columbia River.

Q Have you ever considered or had discussions with

mm3

the aluminum industry regarding buying power from their firm allocations?

A No.

Q They were willing to forego curtailment rather than buy oilfired power during '77.

A There is no way under their contract they could resell any power they bought from Bonneville. The same as there is no way any utility, any municipal utility can resell a kilowatt hour of power from Bonneville, once they buy it from Bonneville.

Q Did the industrials buy the firm power of the West Kootenay offer two years ago?

A I don't know.

Q On page 905 of the UTC transcript you stated:

"I do know for example that very recently West Kootenay offered firm power to the United States, as I remember, 16 mills. It is my understanding the interruptible load purchased that firm power at 16 mills, which therefore would reduce the market availability for Puget or others in meeti ng secondary markets."

That statement implies to me that the direct service industrials bought that power.

Am I misinterpreting your statement?

A The thing is, periodically they have different

mm4

amount of short-term firm power available.

But you didn't give me a timeframe in it. I thought you were talking about 1977. What timeframe are you talking about.

Q Well, I'm afraid I just quoted from you and you didn't provide a timeframe either. So perhaps we are at a loss in identifying that.

A I could probably do it if I looked at the transcript and went back and found out what the question was that I was asked.

MR. BEIGHLE: I believe we are having a materiality problem at this point in the cross-examination.

I have been sitting here giving Mr. Lazar quite a bit of latitude, but I am going to object at this point. I think we are so far afield from Mr. Knight's direct testimony that it is objectionable.

MR. LAZAR: The assumption has always been made by both the Staff and the Applicant that only oil-fired generation can replace the shortfall of delaying plants.

As I established a little bit ago the aluminum industry did not buy oil-fired generation when they were curtailed partially with th eir load.

What I am trying to identify now is whether they possibly could bribe the aluminum industry to shut down and use their power instead of oil-fired power during a shortfall

mm5

which would be an alternative which has not been considered in any way, which I attempted to pursue with Dr. Winters, but his knowledge of the aluminum industry, of course, wasn't very good.

CHAIRMAN DEALE: Mr. Lazar, we, too, have a problem from time to time of following the extent of your cross-examination.

Nevertheless, we will go along with it some more.

(Mr. Lazar handing document to witness.)

BY MR. LAZAR:

Q I will, Mr. Knight, give you the transcript and if you think reviewing it you are able to shed any more light on the previous question regarding, the basic question, regarding the ability of the aApplicants to possibly bid the price up to the aluminum industry high enough to get some of the power that they are presently receiving.

A This is in mid-1978, some surplus power that they had at that time, which, as far as we are concerned, was just secondary power they had for a short period of time.

That was mid-1978.

Q So the firm title did not apply to future years?

A No, no. It was something like, they would make it available in July and August, two months, 60 days or something like that.

But not firm power for any period of time.

mm6

MR. BEIGHLE: Your Honor, I am having a little trouble with the state of the record at this point.

The timeframe that Mr. Lazar is questioning Mr. Knight in, I assume is 1986 to 1990 timeframe.

And I think in his questions Mr. Lazar is representing that the contracts between the Bonneville Power Administration and the aluminum companies would all be in effect during that period and that there would be this quantity of power still under contract from Bonneville.

And that, of course, is contrary to fact. Those contracts start expiring in 1981 and most of them will have expired in that timeframe that we are talking about. And I just wondered, for the state of the record, if this is a hypothetical question Mr. Lazar is asking, or what assumption he has made on the status of those contracts?

CHAIRMAN DEALE: I must say that at least one of us assumed it was a hypothetical question.

Two of us.

MR. LAZAR: I am glad Mr. Beighle brought that up.

BY MR. LAZAR:

Q I am wondering, Mr. Knight, if the West Group Forecast assumes continued operation of the BPA direct service industrials?

A Yes, it does.

Q So that load is in there somewhere?

mm7

A The load is there, yes.

Q But it is not coming from BPA?

A It is not under contract.

Q So would your previous statement that they could not resell their power which they buy under contract from BPA have any applicability during the years that we are speaking of in '87?

A They were purchasing power from Bonneville, no, they would not be able to resell it.

Q Mr. Beighle has just indicated that their contracts will expire, so presumably their power is coming from somewhere else.

If it were coming from somewhere else, wouldn't it --

A It may be coming from the local public utility districts in which they are located.

Q You are telling me that there is not a market mechanism that allows you to go in and bribe them to shut down if that cost is lower than oil-fired power?

A No.

