UNITED STATES ATOMIC ENERGY COMMISSION

REGULATORY DOCKET FILE COPY

IN THE MATTER OF:

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
(Indian Point Station, Unit No. 2)

Docket No. 50-247

Place - Bethesda, Maryland

Date - 10 April 1974

Pages 10,415 - 10,608

Telephone:
(Code 202) 547-6222

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UNITED STATES OF AMERICA

ATOMIC ENERGY COMMISSION

In the matter of:	
CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.	Docket No. 50-247
(Indian Point Station Unit No. 2)	

Hearing Room,
8120 Woodmont Avenue,
Bethesda, Maryland.

Tuesday, April 10, 1973.

Hearing in the above-entitled matter was re-convened, pursuant to adjournment, at 9:00 a.m.

BEFORE:

SAMUEL W. JENSCH, Esq., Chairman,
Atomic Safety and Licensing Board.

DR. JOHN C. GEYER, Member.

MR. R. B. BRIGGS, Member.

APPEARANCES:

(As heretofore noted.)

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C O N T E N T S

(Testimony of Dr. James T. McFadden, omitted from hearing record for 9 April 1973, is included herein following page 10,608.)

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P R O C E E D I N G S

CHAIRMAN JENSCH: Please come to order.

Between the time of yesterday morning's discussion about pressure vessels and this morning, the Board has been giving consideration to the several arguments and contentions which have been asserted in reference to that matter and, while it is not an evidentiary matter, the Board has looked at the so-called Wechsler report and the WASH-1250 document which were furnished by one of the parties. And with the agreement of all of the parties we looked at those two documents.

The Board has again reviewed the terms in general of the Commission decision of October 26th, 1972 in reference to the pressure vessel situation for this proceeding and after a review also of the evidence which has been adduced by both the Applicant and the Staff in reference to the pressure vessel integrity consideration, the Board has concluded that the Applicant and the Staff have provided data which are pertinent to the consideration of the pressure vessel integrity and upon the basis of the present status of the record, the Board concludes that that subject of pressure vessel integrity is not and should not be an issue for further evidentiary proceedings with reference to the Indian Point proceeding.

It is not believed that the present status of the

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record reflects any non-compliance with the regulatory requirements of the Atomic Energy Commission and while the Board is open to persuasion in the matter, upon the basis of the present record the Board concludes that of the four items which were discussed yesterday, the pressure vessel integrity subject is not an issue at this time for further consideration in the proceeding.

We are, I believe, about to resume the environmental concerns situation. Dr. Lawler was on the stand. If that is the next matter, we are ready to proceed with further cross-examination.

Will Dr. Lawler come forward, please?

MR. TROSTEN: Mr. Chairman, I have agreed with Mr. Macbeth that we will commence this morning with cross-examination of Mr. Newman, and complete Dr. Lawler later.

CHAIRMAN JENSCH: Very well.

Mr. Newman having been previously sworn need not be sworn again.

Will you come forward, please, Mr. Newman?

Whereupon,

CARL L. NEWMAN

resumed the stand and, having been previously duly sworn, was examined and testified further as follows:

CHAIRMAN JENSCH: The evidence on behalf of Mr. Newman has been received into the record yesterday. The witness is available for cross-examination.

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Are you ready to proceed?

MR. MACBETH: I am.

CHAIRMAN JENSCH: Will you proceed, please.

CROSS-EXAMINATION

BY MR. MACBETH:

Q Mr. Newman, I turn first to the additional redirect/ rebuttal testimony on restricted operation of Indian Point 2 which you submitted with Mr. Schwartz and Mr. Woodbury and in particular, to the section on the xenon problem, xenon redistribution.

On page 8 of the testimony you provide a chart of the maximum number of days to reach the CVCS design limits in terms of the fraction of the fuel cycle remaining.

First of all, I would like a somewhat fuller description of what these terms mean. How is the fuel cycle being measured in terms of this chart? When does it begin? When does it end?

End 1

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A. I will have to consult with my staff. These are rather detailed calculations and I don't have them --

CHAIRMAN JENSCH: Will you use the microphone Mr. Newman, please, and speak loudly if you will, please.

THE WITNESS: I said these are rather detailed calculations and I will consult with my staff and answer your question specifically.

(Pause.)

The fuel cycle begins at time of refueling.

CHAIRMAN JENSCH: Excuse me, Mr. Newman, I am going to have to ask all parties to withhold interrogation for a few moments to see if we can get somebody to operate our loudspeaker so we can hear.

(Brief recess.)

CHAIRMAN JENSCH: It is like Christmas, somebody is coming, but we will carry on as best we can. If you will speak in a loud voice we will appreciate that.

THE WITNESS: The beginning of the fuel cycle is the core loading. And the end of the fuel cycle occurs when we runout of reactivity and are wholly deborated.

BY MR. MACBETH:

Q. And that would normally be one year later an annual fuel cycle?

A. No.

In the early cycles, no. In the equilibrium

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1 cycle we would be on an annual refueling.

2 Q. As I remember there was to be one 18-month

3 cycle and then successive annual cycles, is that right?

4 A. Yes.

5 Q. So that after the first cycle it would be an

6 annual cycle.

7 A. Yes.

8 Q. I also assumed fromthe chart provided on Table 5

9 and our earlier discussion as to the period of xenon

10 incapacity as the core became older, that you are planning

11 the annual refueling for the spring, is that correct?

12 A. Either the spring or the fall.

13 I believe the chart showed the spring.

14 Q. So that if the refueling took place in the spring,

15 in June and July there would be more than .5 of the fuel

16 remaining, is that not correct?

17 A. That is correct.

18 Q. Could you provide the maximum number of days to

19 reach CVCS design limits for the other tenths of the fuel

20 cycle between .6 and .9?

21 A. We could have these calculations performed and

22 forwarded to you.

23 Q. Thank you.

24 Also, it is my understanding that the chart

25 provided on page 8 reflects only the situation with cycling

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1 from 30 percent of full power to 100 percent of full power.

2 Could you also provide the figures for cycling

3 from 50 percent of full power to 100 percent of full power?

4 A. These figures will be calculated and forwarded.

5 Q. Thank you.

6 Now, I just wanted to clarify the meaning of the

7 column Maximum Number of Days to Reach CVCS Defined Limits

8 Based on One Cycle per Day. Does that mean that when half

9 of fuel life is remaining the core could be cycled from

10 30 percent of full power to 100 percent of full power and back

11 to 30 percent full power ten times before the CVCS limits

12 were reached?

13 A. Yes it does.

14 Q. And what would happen once the CVCS limits are

15 reached?

16 A. We would run out of tankage at the side of tankage

17 for storing borated water.

18 Q. I understand that to mean a disposal problem.

19 You are removing the borated water and --

20 A. It is not a disposal problem, it is a processing

21 problem.

22 We have a capacity for processing borated water.

23 Its rate of processing does not keep up with the rate of

24 production of borated water under this hypothetical cycling

25 so that we accumulate in storage borated water faster than

mm4

1 we can treat it.

2 Q In that situation, once you reached the design

3 limits of the CVCS there would come a time when you have

4 been able to process borated water and store it, would there

5 not?

6 A Yes there would.

7 Q And at that point one could once again begin the

8 cycle in process, is that correct?

9 A That is correct.

10 Q And how long would it take to operate the CVCS

11 process so you once more could begin the cycling procedure?

12 A You would have to be more specific in the terms

13 of the question.

14 Q Well, let us assume that we were halfway through

15 the fuel life and that the plant had been cycled from 30

16 percent of full power to 100 percent of full power and back

17 to 30 percent of full power on ten successive days, and

18 thus we had reached the design limits of the CVCS and the

19 aim was now to process borated water as quickly as possible

20 so that the same cycling process could begin again.

21 How quickly could the borated water be processed

22 and the cycling begin?

23 A When I said the questioning should be more

24 specific, I mean do you want to have one day available for

25 cycling, five days available for cycling, or ten days?

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This is the type of question that we could investigate.

Q Well, let's take each of those in turn.

I essentially would like you to describe the system that is involved there.

A How soon we can be back in some business?

Q Why don't you take one day and then five and then ten, so we could get a sense of what is involved.

A We can calculate that.

Q And would you also do it for cycling from 50 percent of full power to 100 percent of full power?

And if the fraction of the remaining fuel cycle makes any difference, I am not sure that it does.

A It obviously does.

Q If you could then do it for the series from .2 to .9.

I am sorry to give you so much work.

MR. SACK. At one-tenth intervals.

MR. MACBETH: Yes, it is already done from .1 to .5 at one-tenth intervals, and if you would continue that on through .9.

BY MR. MACBETH:

Q Is it correct that the number of cycles could be increased if the capacity of the CVCS was increased?

In other words at half the fuel life with the CVCS

mm6

of greater capacity a greater number of cycles could be run before the design limits would be met?

A Qualitatively, yes.

Physically it is relatively impractical because the design requirements of the system would increase exponentially so you very rapidly get to an impractical situation as far as capacity of the system required to produce a finite number of increased cycles.

end 2

3 eb1

Q If one were to increase the capacity so, say, 25 cycles at half of core life, 30 to 100 and back to 30 would be within the capacity of the CVCS, what would be involved in terms of costs and construction time problems?

A We have not performed that design calculation.

Q I am really only interested in a very rough estimate. I don't want any kind of detailed figures. Are we talking about something to be done in two weeks or two years?

A I can answer your first question. It cannot be done in two weeks. Two years we would have to analyze.

Q I'd appreciate some rough estimate of that, but I don't expect anything terribly detailed.

MR. MACBETH: I have a couple of other questions of Mr. Newman but I wanted to check if Mr. Woodbury would be available.

MR. TROSTEN: Yes.

BY MR. MACBETH:

Q Mr. Newman, has it been a policy of Consolidated Edison from time to time to go forward with construction of facilities despite the fact that not all approvals from Government agencies are in hand? I'm thinking particularly of the situation in Astoria.

MR. SACK: Objection. I don't find the relevancy of that question in this proceeding.

eb2 1 MR. MACBETH: The schedule that is set out in
2 Mr. Newman's testimony on alternative closed cycle cooling
3 systems gives a period for which various kinds of activities
4 have to take place, and it is my memory of it that all Govern-
5 mental approvals and permits must be in hand before any
6 construction begins.
7 And what I am probing is whether this has been
8 consistently the company's policy.
9 MR. SACK: May I confer with the witness?
10 CHAIRMAN JENSCH: Surely.
11 (Pause.)
12 CHAIRMAN JENSCH: What was the page of the testi-
13 mony to which you referred?
14 MR. MACBETH: The chart is set out as Exhibit F
15 at the very end of the testimony.
16 MR. SACK: Mr. Chairman, I object to the question
17 with respect to Astoria-6. If the question were more general
18 as to what the policy of the company is in general, I believe
19 it would be relevant, but Astoria-6 is certainly not rele-
20 vant to this case, and there are some very unique problems
21 there, and I object to anything specific on ~~Astoria-6.~~ Astoria-6
22 If the question were rephrased I think it would
23 be admissible.
24 MR. MACBETH: I would like a ruling from the Board
25 on that. I think that the question directed to Astoria-6

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is perfectly proper. It's an example of what the company has in fact done in various circumstances. There may be peculiarities to Astoria-6 which the company is perfectly free to point out. There certainly also are peculiarities to Indian Point, and I think it is a perfectly proper question.

CHAIRMAN JENSCH: I presume ordinarily the approach would be what is generally the policy of the company in regard to construction. And then, if that subject were pursued a bit, a specific would be raised to test the general applicability of whatever response there were to the question about the general policy of the company.

I think the Hudson River Fishermen has approached this perhaps more directly. If the witness were to answer "We all would get permits before we go ahead," the interrogator would probably say, "How about Astoria?"

So I think we are going to reach the point eventually in any event.

MR. MACBETH: I am willing to go through the form.

MR. SACK: I prefer to reach it in that sequence.

CHAIRMAN JENSCH: I think the objection is well taken. The objection is sustained.

BY MR. MACBETH:

Q What is the general policy of the company on obtaining permits before or after beginning construction when permits are necessary for construction?

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A Our general policy is to obtain permits as required for all work we perform.

Q But in terms of the time sequence is it the policy of the company to obtain them before the permitted activity begins or after the permitted activity begins, or what is the company's policy on the point at which permits are obtained?

A It is our policy as a general policy to obtain permits before work commences.

Q And taking now the example of Astoria-6, were permits obtained for construction before construction began at that plant?

A Yes. Permits were obtained for the various phases of construction before those phases are commenced.

Q Fully complete permits from all relevant Government agencies?

MR. SACK: Objection. I don't understand what he means by "fully complete." It is either issued or not issued.

MR. MACBETH: Permits that fully met the requirements of the law.

MR. SACK: This calls for a legal conclusion.

We might inform the Board that Astoria-6 has been subject to litigation and there have been various rulings on the validity of the permits which have been issued by the Corps of Engineers, and I don't think the witness is qualified

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to pass on the legality of the permit.

He has testified that he had a validly issued permit in hand before construction was commenced.

CHAIRMAN JENSCH: As I understand the witness, the witness says for each phase of the construction he did have permits. Now your further question is, "Well, do you have permits for the whole thing?" And that perhaps is a little more factual.

I think the objection points out there is a possibility of a legal conclusion but you are really asking if you had permits for the entire construction, and I don't understand the answer to indicate that he did.

MR. MACBETH: There was also the question of legal validity and I think that does call for a legal conclusion. I will withdraw that part of the question. I will also in due course ask the Board to take judicial notice of the two decisions on the Astoria-6 plant.

CHAIRMAN JENSCH: What would be the relevancy of that?

MR. MACBETH: I think they do describe whether or not the company in fact had valid permits. The company obviously argues that what they had was a sufficient permit but I think it is perfectly clear, reading the decisions of the District Court, that they were not in fact fully complete permits and they were moving ahead with construction at a

eb6

1 time when the Court had ruled that the permits were not fully
2 complete.
3 CHAIRMAN JENSCH: Well, how would that relate to
4 this case?
5 MR. MACBETH: The company does not in all cases
6 wait until it has fully complete permits to meet all require-
7 ments of law before beginning construction or the activity
8 that must be permitted.
9 MR. SACK: Mr. Chairman, I find we are getting
10 into the peculiar history of Astoria-6 which is somewhat
11 unique because construction was started before enactment of
12 the Federal Water Pollution Control Act amendments and the
13 whole history there has gotten very confused.
14 We had a permit before construction was commenced.
15 It was attacked by intervenors. The Court held that the
16 permit was improper but under the circumstances they refused
17 to enjoin construction, so there was a specific concurrence
18 of the Court with Con Edison's continuing construction be-
19 cause of the very serious power supply problems of New York
20 City, so we continued construction.
21 That plant is vitally needed and the peculiar
22 facts of this matter, I don't see how it has any relevance
23 to the Indian Point proceeding at all.
24 We were forced by circumstances and the changing
25 laws and changing rulings into this very unusual posture.

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CHAIRMAN JENSCH: As I understand, the interrogator says he will ask for some official notice to be taken.

Until you make that request, the Board will consider what should be done about it. At the moment, let's proceed with the interrogation.

4

I think you have withdrawn the question about the legal phases of the permit.

MR. MACBETH: Yes.

BY MR. MACBETH:

Q Mr. Newman, in drawing up the cost-benefit analysis for Indian Point 2, including alternative cooling systems, how did you treat taxes, Federal, State and local taxes?

A May I ask what document you are looking at now?

Q I am looking at your testimony of April 9th, and I will turn to the closed cycle cooling systems and in particular page 21 where you discuss local taxes. And I do want to expand the question and ask about State and Federal taxes as well.

A Property taxes were included at a rate of 2.2 percent for Indian Point calculations and for gas turbine replacement capacity calculations, they were included at a value of 2.0 percent.

Q And when you say "included" you mean included in the costs?

A Included in calculating the total carrying charges.

Q Which would be part of the --

A Or fixed charges as we have them labeled.

Q And in the cost-benefit analysis, those would be costs; is that correct?

A They are costs.

Q And how were State and Federal taxes treated?

A I have no State taxes appearing as such. The Federal income tax was calculated to be 1.209 percent for Indian Point Number 2 and 2.1860 percent for the gas turbines.

Q And in drawing up the benefit side of the cost-benefit analysis on the alternative cooling system, how have you treated the taxes on the benefit side?

MR. TROSTEN: May we have a brief recess?

CHAIRMAN JENSCH: Very well. How much time do you want?

MR. TROSTEN: I think if we could have ten minutes?

CHAIRMAN JENSCH: Very well. At this time let us recess to reconvene in this room at 9:50.

(Recess.)

CHAIRMAN JENSCH: Please come to order. Are we ready to proceed with further interrogation? Is there a question pending?

MR. MACBETH: There was a question pending.

CHAIRMAN JENSCH: Do you recall what it is? Will you restate it?

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MR. MACBETH: It was how the taxes would be treated on the benefit side of a cost-benefit analysis.

THE WITNESS: The taxes were treated as a benefit. Those that were charged as a cost of the cooling towers were treated as a benefit or an incremental benefit under minimum water impact, Column 2.

BY MR. MACBETH:

Q Recently we have seen cost figures for cooling towers but not benefit figures. If we had both in front of us, the tax figures would appear on both the cost side and the benefit side; is that correct?

A That is correct.

Q I have a question --

A Let me qualify that. We're talking about local taxes, not Federal income tax.

Q What about Federal income tax?

A Federal income tax we have ~~no~~ not credited as a benefit.

Q Why is that?

A We have a net export of tax money from our area.

Q If you looked at the benefits to the United States, would it not be a benefit -- should not Federal taxes be counted in the benefit column?

A That's a philosophical question.

Let me point out that every dollar that is spent on anything can be called a benefit. Some of the costs of

eb10

these cooling towers are salaries of my staff and the working people, so that when you get into this type of discussion, you're getting into a discussion really of political philosophy rather than accounting.

Q In other words, it is your policy only to credit those tax dollars to benefits which stay within what? -- New York City and Westchester County?

MR. SACK: Objection to the question. This cost-benefit analysis is not in accordance with Con Edison's policy. It was prepared in accordance with the rules of the Atomic Energy Commission.

MR. MACBETH: I'm afraid I don't have the rules in front of me. There is a rule there on crediting of Federal income tax?

THE WITNESS: Well, let's say there was a guideline, a guideline at the time we made out this benefit description and we followed --

BY MR. MACBETH:

Q And it specifically covered Federal income tax?

A It specifically did not list Federal income tax. It specifically listed local taxes as a benefit.

Q Does that mean it was a judgment on the part of Consolidated Edison that Federal income taxes were not a benefit?

MR.SACK: Objection, Mr. Chairman. He just

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1 testified that Con Edison did not make any judgments behind
2 this cost-benefit analysis but prepared it in accordance with
3 the guidelines given us by the Atomic Energy Commission.
4 CHAIRMAN JENSCH: Well, as I understand the guide-
5 lines are not exclusive in that there is still opportunity for
6 adjustment by the party making the preparation. And as I
7 understand the witness, he has mentioned that the guidelines
8 do not refer to Federal income taxes so apparently it would
9 be open for a judgment by the party preparing the statement.
10 I think the inquiry is asking, "What did you do
11 with it," since there was nothing specific on it in the
12 guidelines.
13 THE WITNESS: Specifically we did not include them.
14 BY MR. MACBETH:
15 Q And that includes both whatever portion of Federal
16 income tax would have remained in the New York City,
17 Westchester area and any remainder of the income tax?
18 A My understanding is none of it remains. It is all
19 sent to the collector. Some of it comes back.
20 Q Well, I live in New York and I share your feeling.
21 Nothing comes back obviously. But I assume you did not
22 include any Federal income taxes. Is that correct?
23 A That was my statement.
24 Q Were there State taxes that were treated one way
25 or the other?

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A We had no State taxes included.

Q No State taxes.

I have a question of clarification about Table 1 on page 15.

Would you simply explain to me how the escalation, the particular escalation figures were reached, and then the process by which part of them was allocated?

A Well, a very simple explanation is that historically we have followed escalation; that appears in my testimony. Our present judgment is that escalation will continue and that is a business judgment based on weighing a number of tangible and intangible factors, the most tangible being negotiated labor contracts reaching into the future, generally judging what pressures are available in the economy to continue this escalation trend.

It is our current judgment that escalation will continue at the rate of seven percent per annum. We used this numbers compounded simply. We do not work with a compound escalation; we work with a ~~simply~~ simple escalation, seven percent per annum.

We then assume from the nature of this particular project that the cash flow of the project would be linear. If one takes then the seven percent for a period from 7/1/73, for example, in the table to 12/31/75 that results in 17-1/2 percent of which escalation -- one-third of the

eb13

capital is expended during that period resulting in 5.83 for that period, et cetera.

We broke it up into three periods and when we add them together they calculate to 24.5 percent.

Q Would you agree that there may well be escalation in the dollar values assigned to the various benefits to be obtained from the closed cycle cooling system over the course of the next four to five years?

A I would like to confer with my attorney for a moment.

(Pause.)

If the towers were to be built in the next four to five years and there were benefits from them, the benefit would possibly escalate.

Q Fine.

End 4

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MR. MACBETH: I have no further questions of Mr. Newman.

CHAIRMAN JENSCH: The Staff?

MR. KARMAN: No questions.

CHAIRMAN JENSCH: Let me ask Mr. Newman a few questions, if I may.

If I had the transcript before me, I would not ask it as a question, but your background is engineering, is it not?

THE WITNESS: Yes, sir.

CHAIRMAN JENSCH: And have you conferred with your accountant of the company before you prepared this statement, these figures which are reflected in your redirect rebuttal testimony on alternative closed cycle cooling systems?

THE WITNESS: Our accounting people did review this document and concurred with the accounting portions of the document.

CHAIRMAN JENSCH: But you had it prepared originally and asked for their approval, is that correct?

THE WITNESS: That is correct.

CHAIRMAN JENSCH: They did not initiate any parts of this testimony reflected here?

THE WITNESS: It is my understanding that they only reviewed and concurred with the presentation.

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CHAIRMAN JENSCH: Is there an accountant of the company here?

THE WITNESS: No there is not.

MR. SACK: No, Mr. Chairman. If you desire, we could bring someone down.

CHAIRMAN JENSCH: No, I was just inquiring.

The reason I asked some of those questions is, I noticed you have used certain percentage figures, while for engineering and supervision, payroll taxes and percentages.

THE WITNESS: These numbers are commonly used by the engineering department. They are produced for us by the accounting department and forwarded to us periodically representing accounting department summaries of the costs of the company.

They do vary from time to time. These are the values that are currently being used in engineering department estimates.

CHAIRMAN JENSCH: Well the reason I asked, it is my recollection that many of these percentage figures which he used, are really experience factors rather than formula applications.

THE WITNESS: That is correct.

CHAIRMAN JENSCH: Therefore the question I really have is, what period of time was utilized to derive the

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1 percentages that you have utilized here, if you know?

2 THE WITNESS: These numbers represent our

3 prediction of clearing accounts for this year. They have

4 been the same numbers that have been used since I have been

5 with the company, which is slightly in excess of two years.

6 They are not uniformly used for all types of

7 construction. This is for in-plant capital construction and

8 represent the moneys that are in the clearing accounts at

9 present.

10 We review this percentage on a three-month basis

11 and we have seen no change in it in the last eight quarters

12 that I am aware of.

13 CHAIRMAN JENSCH: Well I had the impression from

14 your presentation here that some of these figures which you

15 had utilized and which have been identified in your testimony

16 as having had the approval of the New York Public Service

17 Commission and the Federal Power Commission, were figures

18 derived from rate case proceedings?

19 Is that correct?

20 THE WITNESS: They are used in rate case

21 proceedings, yes.

22 CHAIRMAN JENSCH: Do you know what rate case

23 proceedings utilized the figures, for instance, for payroll

24 taxes, pensions, that you gave here of the sum 24 percent?

25 MR. SACK: Mr. Chairman, unfortunately we are

mm4

1 in almost constant rate proceedings.

2 What this testimony --

3 CHAIRMAN JENSCH: I am talking about the Federal

4 Power Commission now.

5 Are you constantly in rate case proceedings

6 before the Federal Power Commission?

7 MR. SACK: No, we are not.

8 We file annual reports, of course, with the

9 Federal Power Commission. We have not -- and these figures

10 have never been challenged, they have been accepted as

11 filed.

12 CHAIRMAN JENSCH: Do you know what procedure there

13 is to challenge figures in an annual report that is filed?

14 MR. SACK: I personally am not familiar with

15 that. We can check that.

16 CHAIRMAN JENSCH: Have you ever heard of a

17 proceeding that challenged the figures that were shown only

18 in an annual report filed by an electric utility?

19 MR. SACK: I am not familiar with the degree of

20 approval on any we have had here. But we can check that for

21 you.

22 CHAIRMAN JENSCH: Well is it your understanding

23 that the filing of an annual report is other than a

24 perfunctory reporting of the transactions reflected in the

25 annual report?

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MR. SACK: I never considered that perfunctory, any filing of that nature. I will check to see exactly what we do. I know our accounting people are in constant communication with the Federal Power Commission as to proper treatment of various items. They don't regard it as a perfunctory matter at all.

I will have to inquire into that.

CHAIRMAN JENSCH: I think you are talking about something other than what I inquired about.

There may be other endeavors to have specific approval of certain accounting practices. But limiting yourself to the filing of an annual report, do you know of any procedure that has ever been applied to challenge the figures in an annual report?

MR. SACK: I have not participated in that area of our legal activities, so I would not be in a position to know.

CHAIRMAN JENSCH: Well you don't know then if there is really any approval derivable out of the filing of an annual report by an electric utility?

MR. SACK: I would have to inquire into that.

I don't know the degree of approval.

CHAIRMAN JENSCH: What was the last rate case proceeding that Consolidated Edison had with the Federal Power Commission?

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1 MR. SACK: The Federal Power Commission --

2 CHAIRMAN JENSCH: Yes.

3 MR. SACK: I would have to check the degree of

4 approval.

5 Our rates are generally not subject to FEderal

6 Power Commission.

7 CHAIRMAN JENSCH: Is that true for both the

8 electric and the gas operation?

9 MR. SACK: Yes, sir.

10 CHAIRMAN JENSCH: That was my understanding, and I

11 did not understand how you would get approval if there is

12 no regulatory jurisdiction over your electric and gas

13 operations.

14 I am puzzled to know. If you can tell me, I

15 would appreciate it. How were these figures ever approved

16 by the Federal Power Commission?

17 MR. SACK: Well our accounting people, as

18 Mr. Newman said, specifically approved that use of the

19 language so I will have to check with them.

20 CHAIRMAN JENSCH: Does Mr. Schwartz desire to confer

21 further? Are you ready to proceed?

22 MR. SACK: We can proceed and we can develop this

23 information.

24 CHAIRMAN JENSCH: I noticed you were conferring

25 and I did not want to interrupt.

mm7

What puzzles me really is, there is some chart here that is used as -- on page 10 of your testimony, Mr. Newman, do you have that before you?

THE WITNESS: Yes, I do.

CHAIRMAN JENSCH: Subsection v and vi you have escalation 24 percent, contingency 20 percent.

THE WITNESS: Yes, sir.

24 1/2 percent for escalation and 20 percent for contingency.

CHAIRMAN JENSCH: Now, is it your understanding that those figures are experience factors from the operations of the company?

THE WITNESS: Yes, sir.

CHAIRMAN JENSCH: Perhaps this is not a question to ask you, but perhaps you can refer it over.

Were these prepared in accordance with generally accepted accounting principles? If you cannot answer, perhaps you can find out. If you will tell us what the principle is, I understand there is quite some question about what are generally accepted accounting principles, I think most recently reflected in the equity funding situation.

MR. SACK: Mr. Chairman, I think accounting --

THE WITNESS: Excuse me, I don't believe we used the words general accounting principles in connection with --

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1 CHAIRMAN JENSCH: No, that is what puzzled me.
2 None of them seems to be reflected according to generally
3 accepted accounting principles as vague as that may be. At
4 least it is something that is held up as a carrot on a
5 stick in analyses of accounting statements.
6 THE WITNESS: This is our historical experience
7 that when we make estimates of projects of this type with the
8 degree of knowledge that we have of the project, we experience
9 costs at the final accounting and reckoning that are 20
10 percent higher than we can account for from takeoffs of the
11 physical design at the time that we make the estimate.
12 It is always to be expected that the final costs
13 will be higher than that which you can account for prior
14 to final design because there are items of omission in
15 the preliminary design that ultimately come into the
16 design. And historically we know that on a project of this
17 type, they amount to approximately 20 percent.
18 DR. GEYER: Does the cost of this hearing
19 constitute part of the cost of this escalation?
20 THE WITNESS: It constitutes part of the 12 percent
21 for engineering, yes, sir.
22 CHAIRMAN JENSCH: Well, speaking of this proceeding
23 do you --
24 THE WITNESS: If I may amplify.
25 The contingency has 20 percent of the 12 percent

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in it, so to answer your question specifically, yes.

CHAIRMAN JENSCH: Well now, we had some interrogation about costs and benefits.

How do you handle crediting, let's say, of an outage at the plant which does not delay the proceedings, or the proceeding does not affect the operation?

Do you have some balancing procedure that you can work out so it really isn't the proceeding that is holding up the operation of the plant? It really isn't a benefit because the proceeding can't go on anyway. Do you have a procedure like that?

THE WITNESS: No, sir.

end 5

CHAIRMAN JENSCH: Will you tu rn to page 16? Subsection C on page 16, the last line of the first paragraph states:

"There is a loss of 2,585,000 megawatt hours which must be replaced."

I take it that that is a calculation that reflects the expected situation where you have to shut down the plant in order to tie in the cooling powers if they are to be constructed, is that correct?

THE WITNESS: There is a seven-month period when the cooling towers would be tied into the existing systems.

For purposes of the analysis, we have said that of that seven months, two months we would be down for

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refueling if we did not take into account as far as the cost of the cooling tower replacement energy, the replacement energy for those units for two months. So for five months of the seven months, we have assumed that this energy would have to be replaced as a result of the cooling tower installation.

CHAIRMAN JENSCH: What facts did you have to consider that it would take seven months to tie in the cooling towers?

THE WITNESS: We had an examination of the existing facilities and a rather detailed preliminary design of the installation.

CHAIRMAN JENSCH: Did you consider the experience from any other plants when they have tied in cooling towers?

THE WITNESS: We think that the experience at the other plants is not necessarily germane to our particular problems, in that we have to tie into the plant as it now exists.

We know the plant as it now exists, we know where we have to tie in.

CHAIRMAN JENSCH: What is the problem of tying in cooling towers? How many pipes have to be tied?

THE WITNESS: There are basically four major pipes that have to be tied in. The problem is the area in which they have to be tied in.

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In other plants where cooling towers have been backfit, the towers have been --

CHAIRMAN JENSCH: Name one, if you will, please, or two or three?

THE WITNESS: Well, let's name Palisades and Vermont Yankee.

The towers have been adjacent to the circulating water lines and the tie-ins have been to the circulating water lines at a convenient location away from the plant.

In our particular case the orientation of our plant is such that our towers would be required to be located north of the plant, while the circulating water system goes south of the plant and therefore we have to tie into the circulating water system at the plant rather than at some convenient spot on the discharge lines.

We have tunnels, we don't have discharge pipes. We have a very compact arrangement of the circulating water system. It is just a problem that is peculiar to the layout of the plant as it was originally conceived with no deference to cooling towers.

CHAIRMAN JENSCH: Well let's take, how long did it take to tie in Palisades? You say you considered that situation?

THE WITNESS: It is still not operating.

It was tied in prior to operation and so they

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they did not have this down-pipe situation to contend with.

CHAIRMAN JENSCH: How long did it take to run the pipe fromthe plant to the cooling tower, if you know?

THE WITNESS: I do not know.

CHAIRMAN JENSCH: What facts did you have about that tie in at all?

THE WITNESS: Just a general picture of the facility.

CHAIRMAN JENSCH: You mean a photograph?

THE WITNESS: No, a general description.

CHAIRMAN JENSCH: With whom did you discuss this situation on Palisades, do you know?

THE WITNESS: Mr. K. A. Swarts, the project manager.

CHAIRMAN JENSCH: And what time did he give you that it took to tie in the plant, do you know?

THE WITNESS: I indicated that I did not have that information.

CHAIRMAN JENSCH: How about Vermont Yankee, how long did it take to put the pipes together for that cooling tower?

THE WITNESS: I do not have that information either.

CHAIRMAN JENSCH: Did you ask for it in either instance?

13 mml

THE WITNESS: No, we didn't, because we did not feel that it was germane to our particular situation.

CHAIRMAN JENSCH: How far is it from the cooling towers? If they were to be constructed, how far would it be from the cooling towers to the circulated water situation?

MR. TROSTEN: May we confer for a moment?

CHAIRMAN JENSCH: Surely.

(Pause.)

THE WITNESS: You were asking me a question, sir?

CHAIRMAN JENSCH: Will you repeat the question.

(Whereupon, the reporter read from the record as requested.)

CHAIRMAN JENSCH: You say you have to tie the two together; one north, one south, and so on? How far in distance?

THE WITNESS: From the containment to the cooling tower, under our present design, is 500 feet.

CHAIRMAN JENSCH: NOw, if you were to build cooling towers -- please understand that all these questions about cooling towers are upon the assumption that when, as and if something is constructed -- supposing you constructed cooling towers and they were all fully completed and you had your pipe from the cooling tower, and you were in south or east, or anywhere you go from the cooling tower to the containment opening, you have it all brought right up there

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all the pipes you can think of that you need from the cooling towers, and you say you have about four principle pipes from the cooling tower?

THE WITNESS: Yes.

CHAIRMAN JENSCH: If you brought it right up to the wall of the containment building, is it your thought it is going to take seven months to go through the wall?

THE WITNESS: No, sir.

CHAIRMAN JENSCH: Well where does the seven months come from?

THE WITNESS: There is additional considerable work required in the condenser pit to rearrange the condenser pit to allow this water to be connected into the circulating water system to the cooling tower.

CHAIRMAN JENSCH: What is the work in the condenser pit that is going to take seven months?

THE WITNESS: There is considerable subsurface structural work to allow us to get through the walls to allow us to turn the pipes north where they now run south.

Referring to my February 5 testimony, Exhibit 3, it shows in detail, the work that is required for this cutover.

CHAIRMAN JENSCH: Thank you.

None of that can be done while the cooling tower construction is going on, is that correct?

15 mm 1 THE WITNESS: That is correct.

2 CHAIRMAN JENSCH: Nothing can be done inside the
3 containment building to assist in expediting the tie in while
4 the cooling tower is being constructed, is that right?

5 THE WITNESS: This work is in the turbine generator
6 building rather than the containment building. This work
7 cannot be done ~~what~~ while the unit is operating.

8 CHAIRMAN JENSCH: Now as I understand it, your
9 proposal is that the Indian Point 2 be permitted to operate
10 while studies are going on as to the desirability of
11 cooling towers, assuming that the operations are underway?
12 And you also decide, or you have already decided that there
13 should be cooling towers.

14 Supposing you have a transient that puts the
15 plant out of operation and it looks like it is going to be
16 down for five or six months, how would you handle the
17 crediting, the costing and benefits for the replacement of
18 this tower? Would you charge it all up to the cooling tower
19 cost? Or, would that go into the general pool of unexpected
20 occurrences and contingencies?

21 THE WITNESS: Assuming that we were in the
22 construction program at the time that this took place?

23 CHAIRMAN JENSCH: Yes.

24 THE WITNESS: We would certainly accomplish this
25 work during that period provided that this forced outage took

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1 place at a time when we were sufficiently complete with the
2 design to accomplish this construction.
3 CHAIRMAN JENSCH: HOw would you handle the
4 accounting of the replacement power situation?
5 You would not charge that up to the cooling tower
6 cost would you?
7 THE WITNESS: In all likelihood, no.
8 CHAIRMAN JENSCH: Just as an indication of the
9 reasonable probability in that regard, what has been the
10 average operating experience of Indian Point 1?
11 Can you tell us on a calendar basis?
END 6 12 Has it been available 60 percent of the time?
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THE WITNESS: The availability of the plant has been 62 percent for Indian Point 1. I might point out that Indian Point 1 was a demonstration type of plant and we would expect the availability of this plant to be somewhat higher than Indian Point 1.