Q Would you regard that as a shortfall of the market for power in the Northwest that perhaps could be corrected?

A No.

I can't even go to Safeway and get them to close

mm8

their doors down, you know. How can I do it in any business, ask them to close their doors down so they won't use power.

Q If you could get them to close down for less than the cost of buying oil-fired power, wouldn't you save your customers money doing it that way?

A I wouldn't be saving those customers any money. They wouldn't be able to sell any aluminum. They would have their total plant laying idle.

Q But if you were to walk in there and say, here is enough money to make up all your lost profits and pay your employees and everything, I just want the power -- which is essentially what happened in 1977 when they wouldn't buy oil-fired power, they thought it was cheaper to not produce aluminum.

A It is only their interruptible quantity of aluminum.

They run their firm quantity and some of the interruptible they did buy higher-priced power.

Q But they didn't buy your oil-fired power?

A No.

Q It was cheaper to shut down than to --

A It might have been that the market for aluminum is a little different then than it is tomorrow or today. I don't know.

mm9

MR. LINENBERGER: It is, perhaps, the diffarence here in this exchange, that you, Mr. Lazar, are talking about initiatives that Puget might take, whereas you, Mr. Knight, are saying Puget is constrained by law not to take such initiatives.

THE WITNESS: I'm sure we couldn't do that.

MR. LINENBERGER: But do you know it as a matter of law that you cannot do that?

THE WITNESS: No, sir, I'm not a lawyer.

MR. LINENBERGER: Okay.

THE WITNESS: But when he used the words "bribe," no, I cannot bribe.

(Laughter.)

MR. LINENBERGER: Well, I was overlooking that word.

BY MR. LAZAR:

Q We could rephrase it.

Could you go in and buy their aluminum output minus everything except the electricity for the price of the aluminum if it were cheaper than oil-fired power?

A I'm sure I could if I had that much money. But running oil would probably be a lot cheaper.

CHAIRMAN DEALE: Mr. Lazar, I think we are getting far afield.

MR. LAZAR: Okay.

mm10

BY MR. LAZAR:

Q Mr. Knight, can you tell me what the difference in the northwest is between critical water and average water and average megawatts?

A The difference of the -- if you summed up each of the 40 historical years, and the total divided by 40, it is approximately 3000 megawatts.

Q Is that in the West Group or the Northwest Power Pool?

A That's in the West Group.

Q If we added in B.C. Hydro, would it be higher?

A I assume it would, but we do not have the data on B.C. Hydro.

Q So that based on the '79 West Group Forecast, would there be a sufficient amount of power available in '87-'88, given an average water year within the West Group?

A To what?

Q To meet our firm load.

A What year?

Q '87-'88 I think is the year Mr. Beighle has referred to here a couple of times.

MR. THOMSEN: You are in the '79 West Group?

MR. LAZAR: Right.

MR. BEIGHLE: You are referring to Exhibit 185, I believe?

mm11

CHAIRMAN DEALE: Yes.

Well,I think so.

(Laughter.)

MR. BEIGHLE: We are referring to 185.

MR. LINENBERGER: So are we.

(Laughter)

MR. LAZAR: 185 is fine.

MR. LINENBERGER: Whereabouts?

(Mr. Lazar indicating to Mr. Linenberger)

MR. LAZAR: We are on this table.

MR. STACHON: It is the same table we were working on yesterday.

MR. LINENBERGER: Mr. Lazar, answer verbally so that the reporter can indicate on the record.

MR. LAZAR: It is sheets one and two in the first section.

MR. LINENBERGER: Thank you.

MR. BEIGHLE: It has got a title. Read that.

MR. LAZAR: Titled,West Group Forecast Estimated Loads and Resources.

THE WITNESS: Would you repeat the question, sir?

BY MR. LAZAR:

Q Would there be a sufficient amount of power available within the West Group to meet the '87-'88 load if Skagit were deferred during that period in an average

mm12

water year.

A I don't think so.

Q What do you expect the output of Skagit to --

A You must remember the 3000 average all shows up primarily in the summertime. It is not available in the wintertime when the maximum load is there.

You can't take that 3000 and spread it against the load.

Q Well then what we are talking about is a peaking need in the winter?

A No, I'm talking about an energy need in the winter. That's when your maximum energy needs are.

And the maximum energy production is in May, June and July during those heavy water years.

Q Mr. Knight, have you evaluated the potential of implamentation of PURPA,particularly in load management and rate structure for holding down some of that load and for reshaping some of that load?