CHAIRMAN JENSCH: Well, this plant was filed originally under Section 104-B, was it not, a demonstration plant too, like Indian Point 1 was?

MR. TROSTEN: It was filed under that particular section, Mr. Chairman. However, this plant is not a demonstration plant in the sense that the Indian Point 1 facility was one of the first-- In fact, it was the first operating facility.

CHAIRMAN JENSCH: Well, I'm just having a little difficulty with his term. I didn't quite understand. As I understand, they still have to demonstrate all these plants really, whether they came under 104-B or not.

My only thought was that you have charged up 2,580,000 hours, megawatt hours that has to be replaced and if your experience at Indian Point 1 is any guide, I just wonder about the generally accepted accounting principle, permission to charge it all up to cooling tower costs here.

I take it you would not undertake to answer from the accounting point of view. Is that correct?

THE WITNESS: That is correct.

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CHAIRMAN JENSCH: Let me just ask you again about this payroll tax and pension. Is it your statement that with this percentage of two percent, except for payroll taxes, the balance of that percentage amount definitely goes to pension provisions of Consolidated Edison Company?

THE WITNESS: That is my understanding.

CHAIRMAN JENSCH: Was it so reported to you?

THE WITNESS: Yes.

CHAIRMAN JENSCH: By your accountant?

THE WITNESS: To be very specific, this is a number which we presented to the accountants and they approved the presentation.

CHAIRMAN JENSCH: Oh, you worked it up.

THE WITNESS: This is a number that-- Well, let me backtrack.

We receive monthly a presentation from the assistant comptroller of the company, telling us what these numbers are, and in our presentation we verified that we were indeed using the current numbers.

CHAIRMAN JENSCH: Well, in any event, you interpret whatever presentation is made to you --

THE WITNESS: The presentation says specifically "payroll taxes, pension and health insurance, percentages applicable to construction for use by general accounting and tax departments, rate to be applied to basic manhour labor

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1 including transfers and corrections, central construction
2 and engineering charges to construction, work in progress
3 orders for use by system and information processing."
4 These are the categories of people who use this
5 number, 24 percent.
6 CHAIRMAN JENSCH: Does that say the rate proceeding
7 people, too?
8 THE WITNESS: No, it does not.
9 CHAIRMAN JENSCH: Do you know what figure they
10 use in rate proceeding?
11 THE WITNESS: No, I do not.
12 CHAIRMAN JENSCH: Did you mention the word "pension"
13 in that listing that you just gave us?
14 THE WITNESS: Payroll taxes, pensions, and health
15 insurance.
16 CHAIRMAN JENSCH: In any event you understand
17 from the representation given to you by the accounting de-
18 partment that there is a commitment to the pension fund to
19 the extent that except for the specifics listed of health
20 insurance and so forth, the balance does go to the pension
21 fund?
22 THE WITNESS: The pension funds, yes, sir.
23 CHAIRMAN JENSCH: All these figures then that you
24 have set forth in here in your testimony are based upon
25 representations given to you by the accounting department,

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given to you and other departments of the company for your use in whatever calculations you work up?

THE WITNESS: That is correct.

CHAIRMAN JENSCH: Now if they are in excess of any of these actualities, for instance, how do you have some -- not backfitting but back-accounting or crediting? What is your experience figures of how many times you are over -- the figures are over?

THE WITNESS: Our experience has been that these percentages have been increasing with time.

CHAIRMAN JENSCH: Yes.

Have there ever been any decreases of any kind?

THE WITNESS: Not in my experience with the company.

CHAIRMAN JENSCH: I was just thinking, some facilities as I understand -- I don't know except what I read in the newspapers, but something about Big Allis. Are you collecting something back from Allis-Chalmers? I wonder if that reduces the percentage. How do you handle that, outages, or is that escalation in reverse?

THE WITNESS: My understanding of the arrangement with Allis-Chalmers -- and I'm not very close to it so this is just hearsay -- is that they have allowed that we will have a credit on the next unit that we buy and therefore, it will be reflected in lower capital costs for the next project involving an Allis-Chalmers generator.

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CHAIRMAN JENSCH: Does Allis-Chalmers sell cooling towers?

THE WITNESS: No, they do not.

CHAIRMAN JENSCH: Well, basically your presentation is that the 34 million, that's the direct cost of -- is it for Marly, a constructor of cooling towers? Where was the source of your direct costs? I think you gave a figure on page 7 and 8.

It's 35, and as soon as you turn the page it's 70 right away. That's escalation in a few words. Where did you get the figures for the direct costs?

THE WITNESS: The direct cost of the cooling component?

CHAIRMAN JENSCH: Yes. Where did you get that figure?

THE WITNESS: We have talked to Marly Research and Ecodyne and this is a consensus of what they would quote to us for a tower of this type.

CHAIRMAN JENSCH: You mean a consensus? They all agreed and they took a pledge they would not charge you any more?

THE WITNESS: They are not about to disclose their commercial position until they actually bid, but they have given us what the order of magnitude of the market is as they see it. That is the nine million five number.

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CHAIRMAN JENSCH: Will you turn, please, to page 9, the second and third lines on that page. It says:

"The cooling tower cost of nine and a half million. . ."

What does that purchase for you?

THE WITNESS: That purchases the fill for the tower, the veil of the tower, the basin on a site prepared by others, and the water distribution piping.

CHAIRMAN JENSCH: Well, let me go back if I may to pages 7 and 8. The total direct cost of $35,795,000 will purchase what?

THE WITNESS: It will purchase site preparation, interconnecting piping, additional pumps, motors, and supporting of electrical work. It will purchase the pump house for these pumps. It will purchase the labor and the material to revamp the facilities in the turbine hall. In other words, it will purchase everything required to convert the existing plant into a plant operating on cooling towers.

It will purchase modifications to the inlet screen house to allow the water to run back through the screen house.

CHAIRMAN JENSCH: The total project cost is set forth at the top of page 8. What does that purchase or secure?

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THE WITNESS: On the top of page 8 there are two numbers. ARe you referring to the 47 --

CHAIRMAN JENSCH: The $47,286,800.

THE WITNESS: That also -- the 47 million purchases the engineering and supervision, the administration and supervision, payroll taxes and pension, and the interest during construction. It accounts for additional costs to the company over and above those costs, those moneys that we pay to contractors or to direct labor on the project.

CHAIRMAN JENSCH: Perhaps I don't understand all of your terms. I am looking for cement, the cement for these towers.

THE WITNESS: That is in the 9 million 5. That is the veil of the tower.

CHAIRMAN JENSCH: Oh, I see.

THE WITNESS: The cement for the basin, the tower itself, is the 9 million 5, including all the materials and labor required to fabricate it, transmit it to -- bring it to the site and construct it.

CHAIRMAN JENSCH: Well I don't understand engineering construction, so I hope you will excuse me for asking some of these questions.

But, isn't that proportion somewhat abnormal to have a cost of 9 million and you end up with a total cost of 70 million?

THE WITNESS: 9 million is only one component of the system.

CHAIRMAN JENSCH: Yes, I understand but is that the ordinary experience of construction, if you buy something for 9 million it is going to cost you 70 million before you can run it?

THE WITNESS: One of the things that distorts the numbers of our particular project is the fact that we have an extraordinary excavation cost for site preparation. Our site generally is not suitable for a cooling tower and the preparation of the site to make it suitable for a cooling tower results in approximately $15 million of excavation.

We are currently working on tradeoffs between excavation, pumping costs, operating penalty costs, piping costs and our optimization puts this tower at elevation 45 which results in $15 million worth of excavation.

We can lower this number by raising the pumping penalty for example. WE can raise this number and lower the piping costs, but the overall optimization results in a $15 million excavation cost.

So that, yes, this is not the ordinary mix that one would expect if one talks about a cooling tower project. Nevertheless, the hill at Indian Point is a very real item with which we must contend.

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1 CHAIRMAN JENSCH: I think in response to some
2 question from Hudson River Fishermens Association, you said
3 something about federal and state taxes, and you said federal
4 and state taxes are such and such percentages.
5 I thought the question really asked for how are
6 you handling them, and you said, well, here are the figures,
7 and I didn't know if you wanted him to handle it.
8 Can you tell us how you handled it?
9 THE WITNESS: My understanding of the question
10 was, what were they.
11 Now we handled them, we had income tax in as a
12 revenue requirement.
13 CHAIRMAN JENSCH: I believe I have no further
14 questions.
15 MR. BRIGGS: Mr. Newman, on page 28 of your
16 testimony on alternative closed cycle cooling systems,
17 April 9, 1973, you make the statement:
18 "The problem with saline drift from the tower,
19 for example, is a very serious matter which was
20 not present at other sites."
21 In the Burns and Roe report, did they consider
22 the effects of saline drift?
23 THE WITNESS: They discussed it, yes.
24 MR. BRIGGS: My impression was that they did not
25 consider it to be a very serious problem. Is that an

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1 incorrect impression?

2 THE WITNESS: I am not sure how much consideration

3 they gave to the statements that appear in their document.

4 MR. BRIGGS: Well, what has caused Con Ed to

5 decide that this is a very serious matter? I believe some

6 numbers were given -- possibly not in the Burns and Roe

7 Report, but in some reports I have seen about the amount of

8 drift and about the expected distribution over the landscape

9 and about what these quantities of salt -- what effects they

10 might have.

11 THE WITNESS: Well, what we read in the statement

12 is a general lack of knowledge due to lack of meteorology and

13 due to lack of any studies on deciduous vegetation, as to

14 what the effect would be.

15 It is our belief that in the absence of that

16 knowledge, we must perform a certain amount of study to

17 determine the effects of this plume.

18 We know that the plume will exist, we know that

19 it will contain some salt. Yet we do not know what these

20 effects will be. We believe it would be imprudent to proceed

21 without a knowledge of these effects.

22 MR. BRIGGS: Well then, you don't know that it is

23 a very serious matter?

24 It is possible that it might be a serious matter?

25 Is that the situation?

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THE WITNESS: WE believe the lack of knowledge is the serious problem. We do not anticipate that an insoluble problem will exist. We do not know how to cure the problem until we are certain what the problem is.

MR. BRIGGS: It says the studies could have a significant impact on the final design.

What kind of impact are you talking about there?

THE WITNESS: The amount of drift elimination, whether we have to do plume washing, whether we have to -- even to the extent of investigating whether we need fresh water makeup for this tower.

DR. GEYER: Where would you get fresh water makeup?

THE WITNESS: I believe in my previous testimony I referred to two studies that we had done.

The fresh water makeup would come from further up the Hudson, north of Chelsea, and we have studied both pipeline delivery and barge delivery of fresh water taken from the upper regions of the river.

DR. GEYER: Both sound quite expensive.

THE WITNESS: They were and they turned out to be approximately a standoff of the order of magnitude of capitalized present worth of about $60 million.

In one case, in the pipeline case, there was a very high capital expenditure.

In the case of the barges, it was a relatively

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high operating labor force to maintain the barges.

MR. BRIGGS: Are there other plants that use saline water for cooling water -- not necessarily in the United States, but is there other experience on use of saline water in cooling towers?

THE WITNESS: Yes there is.

MR. BRIGGS: Has Con Ed studied the problems of drift from those plants?

THE WITNESS: We have very recently executed a contract with a consultant to prepare such a study for us.

MR. BRIGGS: Are there plants that use saline water, that is natural draft cooling towers, that use saline water, where there have been serious problems from the drift from from the towers?

THE WITNESS: I am not aware of any.

MR. BRIGGS: It says the studies could have a significant impact on the final design.

As I understood your remarks, this was concerned with the final design of the $9.6 million part of the project?

THE WITNESS: As far as the plume aspects, yes.

If we had to resort to fresh water makeup it would have some effect on the makeup design also. It would decrease the amount of makeup required.

MR. BRIGGS: Would it change in any substantial way the location or the size of the tower or the way in

mm7 1 which the tower would be connected into the plant?

2 THE WITNESS: We do not believe so.

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MR. BRIGGS: So are these particular studies any reason for delaying the bulk of the design and even the construction of the cooling tower facility I will call it since it involves much more than a cooling tower?

THE WITNESS: We believe they are a basis for delay, yes.

MR. BRIGGS: On what basis? Why do you consider them to be a basis for delay?

THE WITNESS: We do not believe that we can prudently proceed with the commitments of large sums of money prior to receiving construction permits from the applicable state and federal agencies.

MR. BRIGGS: And you believe that you cannot get these permits until you have information on saline drift, is that the idea?

THE WITNESS: That is correct.

CHAIRMAN JENSCH: Let me just ask; you said you do have some plants that do use saline water for cooling. What is your understanding of the experience of these towers?

THE WITNESS: It's my understanding there are some of the European plants that use salt water for make-up. They are generally in locations where the ambient salt background is so high that the plume effects are not generally noticeable. We do not know whether that is the case around the Hudson Valley. We are planning to take ambient salt

1 measurements and we have a contract executed for that.

2 We do not know that our situation is comparable

3 to the geographical situation, and also I might introduce the

4 thought that also our meteorological conditions are not

5 necessarily similar. We are in the Valley meteorological

6 system that is, let's say, quite different from the planes

7 of Holland, the Netherlands.

8 CHAIRMAN JENSCH: Where they do have --

9 THE WITNESS: Where they do have salt-water towers

10 and where their vegetation is generally adapted to the salt

11 background.

12 We have, as I mentioned, deciduous trees, people's

13 gardens, generally a different type of geography, a different

14 type of environment than the towers we are aware of, and we

15 do not believe it would be prudent to proceed until such time

16 as we have definite assurances that such -- and again this

17 assumes that we are told that we must proceed, that goes

18 without saying -- until such time as we really know what the

19 effects are, we would not want to create one environmental

20 impact for some other environmental impact without a full

21 investigation.

22 CHAIRMAN JENSCH: You are not suggesting that they

23 don't have deciduous trees or gardens over in Holland?

24 THE WITNESS: No, I'm not.

25 CHAIRMAN JENSCH: Well, what's the difference, then,

between Holland and --

THE WITNESS: Well, Holland, we know, has a much higher ambient salt level.

CHAIRMAN JENSCH: Is it your thought that a higher ambient salt level holds the plume down and it won't float?

THE WITNESS: No, it's my thinking, and I am beyond my realm of expertise, that where the ambient salt levels are high, the fauna has adapted to those levels, whereas we don't know what the ambient salt levels are and we don't know what the intent of the plume would be in the Hudson Valley.

CHAIRMAN JENSCH: You don't think it is worthwhile spraying around the gardens now and taking an initial test? It isn't your thought you're going to have to build a tower to find out what the effect will be?

THE WITNESS: No, sir, it is not.

CHAIRMAN JENSCH: Well, what experimental work will you undertake besides getting the data from Holland about the situation? Maybe this is a subject for Mr. Woodbury.

THE WITNESS: I believe it is a question you could address to Mr. Woodbury who has cognisance over the biological studies that will be going forward.

CHAIRMAN JENSCH: One other thing I want to ask you. Your statement was dated April 9, the day we started the hearing, and I have not had a chance to review this carefully, as otherwise I would have done, had I received it sooner, but

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1 what are the operative costs, the extra operative costs
2 you feel will be attributable to the operation of cooling
3 towers? Is that set forth in your testimony?
4 THE WITNESS: Yes, it is.
5 CHAIRMAN JENSCH: Can you just tell us what the
6 figure is?
7 THE WITNESS: We calculate that the annualized cost--
8 the annual levelized costs for maintenance and other operat-
9 ing expenses will be $223,000 per year.
10 CHAIRMAN JENSCH: Bearing in mind Hudson River
11 Fishermen's Association statement yesterday, in addition to
12 what Dr. SeStevens said about.50,.75, and $1 cost
13 to raise striped bass, Hudson River pointed out that perch
14 and other fish-- I suppose one of the balancing factors is
15 how many fish, striped bass, perch, sunfish, tomcod, alewives,
16 whatever else,that you would have about $150 million to
17 consider over a period of 40 years. Is there any balancing
18 factor here that you could buy $150 million or less, maybe, of
19 fish and put in the river and --
20 THE WITNESS: I responded to your question as to
21 maintenance and other operative expenses. Perhaps you are
22 inquiring as to what is the present worth of having a cooling
23 tower there as opposed to not having a cooling tower there?
24 The present worth of the cooling towers, including
25 replacement power plant deratings, replacement capital

1 costs for capacity, including the down-time for the cut-in
2 of the cooling tower, is $143 million. That appears on Table
3 2, page 18, of my testimony, and that levelizes to
4 $19,842,000 per annum.
5 CHAIRMAN JENSCH: Well, I was trying to get at was, with
6 a figure of total capital cost of the cooling tower, including
7 the excavation costs and the tie-in and your annual costs and
8 the total figure of all operating expenses attributable to the
9 cooling tower, plus the total capital cost, you would have an
10 awful lot of money for fish.
11 THE WITNESS: That number is the 143 million which
12 appears at the third column.
13 CHAIRMAN JENSCH: That's an operating figure.
14 THE WITNESS: That's all the costs that are
15 attributable, if we were to look at our system.
16 CHAIRMAN JENSCH: But the 143 million does not
17 include the capital cost of cooling towers or other tie-in?
18 THE WITNESS: It includes the revenue requirement
19 of that capital. If we spend the money today that creates
20 a revenue requirement over the coming years. It goes into
21 the capital value of our system, and we then attempt to get it
22 returned. This includes the revenue requirements of all the
23 expenses associated with the cooling tower program, including
24 the initial capital, the cost of replacement energy, the cost
25 of replacement capacity; in other words, we could afford to take

1 some other measures than cooling towers and expend $19
2 million per year at the break-even point. If there should
3 prove to be --
4 CHAIRMAN JENSCH: Well, of course it would not be
5 a gain if you are going to spend the same amount of money
6 to buy a fish as to put in cooling towers. Hudson River, I
7 believe, was talking about other effects on the environment
8 and the ecology. What I was trying to see is if you accept the
9 premise, which I think most parties in this proceeding have
10 done, that the American public desires electricity,
11 and how we can accommodate to that demand with the least
12 harmful effect upon the ecology and all environmental concerns,
13 and at the same time keep the costs to a minimum, now assuming
14 that Con Edison -- I don't know the technical basis and I
15 should not discuss this, but when we went up there Friday
16 and saw all the gadgets that were going of bubbling, and
17 screens, and counts, and so forth, of course it may not be the
18 high time of year for small fish and that sort of thing, there
19 may be a greater count at another time of year, isn't there
20 some suggestion, either from one of the parties or an
21 agreement by Con Edison that they would shut down when the
22 spawning season was at the height or lessen power operation?
23 My only point is where can there be a balancing of
24 some of these factors, bearing in mind the absolute requirement
25 of the Environmental Policy Act that there be no significant

adverse impact upon the environment. Now, what that is and what considerations may be given to it, Mr. Newman here has talked about figures that are astronomical.