A There is a generic case before the Washington Utilities Transportation Commission right now.

Q Have you worked with the Staff in trying to evaluate how much of your load could be reshaped?

A Well, we have read their testimony and we don't see very much happening with the change in the rate schedule they are proposing.

mm13

Q How about the load management techniques?

A Load management tends to reduce your capacity requirement. It also tends to increase your energy requirements. And we -- our problem is a sufficient amount of energy, not a sufficient amount of capacity.

Load management would probably be a wrong thing to do in the Northwest.

Q Have you reviewed the documents of the Northwest Energy Policy Project?

A Sometime ago, yes. Not to any detail.

Q Did you review any of the unconventional sources that they suggested?

A None come to mind now.

Q Have you reviewed Dr. Cheney's testimony on B.C. coal?

A I have read it, yes.

MR. BIEGHLE: I am going to object at this point on the introduction of Dr. Cheney's testimony on B.C. coal as beyond the scope of the direct.

CHAIRMAN DEALE: I think it is.

(Board conferring)

We find it difficult to support you on this one, Mr. Lazar.

(Laughter)

MR. THOMSEN: It is a tempting invitation, but

mm14

we will pass it up.

(Laughter)

BY MR. LAZAR:

Q Do you have projects planned beyond Skagit and Pebble Springs for power resources in the 1990s?

A No, nothing specific.

Q Anything firmly conceptual?

(Laughter)

CHAIRMAN DEALE: Firmly conceptual?

I believe you answered the question the first time.

BY MR. LAZAR:

Q Have you had any discussions with the Washington Water Power Company regarding their proposed Creston generating plant?

A To some degree, yes.

Q Are those discussions in any way involved in the indication by Water Power to expand the application from one unit to three units?

A No.

Their site is capable of handling three units, I believe.

Q Have you indicated an interest in participating in those plants?

A I haven't indicated so.

mm15

Q Have you been asked to pursue that as a possible power supply?

A No.

They are scheduled to be post-Pebble Springs-Skagit units.

(Counsel for Intervenor SCANP conferring)

Q Do you know of anybody within Puget who has had discussions regarding potential participation in those plants?

A Not to any degree. No, I don't know of anybody.

Q But there has been discussion of them being brought on as regional resources?

A Oh, yes.

And the problems of getting them licensed, and the problems of getting the site okayed and everything. Sure.

Q Are most regional resources divided up among the major utilities in the region for ownership?

A Yes.

Q So could we expect that at least some of the applicants other than Water Power would probably participate in those plants?

A Oh, probably so. Water power doesn't use that much generation.

Q Could we expect Puget to be one of those participants?

A It's a possibility, yes.

mm16

Q How much power would the Creston units provide, if all three were built?

A If they built three 500 megawatts, it would be 1500 megawatts.

If they built three 300, it would be 900.

Depending what size the units would be.

Q I have only read about them being 500-megawatt units. Do you have some information on them being some other size?

A Well, the multiplication of five times three is fifteen.

Q You indicated that a smaller plant might have a slightly higher capacity factor.

Could we expect that 1500 megawatts of capacity to be worth a little bit more than 1500 megawatts in larger units?

A 1500 megawatts in 500 megawatts, compared to what?

Q Compared to 1500 megawatts in units of, say 1288.

A Probably so, slightly. Assuming the same coal-fired generation with similar pollution control problems, equipment.

Q Do you consider the 1988 proposed completion date for the first unit to be reasonable?

A I never heard of such a date.

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Q Have you heard of any particular completion date discussed?

A Only as a swagueness, as a post-Pebble-Skagit need for the area.

Q Was that discussion before or after the most recent slippage in the schedules for Pebble and Skagit?

A I think both times.

There is no set date for them as of now.

They don't even have a set date for the licensing.

(Counsel for Intervenor SCANP conferring)

Q Is there a possibility that the moratorium that is going to affect Pebble Springs could result in a situation where Creston would come on line ahead of Pebble?

A If Pebble doesn't get built and Creston does get built, yes, that's a possibility.

Q Even with a moratorium of, say, two years, would that give Creston an advantage?

A WEll, I'm not sure it would be possible if they had a two-year moratorium.

#15MADELON flws mimie mpbl

Q Have you considered any of the smaller coal units on this side of the mountains, utilizing some of the smaller coal deposits over here?

A Have I considered it? Sure we've considered it.

Q Could you describe how much capacity you considered and why it was rejected, and when?

A Well, in previous hearings we've gone through all that.

Q Have you re-evaluated that in light of the most recent cost estimates done by the Staff for Skagit?

A Well, it was re-evaluated approximately a year ago in this hearing.

Q But you haven't re-evaluated them again based on the most recent cost estimates?

MR. BEIGHLE: I'm going to object to this point. I didn't first when he opened up this line, but it's way beyond the scope of the direct.

MR. LAZAR: The direct deals with what has to be acquired in order to meet the deficit, and these coal units, small coal units could be brought on line to meet the deficit. And I think it's very much within the scope of the direct.

CHAIRMAN DEALE: What deficit now?

MR. LAZAR: During the delay during the relocation of the site.

mpb2

CHAIRMAN DEALE: Could all of these small coal --

MR. LAZAR: That's one alternative which neither the Staff nor the Applicant has considered in their testimony in these hearings on alternate sites.

CHAIRMAN DEALE: Carry on with your testimony.

THE WITNESS: Can we have the question?

BY MR. LAZAR:

Q How come they were rejected? How much capacity in small coal?

A In the early 1960s we made an extensive survey of all of the coal in western Washington. We found that we could accumulate enough coal to operate a 300 megawatt plant.

However in evaluating the cost of mining that coal it far exceeded the cost of shipping coal in from either Wyoming or Montana. And that's what we've looked at.

I am sure that is still the case, that you could not mine western Washington coal as cheap as you can ship coal in from Montana and Wyoming.

Q But you didn't look at coal brought in from B.C.?

A I've looked at that too, and that's in the testimony.

Q Can you build a coal plant in less time than you can build a nuclear plant?

A I can't get the license any sooner. If I could

mpb3

ever get started I could probably get it built in a year shorter period of time.

Q In fact, isn't Boardman pretty much on schedule?

A Yes.

Q Jim Bridger 4, is that pretty much on schedule?

A Yes. It should be on the line December this year. It got started before many of the siting acts were passed.

Q But you're a participant in WPPSS 3. Is that pretty much on schedule?

A Well, it's under construction.

Q Is it on the same schedule that it was scheduled to be on at the time it received its construction permit?

A I don't think so.

Q Can you build a small coal plant faster than you can build a big one?

A No.

Q But you can build a coal plant in less time than you can build a nuclear plant, once you get your permits?

A Once you get the permit. If you've got your equipment, you can probably put it up in five years.

We're assuming at Colstrip we can probably get a unit rolling in 50 months. But all of the equipment is onsite because we've had it for three years.

Q So if you could get a permit within, say, three

mpb4

years, you could build a coal plant to meet the deficit that would occur if the plants were relocated.

A If I could get a permit within three years?

Q Right.

A It would take me another five years. I'd be eight years.

Q And you would be right up to 1987-'88, wouldn't you?

A We certainly would.

Q So if you could get a permit within three years, the coal plants on this iside of the mountain could possibly meet all or part of the deficit you've estimated?

A Well, being familiar with the 1977 Clean Air Act, there's no way you're going to be able to build a coal plant on the west side of these mountains. There's too much Class 1 air. You couldn't meet the qualifications.

Q There were some media reports of a large oil fired plant that Puget was mentioned in. Have those been dismissed or are they still active plants?

A I don't know of any active plants.

Q There was an article on a 3000 megawatt oil fired plant for the Anacortes area.

A Who wrote the article? We were not involved.

Q You weren't involved?

A We were not involved.

mpb5

MR. LAZAR: I don't have any further questions.

CHAIRMAN DEALE: Thank you very much, Mr. Lazar.

Mr. Leed, does that conclude SCANP's cross of the witness?

MR. LEED: Yes, it does.

CHAIRMAN DEALE: Mr. Stachon?

MR. STACHON: No questions.

CHAIRMAN DEALE: All right.

Mr. Moser?

MR. MOSER: No questions, thank you.

CHAIRMAN DEALE: Do you have redirect?

MR. BEIGHLE: I have one procedural matter.

In reviewing the transcript from last week, we've had Mr. Knight testify to what we felt were some incorrect representations that were made either in comments or in questions by Mr. Lazar. And we commented on those in Mr. Knight's testimony. And I had hoped Mr. Knight would address those. He has not.

And I really wonder, for the purpose of the record -- and I refer to pages 8 and 11 of Mr. Knight's testimony, and transcript cites are there ---if Mr. Lazar, in some of the statements he made to the Board, shouldn't correct those statements for the purpose of the record because I think they weren't correct.