MR. MACBETH: I think that the answer to that from the point of view of the Fishermen comes in a number of parts. First of all, there was the cost simply associated with the striped bass on which we have tried to provide annual figures which are quite substantial. We will put in further testimony on the hatchery proposal. We have not done this simply because it did come in late Thursday and it simply has not been possible for us to put in testimony yet. I think there are a great many practical problems involved with that particular proposal.

I think another very major aspect of it is that it does not address, as the Applicant made quite clear yesterday, any of the other fish in the river, and the Chairman has laid out a number of what the other fish are, the herring family, the smelts, silversides, white perch, and so on.

In fairness, of course, it's very difficult to estimate exactly what the effect of the plant will be on those particular species. We did not have a great deal in the way of studies and hard factual data on any of those fish, except some of the white perch, but even that obviously is not in the depth and thoroughness of what we have on the striped bass, so that we face with those fish a situation where there was

no proposal to replace them, and the likelihood of a great deal of damage, and there comes a time surely -- and here I am speaking somewhat beyond my expertise, obviously -- where the whole ecological system, the web of life in the river becomes distorted and falls apart and I think it becomes very difficult to know what would happen if you did start to put back in fish into a situation that had been that deeply disturbed.

So that I think there are a great many costs, bearing substantial costs that cannot be quantified very easily on that side of the equation.

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The Fishermen have of course put in testimony which challenges the magnitude of the costs that Con Edison has presented. We still feel that they are being generous. It is a point very hard to demonstrate on cross-examination, but the company has its opinions and they are based on their experience and background.

I don't think that by cross-examining Mr. Newman any further we would shake him on that but we have put in testimony that suggests that those costs are higher than in fact they would be.

And I think the other side of that is that one must also look at the fact that the benefits from the cooling towers will also-- I was trying to bring that out this morning. Escalation works in both directions and as much as one has to talk about contingencies and escalation on the cost side of the cooling towers -- and as the Board can see, they are a very substantial part of what we are dealing with here, and those additional numbers at the end that send the total number up very high.

Something comparable has to be done on the environmental benefits side for the aquatic biota. Obviously, we don't have experience in that. We cannot pull out a set of figures and say 12 percent, 24 percent. I think it would be frivolous to do that, but I think that the Board has to bear in mind that the same kind of additional figures are

there as well.

Who knows exactly what the contingencies are with the entire aquatic biota of the river? But surely there is a very great risk there to other species and other fauna in the river that has not been examined and cannot be presented in a hard, factual manner.

Also, I think there can be no question that the value of the biota in the river also grows over time; not only of course do we see it growing on the striped bass population in the river historically over the past 30 years, a very substantial growth, but also the fact that a higher and higher value is put on the kind of liesure time activity that is associated with fishing, with the kind of environmental amenities that a river, a rich, productive estuary produces, and also the commercial value of the fish that are taken and consumed.

So I think that also has to be borne in mind.

The figures are high. I think that when adds up the possibilities of hatcheries and the known, factually-demonstrated damage to the estuary and the risks of other damage to other species, that they well outbalance the costs that are proposed.

In relation to the research program I should also say that it is very impressive to go to the plant and see how much is going on. I think that what has to be looked at

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very critically -- and I think this is something perhaps that further questions should be directed to the Staff on -- is what is the likelihood of really producing answers that are going to change the final judgment, because unless research is directed toward something that will produce clear answers and will make a difference to the balance of the costs and benefits, then the research, impressive as it is, may simply be irrelevant.

Obviously, it is the position of the Fishermen that enough is known now and not so much will be added by the research to balance and outweigh the risks of a five-year period.

I do want to put some more questions to the Staff in that area, but that is the sort of framework of how I would respond.

CHAIRMAN JENSCH: Thank you.

Before you speak, Applicant's Counsel, let me ask all parties, do you have any information as to whether the State of New York is going to participate in this proceeding?

We received a letter from I think the Attorney General, or it may have been the Conservation Director. This may not be a correct characterization of what he said but it was something like this.

Keep right on whatever you are doing; that's fine, but what we are going to require Con Edison to do is to put

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in cooling towers. We don't know what you are thinking of or what you are doing.

It would be kind of interesting to have their participation in this proceeding because if I understand the evidence that the Staff has put in on the effect of the Roseton-Bowline plant on Indian Point, I wonder if the State of New York has had a chance to review those data, are they going to tell Roseton and Bowline that they are going to put in cooling towers, too? Or is it something that is being deferred for a while?

The Hudson River is filled with a lot of activity, the results of a lot of activity and somewhere it seems to me that the damage to the ecology has got to be considered in the over-all, and I don't know whether-- This plant as I understand the proposal, may have to have some de-rating or lessened releases and that sort of thing, and all these other plants up and down the river are having a heyday. "Cut it down, Indian Point; we can raise our level of release," or something like that.

It's a kind of a balancing of the damage to the ecology. What is the balancing?

MR. MACBETH: I cannot speak as to what the position of the State of New York is. I think they're a subdivision of various elements in the State of New York. Obviously the Fishermen agree that one has to look at the

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1 estuary as a unitary whole and doing anything else does not
2 make scientific sense or administrative sense.
3 Unfortunately, we're also stuck with the situation
4 where different administrative agencies license different
5 plants. The Fishermen have moved to try and force this issue
6 at each plant in turn. There are outstanding suits against
7 the Army Corps of Engineers at Bowline and Roseton for
8 failure to do an environmental impact statement at those two
9 plants, and questions have been raised in the context of the
10 Storm King Plant as well.
11 I would be the first to say that the Fishermen
12 would much prefer to have something that looked at the whole
13 plant by a body that had jurisdiction and authority to rule
14 on all the plants. That does not seem to be something that
15 we have been able to achieve.
16 I have from time to time also raised that point
17 with various State authorities and did not get very success-
18 ful results, so that I think it is regretable.
19 On the other hand, I think there is really no
20 other way at the present time that one can address the
21 problem except in the context of difference licensing pro-
22 ceedings for the different plants. But there is no question
23 that the river should be looked at as a unitary whole and
24 the decisions I think would be clearly more comprehensive
25 ones, and I think probably more sensible ones if they could

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be made by a body that could rule on all the plants and could look at the totality of the river and the fishery in it rather than bulkanizing it from one plant to another.

CHAIRMAN JENSCH: Which does the greater damage -- Maybe this is reflected in the evidence -- the chemicals that are pushed in or the heat releases? Can you make a separation? There are a lot of chemicals dumped in the Hudson River as I understand.

MR. MACBETH: Are you now speaking of chemicals from all plants, all other forms of pollution besides the power plants?

CHAIRMAN JENSCH: Yes.

MR. MACBETH: I think it is the power plants, without any question.

(Laughter.)

It is my honest opinion.

WITNESS WOODBURY: You mean opposed to sewage from New York City?

MR. MACBETH: There are undoubtedly questions of sewage problems in the area around Albany and New York City but as I think the Board is aware, the vast reach of the river where the spawning and nursery grounds are, between Coxsakie and Tappan Zee and Haverstraw Bay are relatively clean.

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Now it might well be that bass and other fish would

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1 spawn even further north than Consahie if you compare it to
2 the situation on the Delaware where the dissolved oxygen
3 levels off Philadelphia are extremely low. When you see there
4 the striped bass population has really been decimated to
5 the point where there is very little, it is perfectly clear
6 that the major reach of the river in the Hudson River for
7 spawning and nursery grounds is relatively clean from pollu-
8 tion.

9 I would not say for a moment it's perfect but it
10 is much better than the Delaware is.

11 The Department of Environmental Conservation in
12 the State puts out a little weekly or monthly newspaper in
13 which there was recently an article on how the river had been
14 cleaned up very largely from pollution so that now the shad
15 and the striped bass will come back.

16 So I think one thing that can be taken into account
17 is the immense effort the State of New York has made to clean
18 up other forms of pollution, an effort that will undoubtedly
19 continue under the Federal Water Pollution Control Act of
20 1972.

21 And we would indeed have an ironic situation if
22 we had imposed size limits in the 30's which allowed the
23 population to naturally increase and grow again and had, in
24 the '60's and '70's, cleaned the river of other pollution,
25 to then impose on it the immense burden of literally thousands

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upon thousands of megawatts of electrical -- steam electrical generation and pump storage generation which would again decimate that population.

It is, I think, very sad that the decade between 1970 and 1980 is very likely to see this enormous increase of power generation on this river and it will come from plants that were not planned with cooling towers. I think that when smaller plants were built and more thought about the nature of the river had been undertaken earlier in time we would not be faced with this situation.

The utilities are no longer asking for plants on the river. The Verplanck Plant plans have -- well, perhaps "abandoned" is too strong a word, but the application has been withdrawn from the AEC. As far as I know, most of the other-- I read a newspaper report of Mr. Schwartz of Con Edison saying that any future plants to be built were planned with cooling towers back from the river.

I think that if the utilities had been aware of what they were doing, that situation would have come about much earlier, but I think it would be a very sad fate if the millions of dollars that the State has put into cleaning the river and the careful regulation the State has enforced on the size limits of fish which fishermen have accepted, that kind of regulation, if that were to be undone by regulated utility use of the waters which then proceeded to

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decimate the fish populations over again, and then we have enormous costs of money literally going down the drain.

CHAIRMAN JENSCH: Thank you.

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MR. TROSTEN: First of all, Con Edison certainly agrees these problems ought to be looked at in a unified way. And indeed, they are being looked at in a unified way by the State of New York which has the jurisdiction over plants on the Hudson River.

There is also, by virtue of the enactment of the ~~General~~ Federal Water Pollution Control Act Amendment of 1972, a scheme established whereby the Environmental Protection AGency and the States will be cooperating in terms of that act to set forth discharge standards and general standards for the operation of power plants.

CHAIRMAN JENSCH: May I interrupt?

I know the Federal Water Pollution Control Act enacted the amendments of '72 in October. We are now in April. Has the Environmental Protection AGency said anything about cooling towers for this Indian Point 2 plant in any type of proceeding or comment on the Environmental IMpact Statement or anything else?

MR. TROSTEN: They have not said anything about this with the exception of the observation that they made to the Atomic Energy Commission in commenting on the draft Environmental Statement, to the best of my knowledge.

CHAIRMAN JENSCH: That was before the Water Pollution Control Act Amendments of 1972?

MR. TROSTEN: Yes, sir.

mm2 1 That is correct.

2 CHAIRMAN JENSCH: What is your view from the
3 legal point of view, respecting this statement of the
4 State of New York, something to this effect. And I hope
5 I don't misdescribe their position.

6 But, whatever you do down there at the Atomic
7 Energy Commission, we will get in touch with you about it,
8 but we are going to require cooling towers.

9 MR. TROSTEN: I don't think there is any such
10 statement, Mr. Chairman.

11 Let me describe the situation as I understand it.

12 There is a somewhat confused situation within the
13 state government because the Attorney General in the State
14 of New York has taken a position in favor of cooling towers.

15 The Department of Environmental Conservation has
16 not taken a position in favor of cooling towers.

17 CHAIRMAN JENSCH: I was referring to the
18 Attorney General's letter.

19 MR. TROSTEN: The Attorney General's letter is
20 consistent with various positions that the Attorney General
21 has taken in regard to the Indian Point 2 facility. He has,
22 for example, brought suit against the company and secured
23 a favorable judgment in the lower court of New York STate,
24 which judgment was very recently reversed by the Appellate
25 Division of New York State Supreme Court.

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So we have one particular judicial officer. We have the chief judicial officer of the State of New York who has taken a particular position.

But we also have the agency that is charged under New York State law with licensing, issuing permits for the Indian Point 2 facility, who has not taken a position with regard to cooling towers for Indian Point 2.

There is, incidentally, Mr. Chairman, a representative of the New York State Atomic Energy Council in the room here today, if you would desire to pose a question to him.

So our general position is that there ought to be a unitary view of the situation on the river, and that you should not look at the Indian Point 2 power plant in isolation.

With regard to the situation of ~~unbalancing~~ balancing, we think that this comes down to the very heart of the question before the Board. The National Environmental Policy Act in our judgment does not create a preference, if you will, for zero environmental data versus all other human values. It calls for a balancing of all costs and benefits, and it calls for the best type of balancing that can be performed in light of existing knowledge and technology.

We think it is extremely important that the Board bear very carefully in mind the evidence in this proceeding as to the costs of these cooling towers and balance this not

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1 only against the monetized cost to the fishery to the best
2 ability that people can monetize those costs, but that they
3 also bear in mind the fact that once a firm commitment is
4 made to construct these cooling towers, that this becomes
5 a real, irretrievable commitment of resources which cannot
6 be recovered. And that the Board bear in mind that what
7 the Applicant is proposing here is not that there be a
8 program of ~~litigation~~ mitigation which would last for the full lifetime
9 of the plant under any and all circumstances where, for
10 example, the Applicant would simply replace all striped bass
11 for the 40-year life of the plant.
12 We are not suggesting that this be done.
13 What we are suggesting be done is that a period
14 of time be allowed for us to investigate the true environ-
15 mental effects. And that we feel confident that if all of
16 our calculations of our best calculations were wrong, that
17 we would be able to restore any damage that had really been
18 done and there is evidence in this proceeding now that
19 indicates very strongly that we can restore any damage that
20 was done to the striped bass fishery.
21 Now it is true we have not put in indication
22 we can restore the eels and the alewives and the various that
23 other things, but, number one, there is no evidence in this
24 proceeding as to the value of these to human beings and NEPA
25 is a statute that deals with the impacts on the human

1 environment. That is what NEPA is about. Not necessarily
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2 the impact on each and every species, but the value to
3 human beings.
4 There is no evidence in this proceeding and
5 I think everybody concedes that there isn't any real basis
6 for determining the impact on the subsidiary species. But
7 I think everybody generally agrees that these subsidiary
8 species have very little value to man.
9 But the species, the real species of interest to
10 man is the striped bass and there is evidence in this
11 proceeding that indicates that we think the impact on the
12 species is going to be low.
13 The best evidence we have is that it is going to
14 be low.
15 Admittedly, this is the subject of tremendous
16 dispute among the parties, but certainly there is evidence
17 about which a reasonable person could conclude that this
18 impact is going to be low.
19 We also have very strong evidence in this proceeding
20 that if there is a serious impact, it could be remedied by
21 steps that could be taken. And this brings us down to sort
22 of the heart of the question which is, whether or not the
23 research program that the Applicant has proposed, will be
24 adequate to detect any damage that is occurring within the
25 timeframe that is involved. And this, of course, is a subject

mm6 1 of dispute among the parties.

2 But we submit that on the basis of the evidence
3 that has been presented to the Board, on the scope of the
4 research program, the quality of the personnel who are
5 involved in conducting this program and in directing its
6 conduct, the willingness of the Applicant to take advice
7 from any qualified sources as to how the research program
8 might be reorganized, that there is a firm basis for this
9 Board to decide that there should not be any position
10 at this time of a requirement for cooling towers.

11 But instead, that the Applicant should be allowed
12 to conduct this program.

13 CHAIRMAN JENSCH: All that is not a predicate,
14 Mr. Newman, to any further interrogation on my part.

15 If there are no further questions, thank you,
16 Mr. Newman.

17 MR. MACBETH: I did have just one question.

18 MR. TROSTEN: Mr. Chairman, I believe Mr. Woodbury
19 had a comment that he wished to make.

20 MR. WOODBURY: I would just like to expand on
21 Mr. ~~Strosten~~ Trosten's statement a little bit, if I may, following
22 up something that the Board said earlier.

23 In reviewing the Environmental Impact of once-
24 through cooling, and reporting the results of that study,
25 we would anticipate as well, addressing alternate measures

mm7 1 to mitigate whatever losses that study suggests might be
2 inflicted upon the environment and in the process then
3 would be suggesting alternatives to once-through cooling.
4 For example, we would be weighing the costs and benefits, if
5 you will, of mitigating losses by once-through cooling, of
6 mitigating losses by hatcheries and artificial stocking by
7 the use of a common intake structure, by the use of other
8 devices that might be employed to mitigate whatever damage
9 is identified.
10 And that would be all part and parcel of what
11 has been referred to as the Environmental Study.
12 CHAIRMAN JENSCH: Thank you.
13 YOu do have some further questions?
14 MR. MACBETH: Just one.
15 CHAIRMAN JENSCH: Just one?
16 I was going to say let's have a recess, but
17 maybe we can finish with Mr. Newman.
18 Will you proceed.
19 BY MR. MACBETH:
20 Q On the 24 percent added to payroll taxes,
21 pensions and health benefits, what proportion of that was
22 assigned to payroll taxes and what proportion to pensions
23 and health benefits?
24 A I don't have that breakdown with us.
25 I will have to obtain it from our accounting

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people.

Q Thank you.

MR. MACBETH: That is all.

CHAIRMAN JENSCH: Any further questions?

MR. KARMAN: No, sir.

CHAIRMAN JENSCH: Thank you Mr. Newman, you are excused.

(Witness excused.)

CHAIRMAN JENSCH: AT this time let us recess to reconvene in this room at 11:30.

end 11 (Recess.)

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CHAIRMAN JENSCH: We will please come to order.

Having concluded I believe with Mr. Newman, is Dr. Lawler --

MR. SACK: Excuse me, Mr. Chairman. Mr. Macbeth had a few questions on the testimony on restricted operation which would be addressed both to Mr. Woodbury and Mr. Newman.

CHAIRMAN JENSCH: Very well.

Mr. Newman, will you resume the stand, please? You may bring your material with you if you need it for reference.

Whereupon,

CARL L. NEWMAN

and

HARRY G. WOODBURY

resumed the stand and, having been previously duly sworn, were examined and testified further as follows:

MR. MACBETH: I might say at this point, Mr. Chairman, I have given some interrogatories to the Applicant on the prediction of load. They are to be answered by Mr. Schwartz. It is not an attempt to make things easy for the parties. I am going to try to ask those questions by interrogatories so that my failure to cross-examine on that issue this morning does not indicate that I have no questions on it.

CHAIRMAN JENSCH: It will be so understood.

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CROSS-EXAMINATION

BY MR. MACBETH:

Q I turn now to Section D of the Newman-Schwartz-Woodbury testimony of April 9th entitled "Planning for Mitigation Measures," and there is a series of different measures to be taken to mitigate impingement and entrainment. I would like to go over some of those.

CHAIRMAN JENSCH: Is this on the restricted operation testimony?

MR. MACBETH: Yes, restricted operation of Indian Point 2, of April 9th.

CHAIRMAN JENSCH: Thank you.

MR. MACBETH: Pages 9 and 10.

CHAIRMAN JENSCH: Thank you.

BY MR. MACBETH:

Q The first item mentioned under "impingement" is "Artificial stocking of screenable . . .bass"; the first item mentioned under entrainment is the "Operation of a hatchery."

What's the difference between those two things?

A (Mr. Woodbury) My name is Mr. Woodbury.

There are two opportunities to artificially stock the Hudson River with striped bass. One would involve an operation of a hatchery on the river or at some location, a hatchery which has to be built.

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Another is the artificial stocking utilizing hatcheries and rearing ponds which are already in existence.

While these two might be considered essentially the same, it is important to recognize that it is not necessary to construct a hatchery before artificial stocking could be instituted as a mitigating measure in the short term.

Whether or not a hatchery is ultimately constructed and whether or not rearing ponds or silos or some other device is ultimately constructed for the principal purpose of serving the Hudson River would be a determination that had to be made as a part of this ecological study which is underway.

Q Is there any particular reason why artificial stocking which I take to mean purchase of screenable size striped bass was assigned to impingement while operation of a hatchery, which I take it means building a hatchery for the river, was assigned to entrainment?

A No, no significance should be attributed to the difference.

Q The second item under impingement is entitled "Extended periods of reduced flow." Am I correct in remembering that it is the present plan of the company to operate Indian Point 2 at reduced flow through six months of the year?

A We initially started operating at reduced flow in

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1 December, January and February. We then extended that to
2 operation at reduced flow when the river temperatures were
3 below 40 degrees.
4 After reviewing the impingement statistics last
5 fall, the company extended the reduced flow from about the
6 15th of October until the 1st of April, and that is the
7 present operating mode.
8 We are considering further extension of that reduc-
9 tion. When you reduce the flow of course you increase the
10 delta-T and we are studying the trade-offs in environmental
11 effects of reducing flow versus increasing delta-T. The out-
12 come of those studies will indicate whether the flow reduction
13 should be extended beyond the first of March -- beyond the
14 first of April.
15 Q And that is the period that you are really con-
16 sidering, April through -- Well, what is the point at which
17 you feel that you could not extend the period of reduced
18 flow?
19 A In August and early September the river tempera-
20 tures are such that if the flow were reduced substantially,
21 there might be difficulty in meeting the State thermal
22 criteria.
23 Q Let me just clarify. What is the delta-T across
24 the condenser tubes when the plant is pumping at 60 percent
25 capacity?

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A About 25 degrees Fahrenheit.

Q The point 3, "Increased frequency of screen washing to reduce pressure drop across screens thereby reducing flow velocity," is that essentially cleaning the screens of debris that have clogged the holes, thus making the velocity through the holes higher than it would normally be, or does that involve something else?

A Would you restate the question, please?

Q Does point number 3 essentially involve cleaning the screens of debris which has clogged the 3/8th inch openings, thus reducing the velocity through the openings, or does this screen washing involve something other than simply cleaning debris?

A It includes cleaning the screens, the fixed screens at more frequent intervals than once every 24 hours during those times of the year when the screens pick up debris.

It also includes consideration of a replacement of fixed screens with screens that can be continuously washed as they are designed to be on Indian Point 3.

Q Essentially the point is to get the debris off the screen; right?

A That's one of the objectives.

Q Well, apart from getting the debris off the screens, how would the increased frequency of screen washing reduce the pressure drop across the screens, thus reducing flow

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velocity?

A If the objective is to reduce flow velocity by keeping the screens clean, there isn't any other purpose.

I don't believe I understand your question, Mr. Macbeth.

Q All I'm trying to get at is whether number 3 here involves anything more than keeping the debris off the screens so that the pressure doesn't go up due to the fact that the debris has clogged the mesh and lowered the area through which the water passes.

A The answer is no, except I don't like to just leave it at that.

Q Well, you are free to add something, but I would like it to be something specific rather than a feeling that you just don't like to say just washing the debris off the screen. It is perfectly reasonable to wash the debris off the screens.

A We have been conducting experiments on the screens at Indian Point 3 in an attempt to determine whether or not the impingement problems on it with traveling screens out front and with different washing systems and with fish pumps that can return the fish promptly to the river would have less impact on the environment than fixed screens.

And so involved in the several mitigating measures is the question of should the fixed screens be replaced with

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moving screens out front.

Q Are there any results to those studies?

A No, sir, not yet.

Q Number 4, "Installation of fish repellent systems." What are the fish repellent systems that would be installed?

A We have under consideration, under continuing consideration, the use of air curtains and those are presently in test. The industry at other locations is testing the use of sonic devices, noise devices for the purposes of diverting fish away from intake screens.

You have read perhaps in the newspapers that there have been some indications, some recent indications of success in tests that were run that were different from the tests that we ran in the mid-'60's. It would include such things as that.

Q Would it be fair to say that these fish repellent systems that are presently being tested, that there is no particular fish repellent system that the company presently plans to install and operate in one particular mode?

A We have installed at Indian Point 1 and 2 an air curtain as a means of mitigating impingement losses and we are testing it to see if it is also useful in mitigating entrainment losses.

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Q. Aside from the installed air current, is there anything else that is past the point of test and experiment so that there is a plan of action that the company has?

A. The company is following experiments that are underway via VEPCO, in the use of noise, sound as a means of repelling fish.

Penn Elec also has some experiments underway and we are following that as well. The outcome of those experiments will indicate what further experimentation may be needed at Indian Point.

The total study that we have, you will recall, has as a part of it, the construction of a fish flume in which these kind of repellent systems can be tested and the fish behavior observed in a way that will, we believe, produce better results than trying to do it in 30 feet of water where it is very difficult to monitor fish behavior.

Q. Number 5, construction of a common intake with advanced screen washing system and reduced intake flow velocity.

Is this the lagoon system that has been under consideration for the last two and a half years or more?

A. Yes, sir.

Q. How have those studies been coming along?

Have you reached any conclusion from them? Is there a plan to actually build the lagoon?

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A. Mr. Newman is in charge of the engineering and hydrologic parts of the studies and can respond to the development and the testing that is going on.

A. (Mr. Newman.) The current status of the effort is that a hydrolic model has been built and operated and a configuration that gives uniform velocity distributions has been developed. And the engineering design is now underway based on the results of the model testing.

The tests were conducted at LaSalle Institute in Montreal.

Q. And what will follow the completion of the design drawings?

A. If there is indeed a benefit that is demonstrated that warrants construction of this lagoon, the lagoon would then be constructed.

Q. Let me now ask a general question in relation to each of the five items.

A. (Mr. Woodbury.) May I clarify the last point.

Q. Sure.

A. The lagoon system is among the alternatives that are under consideration.

Mr. Newman's response should not be interpreted to suggest that any decision has been made as to which alternative would be selected. We need to know what damage is done before we know how to correct the damage. And we

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need to know the cause of the damage before we know how to correct it.

Q I think you are almost anticipating my next question.

Taking each of the five items in turn that are listed under impingement, what are the circumstances under which the company plans to put any -- each of them or more than one of them into operation?

MR. TROSTEN: Mr. Macbeth, could you be a little more specific about that?

What kind of a situation are you envisioning here?

MR. MACBETH: I really want you to tell me, because you are suggesting this as mitigation measures and I am asking when would you apply them, what would you have to see in front of you, what are you looking at, to test whether you would employ any one of the five or some combination of them, or all of them?

MR. TROSTEN: Just as a matter of general principles, is that what you are asking?

MR. MACBETH: Well that depends on what you are looking at. I would have to find out what you are looking at before I could decide where to probe further.

WITNESS WOODBURY: You are raising a question with respect to impingement ~~litigation~~ mitigation and we have to consider losses due to whatever causes. And so it is difficult for me

mm4

to attempt to answer that question as it relates to impingement only.

It won't be addressed as it relates to impingement only.

BY MR. MACBETH:

Q All right, let's defer it for a moment.

Let me take up the eight items listed under entrainment.

Number two, reducing the flow during the spawning season. That really is the same as number two under impingement, extended periods of reduced flow. The same arrangement, except it really is focused on what the spawning season of striped bass only and the spawning season of all organisms.

A (Mr. Woodbury) It is concerned principally with the spawning season of striped bass.

Q Well it is the same reduction of the 60 percent that is listed in 2 above under impingement.

A Not necessarily.

Q What is the difference?

What does this reduction of flow consist of?

A Indian Point 2 is designed with six pumps; two pumps per condenser; each pump being capable of operating at full flow or at reduced flow, and so there are several combinations that could be worked depending on the ambient

mm5 1 temperature and the sensitivity of entrained organisms
2 to permit control of temperature and flow in the way that
3 would optimize the survivability of entrained organisms.
4 Q So that really 2 and 3 have to be considered
5 together? And they are the kinds of combinations that
6 Mr. Newman provided me examples of in his responses to the
7 February questions?
8 A Yes, sir.
9 Q Now would you just explain to me what is meant
10 by number 5, the operating of circulating pumps at Indian
11 Point 3?
12 I just don't entirely grasp what is involved there.
13 A The testimony that has been presented heretofore
14 has indicated that part of the effect on organisms was
15 related to intensity and part of it through duration,
16 whether it was chemical effects or thermal effects.
17 And one of the ways that one could reduce the
18 effect of either chemicals or of temperature, would be to
19 hasten the movement of the organisms through the plant and
20 by starting up thecirculating pumps on Number 3, we would
21 reduce the travel time of the organisms through the plant.
22 Q Well it is that phrase,"the plant" that I
23 don't quite follow.
24 A It is what?
25 Q The phrase, the plant.

mm6

Does that mean you would bring the water, the Indian Point 3 water into the discharge canal and then flush them out the discharge canal faster?

Or would you be using the IndianPoint 3 pumps to pass them through the Indian Point 2 condenser tubes?

I did not see how you could do the latter, but I did see how you could do the former.

A. (Mr. Newman.) That is what this refers to.

By using the Indian Point 3 pumps, we would increase the velocity int the discharge canal by passing the larger quantity through the canal. This would reduce the residence time in the discharge canal by about 40 percent of the residence time?

Q. And could that be done now?

A. Yes.

The pumps are operable.

Q. Number 6, redesign the condenser system to eliminate vacuum on the discharge side of condenser.

Is that a matter that is being studied, or is there a plan to do that under certain circumstances?

A. That is an engineering study that is underway.

Q. And are you studying the feasibility of eliminating the vacuum, or are you studying the effect of the vacuum on the organisms or both?

A. Both.

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Q. Now 7, 7 would involve replacing all the circulating pumps at Indian Point 2?

A. Yes.

Q. How expensive would that be?

A. It would be on the order of magnitude of millions of dollars.

Q. And how long would the plant have to be down to put in the new pumps?

A. The plant would not have to be down. The pumps could be replaced one at a time. And the plant could operate while one plant was out of service.

Q. What is the status of item number 8, researching engineering and constructing a pervious dike or filter system to reduce both impingement and entrainment.

A. That study is just getting underway. It is a feasibility study.

We do know that water can be filtered so it is really strictly an engineering study as to the feasibility of building filters of this size that we are talking about here.

Q. What kind of filter are you talking about? Not diatomaceous earth or something like that?

A. No, the type of filters that are used in municipal water systems which are basically an undergrade system followed by anthracite type of fill which supports

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a grained sand bed.

Q Do you have any estimates on the time it would take to complete the study and build the diatome filter system?

A No, it is premature to come to any conclusions yet. All that we know is that it is about a two-acre installation with a loading on the filters that appears to be to be optimum at about four gallons per minute per square foot of filter.

Having arrived at those parameters we then determined how it will be supported, how it will be washed. We would come up with a test program to see what it would filter. Mr. Woodbury's people would determine what the biological effects of the organisms were of being filtered.

Q Do you have any notion of what the cost would run?

A. NOt yet, not until we design it.

Q Let me go back to the general question I put earlier.

What are the circumstances in which the company would take any of the items -- any action on any of the items listed under impingement and entrainment?

MR. TROSTEN: Again you are just asking this in a general way?

MR. MACBETH: Start with general terms. You are

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out there operating the plant away.

Now, what has to happen for you to start doing one of these things?

MR. TROSTEN: MR. Woodbury will respond to the question.

14 wbl

WITNESS WOODBURY: We are endeavoring to quantify the several effects of the plant on the key species of the river, and endeavoring to look at all of the means of mitigating any damage that might be achieved by different operating modes or different construction configurations.

Having done this, we will have to evaluate the costs and benefits of the various alternatives, and, within the standards and criteria that are extant at the time, make recommendations to the regulatory authorities about whatever modification may seem to be indicated.

BY MR. MACBETH:

Q And how long do you think it will be before you know what the effect of the plant is?

A (Mr. Woodbury) We have testified that we believe we will be able to reach conclusions on this by 1 January 1977.

We have also testified and presented evidence that the losses to the eco-system in the time of study and in the time that it might take to construct-- or institute some mitigating measure would not cause irreversible damage or significant adverse effect to the fisheries.

Q That's your opinion?

A Yes; I didn't mean to imply otherwise.

Q Let me just get this straight again.

On January 1st, 1977 you will be able to tell what the effect of operating the plant has been. Then you

wb2 1 will-- What will happen after that? Let's assume that you
2 discovered that 25 percent of the annual production of
3 striped bass in the Hudson River had been taken by the
4 Indian Point 1 and 2 plants. Then what would happen?
5 MR. TROSTEN: Mr. Macbeth, in the course of your
6 questions are you taking into account what the company would
7 do in the event that it were directed by some agency having
8 jurisdiction to act? In other words, what I'm trying to get
9 at is this:
10 If there were an agency, the Atomic Energy Com-
11 mission or another agency, that had jurisdiction over Con
12 Edison, taking into account the environmental benefits and
13 costs, directed that certain action be taken, the company
14 would take that action.
15 MR. MACBETH: Oh, yes, I'm not--
16 MR. TROSTEN: So your question, I assume, then,
17 is directed strictly to what would be done by the company
18 if it had received no order from--
19 MR. MACBETH: Yes. I'm assuming that you are
20 simply told you may operate the plant.
21 MR. TROSTEN: And it's strictly up to the company
22 to decide what should be done?
23 MR. MACBETH: Yes.
24 This is strictly a hypothetical question, obviously.
25 MR. TROSTEN: I just wanted to make sure I

wb3

1 understood the context in which the question was being asked.

2 MR. MACBETH: Yes.

3 WITNESS WOODBURY: I have trouble comprehending

4 the question, Mr. Macbeth.

5 We operate within the laws and regulations that

6 are set by the state and the federal government and under

7 the jurisdiction of regulatory agencies. So I have a little

8 problem understanding really what you're getting at.

9 BY MR. MACBETH:

10 Q Well, you listed out all these mitigation measures,

11 and I was left with the impression that if on the 1st of

12 January 1977 you reached the conclusion that the plants had

13 killed off 25 percent of the annual production of the striped

14 bass in the river, that you might then, just on your own

15 volition, do something along the lines of taking one of these

16 mitigation measures.

17 Now if the company would simply wait for an

18 agency, a state or federal agency to order it to do something,

19 that's certainly a perfectly rational response. But if you

20 plan to take some other actions on your own on that list,

21 that's what I was kind of interested in getting at.

22 A (Mr. Woodbury) We have indicated that if after

23 these studies are completed, in our evaluation of the

24 benefits and costs, it appears to us that some modification

25 of the plant should be undertaken, we would recommend such

wb4 1 modification to the regulatory agencies.

2 I guess I have a problem with your 25 percent

3 number. We have testified -- Dr. McFadden has testified that

4 many fisheries can withstand harvests of 25 percent or more

5 annually without adversely affecting the productivity of

6 the fishery.

7 We are not concerned only with what percent of

8 the annual hatch is entrained or impinged, we are concerned

9 with the net effect on the striped bass fishery. So it is

10 that that we are trying to evaluate.

11 Q So that if you simply saw that the population,

12 the annual production of striped bass in the river had been

13 reduced 25 percent, you would then have to analyze further

14 what that meant. And how would you analyze that?

15 Say you did discover there was this 25 percent

16 reduction, how would you go about evaluating that?

17 MR. TROSTEN: This is a 25 percent reduction

18 from what to what? This is a 25 percent reduction from the

19 previous year class to--

20 MR. MACBETH: But for the plants, the annual

21 production of striped bass in the Hudson River would have

22 been 25 percent greater.