CHAIRMAN DEALE: What are the pages, Mr. Beighle?

mpb6

MR. BEIGHLE: The statements that I'm talking about are referred to in pages 8 and 11 of Mr. Knight's testimony, with the transcript citations.

On page 11, an answer by Mr. Lazar to a question from you, Mr. Chairman, is quoted. And the problem is the representations were made over what the charts in the Exhibit 201 demonstrated, that they reflected an energy reserve which in fact did not exist on those charts. The energy resources were not depicted on those charts.

I think Mr. Hooper asked some questions of Mr. Lazar about the chart and he responded in this first set of transcript references. And in the second set you, Mr. Chairman, asked him a question and I quoted his answer.

The reason that we introduced Exhibit 211 was to add a line that was missing on those charts, and that's the energy resource line to complete the picture, because the picture was not complete with the questions and statements that Mr. Lazar made at the time he was questioning Dr. Winters.

CHAIRMAN DEALE: Well, what do you propose?

MR. BEIGHLE: Well, I would propose that Mr. Lazar is here. He has had a chance to see Mr. Knight's testimony. He knows the statements that he made. And I just wonder if the record shouldn't be corrected at this point by him.

DR. HOOPER: Mr. Beighle, I'm a little confused.

mpb7

Adding the firm energy resource line does not do anything at all to the questions I had for him. I was talking about secondary power or power from any source. So I see no relevance to the firm energy resources line to what I was talking about.

Now maybe you're confused and not me, I don't know. But I was drawing the line across from generation and firm transfers across to firm peak loads.

Now we're talking about -- I assume that means all sources of energy. We're not talking about drawing the line on firm energy resources. We're not talking about firm power, we're talking about all sorts of power. And I don't think I would represent it as anything else.

MR. BEIGHLE: Well, this is an adverse hydro chart.

DR. HOOPER: Well, I realize that, sir. So I don't think I was misrepresented as far as my question.

MR. BEIGHLE: Well, the record is not clear, then, in that regard.

DR. HOOPER: Well, it's clear to me. I don't know whether it's clear to you.

MR. THOMSEN: It certainly isn't clear to me. I remember the colloquy and there was no attempt to differentiate between peak and energy. And the problem in this region is energy.

mpb8

And we're simply making the point that the discourse about peak resources compared with peak loads is irrelevant and immaterial in regard to the Northwest.

MR. BEIGHLE: Now we did not prepare a second chart which would have been a median water chart. But those tables are available and Mr. Knight addresses that subject in his testimony on the whole WSEC in median water, and there are deficiencies also under median water.

But we did not prepare that chart because this was the only one that was referred to in Mr. Lazar's examination.

CHAIRMAN DEALE: This is Mr. Knight's testimony.

My question is:

Has Mr. Knight's testimony, say, clarified your position? Now it admittedly isn't clarified to the extent that you might like, such as by Mr. Lazar saying that 'I made a mistake' or what have you. But I think my first question would be whether Mr. Knight actually clarifies your position, and I assume that it would.

MR. BEIGHLE: Oh, yes, there's no question about that.

CHAIRMAN DEALE: Now the next question is whether Mr. Lazar agrees with this clarification. And I think that that's a question which you might, well, ask Mr. Lazar.

Mr. Lazar, you've heard Mr. Beighle speak of

mpb9

Mr. Knight's testimony and he referred to the fact that there is -- excuse me, Mr. Beighle referred to the statements by Mr. Knight which identify let's say mistakes which Mr. Beighle assumes you made, and he would like to find out whether you agree with it or not.

MR. LAZAR: First of all, I did address the quotation on page 11 regarding the underload or overforecast when I asked Mr. Knight to refer to the tables on page 23, 27, 31, 35 and 39 of the Western System Coordinating Council plan. So I think I did definitely refer to that.

Regarding the energy situation, my own understanding is that there is a sufficient surplus in B.C. Hydro that puts the Northwest Coordinated System in a situation of surplus, although the West Group is in a situation of deficit. So I would have to say that I cannot, with the data that's been made available to me, confirm in any way the suggestion that Mr. Beighle has made, that the Northwest Power Pool is in a deficit in the years under discussion.

CHAIRMAN DEALE: Does this help you out, Mr. Beighle? No.

MR. BEIGHLE: It really doesn't.

Is Mr. Lazar suggesting that B.C. Hydro's resources are not included on Exhibit 211?

MR. LAZAR: I'm suggesting that the information available to me would draw a line in in a different

mpb10

place than where you have drawn a line in.

MR. BEIGHLE: Well, is it not true that Exhibit 211 includes B.C. Hydro?