23 MR. TROSTEN: For that particular year?

24 MR. MACBETH: For that particular year.

25 WITNESS WOODBURY: I tried to say before, and maybe

ebl

I did not say it very well, that that annual recruitment rate to the fishery is not alone a measure of adverse impact on the fishery, so I still am-- I'm having trouble with your question.

MR. MACBETH: Maybe I'm not getting all the factors out.

BY MR. MACBETH:

Q What are the indications of adverse impact on the fishery that you would be looking at on January 1st, 1977?

A (Mr. Woodbury) The decline in population attributable to the operation of the plant.

Q That's it?

A Yes.

Q Well, I kind of thought that's just what I had been talking about.

How would you phrase that? Are you talking about a decline from year to year rather than a decline over what production would have been in the river before the plant? Maybe we are having trouble in terms of how you measure it, and how do you express the decline in population attributale to the plant?

A Well, it is generally believed that the population of striped bass in the Hudson River over the last several years has been increasing each year, granted not steadily but at a rate which I believe you said only this morning was

eb2 1 something like five percent a year, or something like that.

2 And this has been occurring in spite of the fact

3 in the last 20 years there has been 1600 megawatts of once-

4 through cooling added to the river.

5 Now we're talking about another 875 megawatts or

6 873 megawatts of once-through cooling on Indian Point 2. We

7 will be concerned if the operation of Indian Point 2 were to

8 reduce the population of the river by some 40 percent as

9 suggested in some of the testimony that has been presented,

10 that this would be something that you could immediately see

11 and would constitute an adverse effect for which some miti-

12 gating measures should be taken.

13 Q Well, are you suggesting 25 percent is not suffi-

14 ciently adverse to do anything? I am proposing 25 percent --

15 A Twenty-five percent of what?

16 Q Well, how are you reducing the population? I'm

17 having a little trouble following you. Are you going to take

18 the 1972 population and say that was X-million and then

19 measure it at the end of the '77 season and say now it is X-

20 minus-25 percent, therefore it is down 25 percent and we

21 ought to get out our list of mitigating measures and see what

22 to do, or it's down 40 percent, and we get out the list and

23 do a couple of more things, or it is only down three percent

24 and we will throw a few fish in the river?

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20 minus-25 percent, therefore it is down 25 percent and we

21 ought to get out our list of mitigating measures and see what

22 to do, or it's down 40 percent, and we get out the list and

23 do a couple of more things, or it is only down three percent

24 and we will throw a few fish in the river?

25 How are you going to measure this decline in

eb3

1 population attributable to the plant?

2 A That is pretty difficult to say until we have done

3 what we have to do for input. What is going to come out of

4 the 1972 amendment to the Water Quality Act, what kind of

5 effluent limitations may be imposed on us, what the State

6 Water Quality Standards may be at some time in the future

7 is something-- You know, it is only speculative at this point.

8 But what we would be proposing would be operating

9 within the criteria and the standards that are extant at the

10 time we make our recommendation.

11 Q Sure. I'm not suggesting that you are going to

12 do any illegal operation of this plant.

13 Let's just for the moment assume that the Water

14 Quality STandards and so on remain the same. But now how

15 are you going to measure this decline in population, whether

16 it is there, whether it isn't there, on January 1st, '77?

17 A I think Dr. McFadden has testified to that in a

18 much better way than I can.

19 Q Well, I take it what you are saying is he is the

20 appropriate witness to whom to address the question?

21 A The question was addressed to him on two different

22 occasions and he testified at length in response.

23 Q Well, that still doesn't answer the last question

24 I put to you. You're saying that I should ask him the ques-

25 tion?

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A If you want to ask it again. I think the answer is in the record.

Q Okay.

Let's assume that by whatever method Dr. McFadden produces you see that there has been a decline in the striped bass population of 25 percent that is attributable to the plant. Now what do you do with this list of mitigation measures?

A We look at the relative effectiveness of the alternate mitigating measures and weighing economic, social, and environmental benefits and costs, attempt to reach a balance as suggested by NEPA.

Q And then you would propose whatever-- If you assumed that you had to get some sort of permit from some State or Federal agency to do whatever it was you wanted to do, you would then, after making that balancing judgment, then make the proposal to the agency?

A Yes, sir.

Meanwhile we would be pleased to make available to any and all agencies all of the data that was coming out of these studies as it comes out, so that we do not propose to, you know, not have-- That is, we propose full disclosure of all of our study effort.

Q Oh, sure.

A So any agency could move at any time they felt constrained to move.

End 14

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Q Then what you envision is an agency review process and then you would begin the construction or modification that the mitigation measure required?

A Yes, sir.

Q And assume that you discovered on January 1st, '77, that 25 percent reduction attributable to the plant had taken place in the striped bass population of the river, how long do you think it would be before you have the mitigation measure installed and operating?

A It would depend on what the measure was. Some of the measures can be instituted in ten minutes; some of them would take five years. It depends on what the damage is, what is the cause of the damage, and then what you do to prevent it.

The outside time is the time which Mr. Newman and I testified to in February when we indicated that the most time-consuming mitigating action would be the construction of closed cycle cooling systems, and the outside time for the availability of those was 1981.

Q And because you have not fully analyzed the feasibility and the effect of all the measures listed on pages 10 and 11 and because you don't know what the cause of damage to fish in the river would be, you could not at this time say whether or not a ten-minute measure, a measure that took ten minutes to institute rather than one that took five

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1 years to institute would be the appropriate one to begin on
2 January 1st, '77 if you saw a 25 percent decline in the popu-
3 lation attributable to the plant? Is that correct?
4 A That is correct. And it might be a combination of
5 more than one.
6 Q Sure.
7 A It might be that you might institute one in the
8 short term and another for the long term.
9 Q Sure.
10 Is it also fair to say that you see all these
11 mitigation measures operating-- Strike that.
12 Do you presently have for any of these proposed
13 mitigation measures any prediction as to the effect that
14 installing and operating the measure would have on the aquatic
15 biota of the river?
16 A I think my answer has to be no, not yet. We have
17 of course selected mitigating measures in anticipation that
18 they would offer a means of reducing the stress that has been
19 of concern during the course of the hearing, and during the
20 course of our research to date.
21 If, for example, 100 percent of all the mass that
22 were entrained were killed anyway, as suggested by the Hudson
23 River Fishermen's Association, then it would not make any
24 difference what the delta-T is and one could reduce the flow
25 in the plant without regard to the delta-T except as it might

eb7

affect the plume.

If, on the other hand, we find as a result of the further entrainment efforts that have been going on this year that the striped bass larvae are sensitive to temperature and that by increasing the temperatures we would substantially increase the entrainment losses, there would be a point at which you could find a balance as to the flow and temperature regimes which was best for the striped bass, and that's what we are seeking.

MR. MACBETH: Mr. Chairman, I think that completes my cross-examination on this testimony, but I would like just a few minutes to look through the testimony quickly and see if there are any items that I have missed and that I should ask a question or two about.

May we take a five-minute recess?

MR. TROSTEN: May I suggest, Mr. Chairman, while we have Mr. Newman and Mr. Woodbury here, I thought perhaps if the Board had not already done so it might take this opportunity to review the sections of the Burns and Roe report which was offered in evidence yesterday by Mr. Macbeth, and then perhaps we might have further consideration of this matter at this time.

CHAIRMAN JENSCH: Yes. Do you have the selected portions?

MR. TROSTEN: Yes, I have a copy of the document.

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CHAIRMAN JENSCH: I understood he was going to offer just certain portions.

MR. MACBETH: Yes, and the portions would be the cover page, the introductory chapter, the summary chapter, and Exhibit 15 at the back.

MR. TROSTEN: All right. Just for the record we are talking about the cover, the cover page? All right.

MR. MACBETH: I thought that was useful.

MR. TROSTEN: Chapter 1, "Introduction and Scope," Chapter 2, "Summary and Results," and Exhibit 15 attached to the document.

CHAIRMAN JENSCH: Very well. Let's take a little longer than five minutes; let's take 15 minutes.

At this time let us recess to reconvene in this room at 12:45.

(Recess.)

End 15

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CHAIRMAN JENSCH: Please come to order.

Did you have some further interrogation of Mr. Newman or Mr. Woodbury?

MR. MACBETH: I do not.

CHAIRMAN JENSCH: Are there any further questions?

MR. KARMAN: No further questions, Mr. Chairman.

CHAIRMAN JENSCH: Thank you.

You may be temporarily excused Mr. Newman and Mr. Woodbury.

(Witnesses temorarily excused.)

Do you want to take up the Burns and Roe report?

MR. TROSTEN: Yes.

MR. MACBETH: I formally moved for the admission of those portions of the Burns and Roe report identified before the break, into evidence.

The Board discussed the Burns and Roe report in the course of the December hearings, and of course it was pointed out at that time that this was a foundation document for material reflected in the Environmental Report Supplement that Con Edison submitted. And that it has relevance and admissibility as a foundation document.

It was my reading of the Board's remarks at that time that the Board wanted something less than the whole report, something manageable with as little as possible of the historical material and as little as possible of

mm2 1 irrelevant material.

2 Therefore the portion that I am suggesting, and
3 it is my understanding that the Applicant does not object to
4 those portions, it objects to the whole motion of anything
5 of Burns and Roe going in. Those portions obviously bring
6 down the conclusions and the study to a brief, comprehensive
7 form and demonstrate the conclusions reached by some of
8 the Applicant's consultants who undertook a study of some
9 magnitude over some time and I think thus represent a
10 competent opinion on the topic.

11 The Applicant, of course, has gone on to make
12 other studies which he has presented.

13 I think there is every reason why, at least in
14 the short compass, the Burns and Roe study should also
15 be part of the record, and the Applicant can argue as to
16 the weight that should be given it.

17 But I think that it certainly is admissible and
18 these short parts of the document should be admitted into
19 evidence at this proceeding.

20 CHAIRMAN JENSCH: Can you give us the language
21 that is in the Applicant's Environmental Report that
22 indicates that this is a foundation document?

23 MR. MACBETH: It came out most clearly in the
24 discussion back and forth in the December hearing, which
25 is reflected on page -- well, it is the passage immediately

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following page 753.

I have Mr. Trostan's copy of the transcript.

CHAIRMAN JENSCH: Wherein did the Applicant's Environmental REport make reference to this document and utilize it as a foundation document?

MR. MACBETH: In Supplement 3 of the Environmental Report Supplement which is essentially the overall cost-benefit analysis.

There is a discussion of each of the various impacts to be expected from the plant and an attempt to sum up the costs and benefits. And it is my reading of these transcript pages that the Burns and Roe report was a foundation document for the Supplement 3.

Is that not correct?

MR. TROSTEN: Well I think the situation was this, that the Applicant considers the information that was used in the Burns and Roe -- that was contained ultimately in the final draft of the Burns and Roe report together with other information that was developed by Battelle Columbus, another contractor consultant of the Applicant, and prepared Supplement 3 of the Final Environmental -- the Environmental Report.

I am not certain exactly what the Chairman has in mind, frankly, by the use of the term foundation document It was one of the documents that was used and it contained

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information that was eventually collated by the Applicant and presented in Supplement 3 of the Final Environmental report.

CHAIRMAN JENSCH: May I see the transcript page?

MR. MACBETH: Yes, sir.

(Document handed to the Chairman.)

CHAIRMAN JENSCH: Did you have some desire to make a formal statement on your position?

MR. TROSTEN: Yes.

The problem, I realize Mr. Chairman, that there is some degree of flexibility in what may be admitted into an administrative proceeding, and I really feel that this particular document does not rise to the level even on admissibility.

The facts of the matter are that this study was contracted for by Con Edison in the fall of 1971. It was completed in February or March, or largely completed in February or March of 1972.

The information was considered by the Applicant together with other information developed on the Applicant's behalf by other contractors and was used in preparing the Final Environmental Report.

The basic problem that I have with this is that the time has completely and utterly passed by this document. I have grave difficulty, Mr. Chairman, with

mm5 1 this particular -- with these excerpts from the Burns and
2 Roe report being included in the transcript of this
3 proceeding for the truth of the matters asserted therein
4 when everything contained in that document has been
5 superceded by more detailed studies, much more involved
6 studies, much more intensive studies that are matters of
7 record in this proceeding.
8 CHAIRMAN JENSCH: Well let me just ask you about
9 one. I notice here something about salinity, the matter
10 that I discussed with Mr. Newman.
11 What has occurred that supercedes the statements
12 in here about salinity?
13 You say you have had some more studies that
14 superceded this. What study on salinity?
15 MR. TROSTEN: I would like to have Mr. Woodbury
16 address himself to that matter, Mr. Chairman.
17 CHAIRMAN JENSCH: All right.
18 Let me just see if I can find the portion to
19 which I refer.
20 Do you have a copy of that there? If you will
21 show it to him, I will find this, I am sure, in a minute.
22 MR. TROSTEN: I have a copy of it here.
23 There is a statement in here that states somewhere
24 to the effect -- it is on page 2-7, for example. This is
25 presumably what you are referring to:

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"Salt deposition should not be a problem for either mechanical or natural draft cooling towers."

Is that it?

CHAIRMAN JENSCH: Well there is something additional, too. Let me see if I can find it. I think it would be very important to know whether you have superceded this salinity study here.

MR. TROSTEN: Do you know which part it is in?

CHAIRMAN JENSCH: It is VII-6.

MR. TROSTEN: This is not the part that Mr. Macbeth is offering into evidence.

CHAIRMAN JENSCH: No, it is not.

MR. TROSTEN: All right.

Well, let's take a look at that VII-6.

16 end

17 ebl

I would like to exhibit this to Mr. Woodbury and have him comment on your question.

(Handing document to Witness Woodbury.)

WITNESS WOODBURY: This report was prepared on a very short time frame, Mr. Chairman, when --

CHAIRMAN JENSCH: Does that lessen its accuracy or is that just a parenthetical statement?

WITNESS WOODBURY: I've tried to qualify the report.

CHAIRMAN JENSCH: In other words you feel it lessens the accuracy because it was not prepared over a long enough period of time?

WITNESS WOODBURY: You asked what has changed since this time.

CHAIRMAN JENSCH: I understood that your Counsel had said that this has all be superceded and I would like to know what superceded the salinity reports set forth on VII-6.

WITNESS WOODBURY: What I was about to explain was the basis upon which the findings in this report were reached with respect to salinity, and then tell you what has happened since then. Is that not what you want me to do?

CHAIRMAN JENSCH: I see the report. What I want to know, have you had a further study on salinity, because Mr. Newman indicated this morning that they were going to make some studies of the towers in Holland, and the trees over there and the gardens don't bother about the salt, and

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apparently it is something that they want to study a bit.

Now have you run such a study, in Holland or otherwise?

WITNESS WOODBURY: Yes, sir.

CHAIRMAN JENSCH: And does the salinity information from your study supercede what is set forth in the Burns and Roe report?

WITNESS WOODBURY: There is new information regarding drift control. There is new information that has been developed since this on the types, the ~~mechanical~~ botanical types that would be affected in Westchester County. This was prepared basically after reviewing a salinity study that was done in connection with Oyster Creek, sir, where the vegetation is very different than it is in Westchester.

It was done on the basis of some studies that were done by the Federal Highway Department with respect to salt use on highways, which concluded that some 500 pounds per acre were the threshold for adverse effect. This is hardly the basis we feel for determining what the effect is on the rhodendrons and the flora and fauna in Westchester County.

So we contracted with Dames and Moore to identify the flora and fauna in the area. We have their report. We have contracted with Boyce Thompson Institute, a recognized air pollution-mechanical effect organization in Westchester that has undertaken a two-year study of examining the

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threshold levels for various key fauna in Westchester County in a hothouse situation to determine what levels of salt they can take without adverse effect.

And Mr. Newman has undertaken some studies, too, which he can address.

CHAIRMAN JENSCH: What I'm really trying to find out-- You told us about the contracts with Danes and Moore and Boyce Thompson. What has superceded? Nothing, as I understand from your statement except contracts and that's somebody else going out to take a look at the birds and bees and the flowers and the plants, which really doesn't help supercede what the salinity study reflected by Burns and Roe, as I understand your statement. Isn't that correct?

WITNESS WOODBURY: I guess what I'm trying to say is that what has been superceded is that we feel that conclusions that can be drawn with respect to cooling towers and their effect along the Jersey shore we feel at this time is not an appropriate base for determining whether cooling towers should be built in Westchester County.

CHAIRMAN JENSCH: Yes. Well, I understood you to say the flora and fauna even around Oyster Creed are different than Westchester County. So if that is correct then there is no need to get that from Holland either, as I mentioned to Mr.Newman. You could stay right with Westchester County.

eb4 1 But I don't see any study except contracts, or
2 anything factual to supercede.
3 WITNESS WOODBURY: The conclusions that Burns and
4 Roe drew in this report and that are reflected in Appendix
5 15 were drawn on the basis of studies that were done by GPU
6 in New Jersey and by the Federal Highway Department. It is
7 our view that these studies are not an adequate basis for
8 making a determination of what we can impose on Westchester
9 County.
10 MR. BRIGGS: Could I ask a question or two?
11 You indicated that the Federal Highway Department's
12 report or the information that was gotten suggested that the
13 threshold level for damage was 500 pounds per acre?
14 WITNESS WOODBURY: That is my recollection, sir.
15 It is in this report.
16 MR. BIRGGS: Okay.
17 The calculations that Burns and Roe made came up
18 with an average annual deposition in pounds per acre of one
19 at a distance downwind of 3.35 miles from the site of the
20 cooling tower.
21 Have you gotten any information that indicates
22 that this factor of 500 under the Federal Highway Department
23 number is just not an adequate number, that salt deposition
24 of one pound per acre will be harmful to plant life in
25 Westchester County?

eb5

WITNESS WOODBURY: We don't know what concentration would be harmful to plant life in Westchester County and we feel it would be irresponsible to impose an environmental insult, if you want to call it that, until we have tried to find out.

MR. BRIGGS: In other -- let's call them engineering and biological calculations that you make, are the data always better than these data before you subject people to possible insults?

WITNESS WOODBURY: The best that we can get, sir, in the time that is available to us to get it, but we had very little time here. We had a month and a half.

MR. BRIGGS: And the drift numbers. This says that the drift recommendation was based on Homer City measurements, which indicate a .0025 percent drift rate and the people who made the study here took an .00375 percent drift rate.

Is there reason to believe that that .00357 percent drift rate could be substantially wrong, substantially low?

WITNESS NEWMAN: Current guarantees from commercial suppliers are .0025 percent.

MR. BRIGGS: Those are guaranteed numbers?

WITNESS NEWMAN: Guaranteed numbers.

They are down in the range of virtually unmeasurable and our experience has been that when you get into

eb6

1 immeasurable numbers under guaranteed conditions, research
2 usually finds that they are somewhat higher.
3 MR. BRIGGS: Well, the numbers that were taken
4 here were 50 percent higher. Whether 50 percent is adequate
5 I don't know and I am not quite sure what you do about the
6 guarantee, but at least these numbers seem to be within
7 pretty close to what one would expect.
8 WITNESS WOODBURY: I don't mean to give the im-
9 pression that Con Edison is ashamed of this report. We had
10 very little time in which to do it and it was done for the
11 express purpose of providing input to the benefit-cost analy-
12 sis which was a new requirement imposed on us during the
13 course of this hearing.
14 CHAIRMAN JENSCH: I don't think anybody wants to
15 criticize the value of the report. I think it is just a
16 question of relevancy and reliability.
17 Had you finished?
18 MR. TROSTEN: Just a couple of more points about
19 this, Mr. Chairman.
20 To take the matter of costs, for example, that are
21 discussed in the Summary and Results, these were preliminary
22 cost estimates that were made on the basis of a limited
23 amount of investigation and these very clearly have been
24 superceded in the sense that much more detailed work has been
25 done by the Mechanical Engineering Department of Con Edison

eb7

under Mr. Newman's supervision.

Looking at Exhibit 15, the environmental costs of once-through cooling and of other things were based on Appendix A, input from New York University, and Quirk, Lawler and Matusky Engineers. On the face of this document this was preliminary information which has been superceded by the much more detailed data that is contained in evidence in this proceeding, Mr. Chairman.

CHAIRMAN JENSCH: I was looking for salinity. We talked a little bit about it and I understood your statement applied to all parts being superceded, and the way I understand, nothing has really superceded anything except you have signed some new contracts, and I think that's fine and you should be encouraged to carry out all of the things you think should be done.

But this is the best that there is at the moment as I see the record. Maybe it is not as good as you would like it but --

MR. TROSTEN: Excuse me. I would say this, Mr. Chairman, that as of the beginning of 1972, this information represented the best there was on the basis of a limited amount of -- on the basis of a few months of investigation. This certainly does not represent the best evidence before the Board at this moment in time. That was the point I was trying to make.

eb8

MR. MACBETH: There are a number of points here, Mr. Chairman. First of all, I think the date on that document is June 1972. The other point is this whole notion of superseding-- What has happened of course is contracts have been let to other consultants; work has been done in-house, and other opinions have been brought forth on the basis of other bodies of knowledge and so forth, which is perfectly proper, and the company is perfectly free to bring those in.

I don't think that goes to the admissibility of this document. It may go to the weight the Board should put on this or that particular part, once admitted, which I think it --

CHAIRMAN JENSCH: I think that distinction has not been mentioned. The weight is one factor. The usefulness or relevancy is another.

End 17

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MR. MACBETH: I think what Mr. Woodbury said it was done with the express purpose of providing input to the cost-benefit analysis to this claim makes it clearly relevant as a foundation document to this proceeding. The Applicant can come in and argue any way he wishes about what weight to put on particular points in it. I'm willing to meet those arguments, and some I would agree have been superceded. I think the sensible thing is to get an outline of the whole thing into the record, instead of spending weeks picking over this bit and that bit, and the argument about what we will do in each little bit.

CHAIRMAN JENSCH: Did you have a further statement?

MR. TROSTEN: My only summation statement, Mr. Chairman, is I think this is really a situation very much like the matter of the Division of Compliance report on the Indian Point fish impingement situation.

CHAIRMAN JENSCH: This is signed, isn't it? I guess that was really the distinction we had.

MR. TROSTEN: This has a signature page, that is correct, that does constitute a distinction, but other than that, no, I think the situations are somewhat comparable in that both of these documents represent efforts to comprehend the situation as it existed with the time and manpower available at the time, and I just think it would be preferable if the Board relied upon the best evidence in the record, rather

1 than upon a preliminary record.

2 CHAIRMAN JENSCH: I think the Compliance report
3 situation was nobody was indicated that would stand up and
4 sign for it, and these gentlemen, as I understand it, the
5 offer has been made on the title page, Schoenwetter, Fiehn and
6 Baron have been cited. I would think any one of them would
7 stand up and be counted about it.

8 MR. MACBETH: It's a clearly foundation document.
9 I don't think anyone can really contend that it's true the
10 Compliance Division report, the Staff is not saying that
11 they relied on that Compliance Division report.

12 CHAIRMAN JENSCH: Your position is simply use it
13 for one purpose that it could be considered for the use
14 that they used it.

15 MR. MACBETH: Yes.

16 MR. TROSTEN: Mr. Chairman, I would just like to
17 emphasize that this point of a foundation document, I'm still
18 not entirely clear, to be perfectly frank, Mr. Chairman,
19 the significance that you are attributing to this. This is a
20 document, it's a foundation or a report that we submitted to
21 the Atomic Energy Commission as part of a requirement of the
22 Atomic Energy Commission, that's all that document is, is a
23 document we submitted.

24 CHAIRMAN JENSCH: Well, that's quite a bit, isn't it
25 when you say, "Oh, that's all it is"? I mean that's the

basis of all of the comments from the federal agencies.

MR. TROSTEN: Yes.

CHAIRMAN JENSCH: And as I read the National Environmental Policy Act, that's a pretty important document. I mean to say, "Well, we're going to wipe it off now, we've got some more contracts going down, and wait till you see what they come up with," we can't really throw it out as fast as that, I don't think.

MR. TROSTEN: What I just am having a little trouble with is this: We submitted Supplement 3 to the Environmental Report, we submitted it as required by the Atomic Energy Commission, and of course we stand behind it as being the best information that was available to us at the time. I don't really -- it has never been entirely clear to me just exactly what intent Mr. Macbeth has with regard to the Board's relying upon this. Is he offering it for the purpose of showing that Con Edison hired Burns & Roe to do this study? We concede that, we stipulate to that very easily. Is he offering it for the purpose of showing that there will indeed be 171 million fish larvae entrained in once-through cooling system at Indian Point 1 and 2? What is the purpose for offering this document?

If he is intending that the Board be able to rely upon this particular study which was done, as I say, on the basis of a preliminary analysis over a short period of time

1 as against the other evidence that Applicant has offered at
2 this proceeding, what is actually in evidence in this
3 proceeding, sworn testimony, I just have grave difficulty with
4 the Board using this and actually relying upon this as a hearsay
5 document. I really feel that there is a significant problem
6 associated with this.
7 MR. MACBETH: Another thing, I don't think Mr. Trosten
8 is getting back to the whole question of weight. He does not
9 want the Board to rely on the figures in the Burns and Roe
10 report, yet there are some that may be entitled to a great
11 deal of weight; some of them may not entitled to as much.
12 It certainly represents the competent opinion of a competent
13 group of men who reviewed this plant, over what I still think
14 is a period running from October until the following June, at
15 least according to the documents --
16 MR. TROSTEN: Let's get that point clear in the
17 record, so we can just be clear.
18 MR. MACBETH: When I asked for the document before
19 June, I was told I would get it when it was finished. I got
20 it in June. It says June on it. It says on the first page
21 that the contract was let the previous October. I think how
22 that has been reduced to a month and a half, I don't apparently
23 grasp.
24 CHAIRMAN JENSCH: Authorized October 1, 1971.
25 MR. TROSTEN: That's correct.

MR. MACBETH: Doesn't the cover page have a June date on it?

CHAIRMAN JENSCH: The cover page says June 28.

MR. TROSTEN: The cover page says June 28. It's my understanding that, subject to check right now, Mr. Chairman, that the basic information that was contained in this without any substantial amount of change was presented to Con Edison in March of 1972, so it represented a period of study from essentially the beginning of October to the beginning of March.

CHAIRMAN JENSCH: Do you want to collapse it to a month and a half or shall we go on from there?

I think this, it seems to me the problem with your statement -- pay no attention to this, it seems to me that if there is something so important in this record that supercedes this, it should go back to the Environmental Protection Agency, because if you can put one report to them and say we have really come up with something, now let's forget that other, I think it comes down to that, because you say we have superceded it and I haven't heard anything you have superceded except contracts on solidity. That was the big problem with Mr. Newman.

MR. TROSTEN: I would regard cross-examination by Mr. Macbeth using this document as an entirely proper usage of this document, I would have absolutely no difficulty with that

at all. The problem that I have with it is having to start with received -- having portions of this document designated received in evidence for the truth of the matters asserted.

CHAIRMAN JENSCH: I think you have a problem there. I think your objection on portions is quite well taken, because it seems to me that the entirety might be of more value.

MR. MACBETH: I offered the entire document the first time, and I would be happy to do that again.

CHAIRMAN JENSCH: It seems to me there is much more exclamation in the --

MR. MACBETH: I would be happy to do that, to put in the entire document.

CHAIRMAN JENSCH: Putting in portions might not give the full picture that the report could.

MR. MACBETH: I will change the offer to the whole document. I prefer the whole document, then one can see it in the round. The board can decide if any party relies upon any particular parts of it, exactly what it is that is being relied on, and how it is what it is. I think that would be a better use of the document.

CHAIRMAN JENSCH: The Board will take it into consideration to this matter during the noon hour.

Do you have any other statement?

MR. TROSTEN: That's all.

CHAIRMAN JENSCH: At this time let's recess, to

reconvene in this room this afternoon at 2:30.

(Whereupon, at 1:15 p.m., the hearing was recessed, to reconvene at 2:30 p.m., this same day.)

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AFTERNOON SESSION

2:30 p.m.

CHAIRMAN JENSCH: Please come to order.

Before we proceed, the Board will return to Staff counsel the Wechsler Report and the WASH 1250 Report, which Staff counsel kindly permitted us to use.

The Board has given consideration to the offer of the Burns and Roe Report identified by Hudson River Fishermens Association as well as the objection made thereto and the Board has concluded that since the document was used by Applicant, that it constitutes a foundation document and is relevant and material to the proceeding.

The objection is overruled. The Burns and Roe Report will be received in Exhibit 4, which obligates the offeror to give three copies to the Board, two copies to the reporter, and to any of the other parties who desire. We will leave that responsibility to the Hudson River Fishermens Association.

Also, if you will identify it with the last number of your exhibit.

MR. MACBETH: The next exhibit number would be V.

CHAIRMAN JENSCH: Very well, V is assigned to the Burns and Roe report which has just been discussed.

Having thus been identified, the Hudson River Fishermens Association Exhibit No. V, and the objection

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thereto overruled, Hudson River Fishermens Association Exhibit No. V is received in evidence.

(The document referred to was marked Hudson River Fishermens Association Exhibit No. V for identification, and received in evidence.)

CHAIRMAN JENSCH: Have we concluded with Messrs. Woodbury and Newman for the present?

MR. MACBETH: I have, Mr. Chairman.

CHAIRMAN JENSCH: I will be back with Dr. Lawler.

Messrs. Newman and Woodbury, thank you, you are temporarily excused.

(Witnesses temporarily excused.)

Whereupon,

JOHN P. LAWLER

resumed the stand as a witness, and having been previously duly sworn, was further examined and testified as follows:

CHAIRMAN JENSCH: Dr. Lawler has resumed the stand. He is available for cross-examination.

Are you ready to proceed, Hudson River Fishermen?

MR. MACBETH: I am.

CHAIRMAN JENSCH: Will you proceed, please.

MR. MACBETH: I have just a few questions for Dr. Lawler.

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CHAIRMAN JENSCH: Will you proceed.

CROSS-EXAMINATION (Continued.)

BY MR. MACBETH:

Q On table I-1 following page I-1 of your testimony of March 30, you have in the footnotes, the dates on which the various units at the Lovett and Danskammera plants went into operation, into commercial operation.

Could you give me the megawattage for each of the units at the Lovett and Danskammera plant as well?

A. Could you tell me what page you are on, Mr. Macbeth?

Q. It is table I-1 which follows page I-1, but inbetween there is figure I-1. It is a big area, I-1.

A. All right, I have that table now.

What you wish is the date of operation of the Lovett and Danskammera units, is that correct?

Q The megawattage of each unit.

You provided the dates in the footnote to that table, and I want the megawattage of the unit.

A. Okay.

I will read them starting with Lovett and I will give you the unit number and the megawattage.

Lovett Unit 1 is 19 megawatts; Lovett Unit 2, 20 megawatts; Lovett Unit 3, 68 megawatts; Lovett Unit 4, 194 megawatts; and Lovett Unit 5, 201 megawatts.

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On Danskammera, Unit 1, 66 megawatts; Unit 2, 66 megawatts; Unit 3, 125 megawatts; and Unit 4, 225 megawatts.

Q. Thank you.

On page D-4 of the Appendix to the testimony of March 30, you discuss the tagging of fish by sportsmen and state that the majority of the fish tagged and the studies provided by Clark and Raney were in the area of Western Long Island Sound and Jamaica Bay and Northern New Jersey.

Would it not be reasonable to assume that sportsmen would fish for striped bass in the area where there were most striped bass to be caught?

A. I suppose that would be reasonable.

MR. MACBETH: I have no further questions for Dr. Lawler.

MR. KARMAN: Mr. Chairman, pursuant to an agreement with Mr. Trosten, between Mr. Trosten and myself, any questions the Staff has for Mr. Lawler can be handled by way of interrogatory.

CHAIRMAN JENSCH: Very well.

Is there any redirect?

MR. TROSTEN: We have no redirect.

Dr. Lawler does have the answers to the questions that were asked of him by Mr. Macbeth yesterday and he is prepared to give them.

CHAIRMAN JENSCH: Will you proceed, please.

mm5

THE WITNESS: You will have to bear with me for a moment while I find the various questions that you had.

One thing you asked for was the operation of INdian Point in 1966 and 1967. And it was operating throughout 1966 and 1967 with the exception of 40 days in 1966 and 6 days in 1967.

I could give you the particular numbers of days that it was not operating during particular months in '66 and '67 if you wish.

BY MR. MACBETH:

Q. Just for the months, May, June, July and August.

A. In 1966 -- and these are the days that the unit was not operating -- in May 5 days; in June 1 day; in July 2 days; and in August zero days, not operating.

In 1967; May zero days; June zero days; July 3 days; August zero days.

Q. And was it operating substantially at full power when operating?

A. We are checking that point now.

To the best of my knowledge it was operating substantially at full power.

Q. Thank you.

end 19 A. There were a few other questions that you asked

$20 Mr. Macbeth.

mm6

You had a series of questions with respect to the Roseton screens, in which you asked me to look at Appendix A-3-1 of the Staff and I said I would and I did.

I don't remember what you were driving at on that.

Q I just asked if you agreed with their calculations.

A I see.

I do recall now. This was in connection with asking me what I would expect the reduced velocity through the travelling screen apertures to be, given a throttling reduction at Roseton.

And my answer would be that I would expect it would be proportional to the ratio of the throttled flow to the full flow which is similar to the manner in which the Staff calculated it.

The area of the screen stays the same.

Q And you don't disagree with the way the way the Staff went about the calculation?

A Well I didn't go through them in detail.

My recollection is they simply ratioed the velocities down in accordance with flow. And that is a good first-pass way of doing it. If you want to get more detail, you really have to do a complete velocity profile.

But on an average basis, that is all right.

You also asked me about the characteristics of the river cross section at Roseton and I can describe that to

mm7

you generally.

It extends from the shore to a depth of approximately 60 feet in a distance of about 1000 feet, and then holds that depth out to the mid-channel, which is about a distance of 2000 feet from shore and then moves back to the east shore in pretty much a linear relationship.

Q And right at the plant is the intake on the bottom of the river, so that we are starting at a depth of -- I believe the depth of the intake is 20 feet at Roseton?

A The depth of intake at Roseton will be -- is now, because it is constructed, is about 26 feet.

And there is dredging that is taking place in front of the Roseton plant and that is shown on the figure in my testimony.

CHAIRMAN JENSCH: While there is a pause, if the gentlemen will refrain from smoking, there is no smoking in the hearing room, please.

BY MR. MACBETH:

Q Is that figure II-3?

(Handing document to the witness.)

A Yes.

Q And does the roughly rectangular area in front of the intake, which has a number 27 on that rectangular line, indicate that the depth of the river bottom within that contour is 27 feet?

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A. That is correct, Mr. Macbeth.

Q. With the 26-foot intake, the intake is a foot off bottom, or virtually off the bottom?

A. That is right.

Q. Thank you.

And I take it that these -- in fact all these -- I forget the right cartographic terms, but the lines in the river with the numbers in them are contour lines of the depth of the bottom at various points.

For instance, in the area by the dock there are some at 20, one at 10, one at zero, and around the diffuser pipe, there are quite a number.

A. Yes, those are all dredged contours.

Q. All right, fine, thank you.

A. These are the contours, these are not as-built drawings. These are contours -- these are design drawings. As whether the as-builts are identical to it or not, I don't know.

I don't know why there would be substantial differences at this point.

You asked me if I could provide additional support for the application of low velocities on the order of .75 and throttling capability down to .5.

I will have to get that for you.

That is all I have with the exception of

mm9

Mr. Briggs' request, which we will have to run and present in writing.

Q. The only other item that I remember, that I do not remember your reciting, is the velocity through the screens at Roseton. I think I asked for that.

A. I thought I indicated that a moment ago.

We show at full flow 1.6 and at -- corresponding to an entrance a velocity of .75. Their estimates are that their entrance velocities and their throttling conditions can be reduced to about .48. And by ratio the flow through the screen would run about 1.0.