MR. LAZAR: I have no way of knowing whether the line that you have drawn in on Exhibit 211 includes any particular system.

That has been added by Puget. I cannot confirm it with the information available to me. It is different from what I have been told by people in the utilities industry. But I don't have the information --

MR. BEIGHLE: Why don't I ask Mr. Knight and get this on the record.

REDIRECT EXAMINATION

BY MR. BEIGHLE:

Q Mr. Knight, referring to Exhibit 211 and the firm energy resource line that you plotted on that exhibit, do the firm energy resources that you plotted for the Northwest Power Pool include the resources of the total Northwest Power Pool, including the British Columbia resources?

A Yes, it does.

Q Could you refer to Exhibit 202, and where in that exhibit would we find that information?

A Yes.

It's in page 74, 78 and 82.

Q Those are page references to Exhibit 202?

mpb11

A Yes.

Q Now are there comparable page references to the Northwest Power Pool where it excludes the Canadian system?

A Yes, there are.

Q Are those pages 84, 86 and following?

A Yes, that is correct.

Q So am I correct, the line that you have plotted, the firm energy resources that you have plotted on 211 includes the resources in British Columbia of B.C. Hydro?

A Yes, it does.

MR. BEIGHLE: I have no further redirect.

CHAIRMAN DEALE: Fine.

Well, I think now everybody has had his turn except the Board.

MR. LINENBERGER: Well, Exhibit 211 is taking on a slightly different character here, so I have to be sure that I understand a couple of things about it.

EXAMINATION BY THE BOARD

BY MR. LINENBERGER:

Q Mr. Knight, do you have Exhibit 211 in front of you?

A Yes, I do.

Q Explain to me what is different about the makeup between the line labeled Firm Energy Load and the line

mpb12

labeled Generation and Firm Transfers.

In other words, at the left-hand side of that figure I am asking what's the difference, what goes into the category making up the bottom curve versus the things that make up the top curve?

A Okay.

The firm energy load is the amount of load, average load annually in gigawatt hours.

The top line is the peaking capacity of the resources. That represents their capability generally on a one hour basis.

For example, the additional units at Grand Coulee cannot create any additional energy whatsoever relative to what the existing units can do. But they can narrow the use of the energy, so for one hour or two hours they can produce a larger quantity. But on an annual average they cannot produce any more energy.

Q Well, I understand your example about Coulee. But generation and firm transfers you say refers to?

A Capacity.

Q Capacity.

A Yes.

Not energy capability.

Q Understood. Capacity.

MR. THOMSEN: Excuse me, that would be the

mpb13

left-hand scale. Does that help you, Mr. Linenberger?

THE WITNESS: Yes.

MR. THOMSEN: You read that line against the left-hand scale.

MR. LINENBERGER: I'm assuming you do because the resources and capacity mean the same thing.

THE WITNESS: That is correct.

MR. THOMSEN: And the right-hand scale is the hours, then, at the time.

MR. LINENBERGER: Right.

THE WITNESS: Only the lower line uses the right-hand scale.

MR. LINENBERGER: That was my assumption.

THE WITNESS: The two upper lines use the left-hand scale.

MR. THOMSEN: The line you added uses the right-hand scale.

THE WITNESS: Yes.

MR. THOMSEN: So it's the lower two lines --

THE WITNESS: Yes, the one that I added.

MR. THOMSEN: Right.

MR. LINENBERGER: Yes.

BY MR. LINENBERGER:

Q Well, pardon me for belaboring this, but I look at the upper line and the second-from-upper line, which

mpb14

As labeled Firm Peak -- No, I'm sorry. I understand my problem now. Thank you.

CHAIRMAN DEALE: All right.

Mr. Knight, thank you, thank you very much. You may be excused.

(The witness excused.)

CHAIRMAN DEALE: That concludes the testimony for today principally because we've run out of time.

We've already considered the housekeeping chores, looking toward the next hearing session beginning the last week of next month, namely August. And I see no one --

MR. THOMSEN: We should offer 211 and 212 into evidence. e.)

We would offer them in evidence at this time. I wasn't sure we'd done that.

CHAIRMAN DEALE: All right.

MR. THOMSEN: It's these two that Mr. Knight has been working with.

CHAIRMAN DEALE: Oh, yes. All right.

This relates to the material which Mr. Knight had --

MR. THOMSEN: Yes, sir.

CHAIRMAN DEALE: Are there any objections?

MR. STACHON: Can I just get a reference from which part of Exhibit 202 212 was taken?