Q. That is fine. That takes care of it.

A. That is all I have.

CHAIRMAN JENSCH: We have some questions of Dr. Lawler.

MR. BRIGGS: Dr. Lawler, on page D-19 of your additional testimony of March 30, you have a table here that shows the number of fish four years old and older migrating from the Chesapeake and the percent of the mid-Atlantic catch that this corresponds to.

And the base numbers for the mid-Atlantic catch are 1.9 million and 6.1 million.

And you indicate below here that if the value for the catch size derived from Goodyear is utilized, the number of striped bass migrating out of the Chesapeake Bay in

mm10

1 all cases is greater than 23 percent of the total mid-Atlantic
2 catch.
3 For many of the values, the number of the migrants
4 exceeds the catch.
5 And you show here that for the Goodyear numbers,
6 the 1.9 million, that the percentage varies from 24 percent to
7 379 percent.
8 What fraction of the fish that leave the Chesapeake
9 do you suppose are caught?
10 Would it be 100 percent of the number that leave
11 the Chesapeake?
12 THE WITNESS: I don't know, Mr. Briggs.
13 MR. BRIGGS: Do you have any reason to believe
14 that it would be 100 percent.
15 THE WITNESS: In trying to think this one
16 through, the only thing that I could offer there is that
17 it would seem to me that even if it were 100 percent, that
18 he would still have sufficient -- you would still have
19 retained sufficient fish of adult size in Chesapeake Bay
20 to continue the population.
21 But I really don't have any estimate as to what
22 percentage of the Chesapeake Bay migrants that have been
23 estimated here would actually be caught.
24 I asked myself the same question, but I don't really
25 know how to get at it.

mmll 1 MR. BRIGGS: Well, you show in the Chesapeake Bay,
2 in the numbers that you have on the previous pages, 50 percent
3 exploitation and 30 percent exploitation.
4 Is there a reason to believe that the exploitation
5 in the mid-Atlantic is greater than that in Chesapeake Bay,
6 for instance?
7 THE WITNESS: I really don't know.
8 The reason why I used that 10, 30 and 50 percent in
9 Chesapeake Bay was because there were some indications in
10 some of the papers I quoted that that would be the expectation.
11 But I don't have any similar expectations for the catch in
12 the Atlantic.
13 MR. BRIGGS: If one assumed that the catch in the
14 Atlantic, the exploitation of the Atlantic were 30 percent,
15 or 50 percent, that would rather drastically change these
16 numbers that you have on page D-19, would it not?
17 That is if you assumed an exploitation of 30
18 percent in the mid-Atlantic then would not these numbers be
19 divided by roughly a factor of 3 in the table?
20 I guess I am not making myself clear. Suppose I
21 put in another column here and said, number of fish caught
22 in the mid-Atlantic four years old and older. If I assumed
23 that the exploitation rate was 30 percent, would I not
24 divide those numbers or multiply those numbers by .3?
25 THE WITNESS: Yes, I think you would.

mm12

MR. BRIGGS: And then the percent of mid-Atlantic catch that you have would require that those numbers be multiplied by .37

THE WITNESS: That is correct.

And similarly if you used the 50 percent exploitation you would divide them by 2.

MR. BRIGGS: So then the numbers would come out to be for the larger numbers of fish migrating from the Chesapeake that you would have roughly -- those would be equal to 100 percent of the 1.9 million rather than 379 percent, roughly 100 percent?

THE WITNESS: If you used 25 to 30 percent exploitation, right.

MR. BRIGGS: And for the 6.1 million it would be more like 30 percent, 33 percent?

THE WITNESS: Again using those exploitations, correct.

MR. BRIGGS: So one has to look at these numbers and be concerned a bit about what the exploitation rate might be in deciding whether the Chesapeake provides a large fraction, or could provide a large fraction of the catch in the mid-Atlantic?

THE WITNESS: Yes, that is correct.

end 20

I have one comment to add to that, and I'm trying to bring this out early in the text, that the purpose of this analysis was not to say that this is what the Chesapeake is contributing, but simply to say that one could, through this series of misreasoning, show that it is possible that the Chesapeake could be contributing significant numbers.

MR. BRIGGS: Yes.

THE WITNESS: If you recall, also I chose to use only those estimates on the population given by the Staff and the Intervenors. I bracketed the Chesapeake population by those numbers, although again based on the assumption that was made for exploitation, you could also show higher numbers.

MR. BRIGGS: Yes. Thank you.

DR. GEYER: I would like to refer back to some things that Mr. Woodbury said this morning, Dr. Lawler, about optimizing the flow temperature system to cause the least damage to the striped bass initially, or to enhance it to the maximum extent possible. With high flows you get large impingement and large entrainment, but lower delta-T; with low flows, you get correspondingly lower impingement and lower entrainment, but the higher delta-T. Now in your models -- or have you yet developed models which take account of these effects so that you can actually do this optimization?

THE WITNESS: Yes, we can definitely do that, Dr. Geyer. We simply need the information that we expect to be able to develop this summer that has been described earlier. I think perhaps the simplest way I can describe that is that if we have a situation where you have 100 percent mortality and whole flow, then you know automatically that you are better off reducing the flow because you cannot have more than 100 percent mortality, and yet the number of organisms entrained and impinged seems to be proportionatal to the flow.

DR. GEYER: Unless the lower temperature you obtain at the higher flows has benefits out into the river, it may be ---

THE WITNESS: Okay. That's a secondary effect that I was not addressing myself to, but I would agree that that would also be taken into account.

The other part of the example, at least as far as direct effects would go, would be that if you found under conditions of full flow your entrainment mortality was, let's say, 30 percent, and then under conditions of, say, 50 percent throttling, you found your entrainment mortality was 100 percent, you would be better off going with the full flow, at least for that particular effect.

Now I agree that once you get out into the river, you have to concern yourself with the effect on the river also.

DR. GEYER: Now at the low flows and higher

delta-Ts, you get higher temperatures around the discharge, and so lose more heat there, and since the amount of heat being discharged is the same in any case if you are running at a certain level or essentially so, then in the far field you would expect the temperature to be somewhat less with the high delta-T. Do you know where the crossover is? Does your model show that?

THE WITNESS: That's a very difficult question. The model will show the temperature profiles in the far field for a given near field configuration; in other words, as you are suggesting, the higher the temperature in the near field, the more heat exchange to the atmosphere takes place there, and therefore the less heat exchange to the atmosphere you have to rely on as you get farther out.

The temperature model will show that. It is difficult sometimes to know just how accurate the relation between the near field models and the far field models is. As I think you know, it is a bit of a problem.

DR. GEYER: There are two different models.

THE WITNESS: They are two different models, and the intermediate area is really not easy to get at.

DR. GEYER: Thank you.

CHAIRMAN JENSCH: Any further questions of the witness?

MR. TROSTEN: No, Mr. Chairman.

CHAIRMAN JENSCH: If not, Dr. Lawler, thank you. You are excused.

MR. KARMAN: Mr. Chairman, before we leave the environmental activities for this afternoon, I wanted to advise the Board and the parties that the Regulatory Staff will, if the Xerox machines are working well over in our office two blocks away, submit some additional redirect rebuttal testimony in response to the testimony filed by the Applicant last week, and one matter which is in a response from a response to a request from the Board at the last session of the hearing.

CHAIRMAN JENSCH: When do you expect to have the data?

MR. KARMAN: I expect this afternoon.

CHAIRMAN JENSCH: So witnesses should be available this afternoon and tomorrow?

MR. KARMAN: My witnesses will be here, but I'm not quite sure everybody will be able to interrogate them that quickly.

MR. TROSTEN: We would like certainly to have until sometime tomorrow to look this over. It may be that after a preliminary review of it, we can determine either that we can cover part of it tomorrow and submit the rest of it in interrogatories or do the rest entirely by interrogatories.

CHAIRMAN JENSCH: What kind of a schedule are you

gentlemen developing with reference to environmental matters? You said you thought that we would finish within a few days with the environmental matters?

MR. TROSTEN: It's certain I thought that we will, Mr. Chairman. I hope we can be finished by tomorrow, subject to two things. We have some interrogatories probably that we will submit to Mr. Clark which will be answered, I presume, next week.

MR. KARMAN: We may, too.

MR. TROSTEN: -- or some time thereafter.

Mr. Macbeth has indicated that he has some additional testimony on the hatchery which will come in, I guess, the week after next, I guess is what he said. We may well have some interrogatories or some -- a very brief hearing session we might have to have on that.

The limiting thing, I would say, would be the hatchery testimony.

MR. KARMAN: Part of our testimony today will relate to the hatchery.

CHAIRMAN JENSCH: We, of course, encourage the efforts of the parties to expedite the proceeding, but it oftentimes happens that some of the matters covered by interrogatories are of interest to other persons, and perhaps to the Board, and while we encourage interrogatories generally, and certainly those are intended to be part of the hearing

1 session, that during the hearing sessions, if it is possible
2 to have interrogatories or the intended questions available
3 and the witnesses, it might lead to resolution of the matters
4 that otherwise would remain unresolved and not be helpful
5 to the consideration of the matter before a decision. So
6 while we encourage the parties to work together and get
7 interrogatories, we do not want to seem to foreclose the
8 opportunity of having witnesses here so that other persons who
9 have not participated in the interrogatories can cross-
10 examine. And of course the Board has expressed some interest
11 in some of the matters raised.

12 MR. TROSTEN: We are certainly prepared, Mr. Chairman--
13 let's see, when could Mr. Clark be made available? Is it
14 your view that these witnesses should be made available, because
15 we certainly can make our witnesses available live to answer
16 Mr. Macbeth's questions this week. There is no question
17 that we could do that, and we will do that, if that is the
18 Board's desire.

19 MR. MACBETH: I can provide Mr. Clark next week for
20 any questions that the Board has for him, or that the other
21 parties do. At the present time the parties have not given
22 me any interrogatories for Mr. Clark, so at the moment there
23 simply are not any, and we are happy to answer those that are
24 given to us, but I could provide Mr. Clark live next week. I
25 could simply put the handful of questions I have for Dr.

McFadden and Mr. Schwartz verbally, too, if the Board would prefer, or perhaps we could -- it might be very sensible to show the Board what those interrogatories were.

CHAIRMAN JENSCH: I think that would help. I don't think the Board would be in a position to indicate any desires until it has seen the interrogatories, and it might be better after seeing the answer.

Our thought is the Board has intended to set aside three weeks; now, if some recess within those three weeks is advisable that might be better to do that, and then come back when your interrogatories and answer are completed, and by that time people can indicate whether they desire to interrogate orally further. Perhaps the answers to the interrogatories might not be as complete as the propounder would like, and those are matters that we are getting down to the closing parts of this thing that I think we ought to have the record complete.

MR. TROSTEN: May I suggest that Mr. Macbeth and I could confer with Mr. Karman briefly, and perhaps we could set a schedule for the submission and answering of interrogatories, their submission to the Board well within this period, and the Board could make a determination if live testimony would be required.

CHAIRMAN JENSCH: I think the Board would not want to make a decision until it saw the interrogatories, in any

1 event. Is there any advantage in knocking off today and
2 getting started on that and coming back some other day?
3 MR. MACBETH: I think there might be an advantage
4 to perhaps taking a recess and just having three counsel
5 having a preconference on the scheduling. I have presented
6 all the interrogatories I want to. I don't think there is
7 too much can be done in the way of drafting interrogatories
8 now, but I think we might be able to settle among ourselves
9 what we think the real possibilities and practical possibilities
10 of scheduling are and be able to report that to the Board very
11 quickly.
12 MR. TROSTEN: I agree with that, Mr. Chairman. We
13 have seen within the last five minutes -- I should say we
14 received in the last five minutes some of the testimony Mr.
15 Karman is going to present. I feel confident
16 we can agree that we will have interrogatories available
17 within a very prompt period of time if we just had a few
18 minutes to discuss this.
19 CHAIRMAN JENSCH: Well, let's take some time.
20 My only thought is, do you think it would be advisable to take
21 a day or now or something and then finish up on Thursday and
22 Friday, or work through and come back Monday or something? I
23 leave it to the parties to do, but I think some way should be
24 provided so the parties will have a chance to interrogate
25 further from the answers, or the other parties may be able

to interrogate with reference to those matters.

MR. TROSTEN: We're perfectly willing to do that, Mr. Chairman. I do think since there's quite an assemblage of people here involved in the fuel densification matters, and also the thin walled valves, and Mr. Roisman is present, if we could just go forward it would be helpful.

CHAIRMAN JENSCH: That's all right, so we keep it moving. I want to be sure all parties have an opportunity to interrogate to the full. If the parties have agreed that we go ahead with the fuel densification now, and you want to take a few minutes before we do that, why don't we do that?

MR. TROSTEN: I think this would help.

CHAIRMAN JENSCH: We will recess to reconvene in this room at 3:20.

(Recess.)

e21

CHAIRMAN JENSCH: Please come to order.

MR. TROSTEN: Mr. Chairman, on the understanding that the Board has set aside this week and next week and the following week for the purpose of the hearing, we come up with the following schedule:

All parties would provide each other with written interrogatories by April 15, answers to interrogatories would be in the hands of all parties by April 19, the Hudson River Fishermen's Association would provide its additional direct testimony dealing with the hatchery by April 24, and a hearing, if necessary, would be convened the 26th and the 27th, and we are, of course, open to suggestions from the Board as to the schedule.

MR. MACBETH: In addition, we would give the Board tomorrow the interrogatories to Dr. McFadden and Mr. Schwartz that I conveyed to the Applicant in the course of the last few days, so the Board can see the outlines of my questions to McFadden and Schwartz.

MR. TROSTEN: And we will, of course, provide our interrogatories to the Board as soon as they are set out.

Mr. Chairman, I would like to say this: If, for any reason, the Board does not find this schedule satisfactory and would prefer to have us stay in continuous session, no matter how long it takes, to go over these things, we are perfectly happy to do that. We are more than willing to do

that.

CHAIRMAN JENSCH: I think any measure you can undertake to shorten the hearing time, the better it is, with the proviso that all parties have a chance to interrogate, not only just those who propound the interrogatories. And I think if this seems to be a feasible schedule for the parties, unless the Board makes some specific suggestion about it, we will proceed upon that basis.

You are talking about environmental matters?

MR. TROSTEN: That's correct.

CHAIRMAN JENSCH: Then we will proceed now in all respects on the remaining radiological matters, is that correct?

MR. TROSTEN: That's correct.

CHAIRMAN JENSCH: And that may take the rest of the week and part of the next, I don't know.

MR. TROSTEN: Now, one matter that remains, however, is that Mr. Hall will be here tomorrow, and that matter -- he will be here to respond to the Board's questions, and I understand Mr. Macbeth may wish to direct some oral interrogation to the Staff on its testimony submitted heretofore tomorrow, is that correct?

MR. MACBETH: I was going to go a little further. I was going to suggest doing it on testimony to be submitted hereafter. I mean if the Staff can put in my hands this afternoon or this evening the rest of their testimony, I think

my cross-examination of the Staff witnesses will be very brief, and I might as well do that, it seems to me, as not.

MR. ROISMAN: Mr. Chairman, I would just like to speak to one aspect of that. I would like to have the radiological portions now concluded without interruption by the environmental portions, and if it runs through tomorrow, then Mr. Hall will wait. I am here for that purpose, and I made no agreement to go and have Wednesday, or if necessary Thursday, broken up into various different parts to accommodate the environmental section. It was my understanding that the parties concerned with environmental matters would clean it up before the radiological portions started; not to have a tag-end hearing for the 26th and 27th, and I would like to finish radiological in order. It will not run anything like into next week, in light of the Board's ruling on pressure vessel.

MR. TROSTEN: May I speak to that, Mr. Chairman?

CHAIRMAN JENSCH: Just a minute, please.

(The Board conferring.)

e22

23 wbl 1 CHAIRMAN JENSCH: Upon further consideration, and to avoid complicating the schedule, the Board will withdraw its request for the presence of Mr. Hall. That may solve a lot of problems.

MR. TROSTEN: You just withdraw the request?

CHAIRMAN JENSCH: Yes.

I think Mr. Woodbury has given us several times statements as to this activity, and I think that is adequate from the Board's point of view.

MR. TROSTEN: All right. We will endeavor to contact Mr. Hall and so advise him.

CHAIRMAN JENSCH: Very well, that will leave the proceeding in such a stage that we can go ahead with the radiological matters.

MR. MACBETH: Mr. Chairman, in light of that, may I be temporarily excused from the hearing?

CHAIRMAN JENSCH: Yes. You will have to keep informed concerning the progress of the matter.

MR. MACBETH: Yes, Mr. Chairman.

MR. TROSTEN: Let me just doublecheck one thing. The disposition of the letter from Mr. Hall to Mr. Woodbury was being held in abeyance.

CHAIRMAN JENSCH: Let's take that up when we get back to the environmental matters.

MR. TROSTEN: We will not have to bring him in in

wb2

connection with that letter; all right.

MR. KARMAN: Might I have a word?

CHAIRMAN JENSCH: If you can get one in.

(Laughter)

MR. KARMAN: If we are to go ahead directly now with the radiological and not have it interrupted, Mr. Macbeth indicated that he was desirous of cross-examining Dr. Goodyear on testimony which we may not submit until tomorrow morning. So I am a little at a loss--

MR. MACBETH: I will reserve any necessary cross-examination until the end.

I will join the rest of the group in interrogatories.

Is Mr. Trosten going to offer Mr. Hall's letter again? Because I want to state my objection.

CHAIRMAN JENSCH: We're going to take that up later. Let's get on with the hearing.

MR. MACBETH: After the radiological; very well.

CHAIRMAN JENSCH: Are we ready? The next subject is, what?

MR. ROISMAN: Thin walled valves.

CHAIRMAN JENSCH: Is that agreeable to all the parties?

Are the witnesses available for the thin walled valves?

MR. ROISMAN: By prior agreement we are beginning

wb3

with staff witnesses on thin walled valves and fuel densification, then we will go to applicant witnesses.

I received the steam line break information yesterday afternoon at my home. I should be ready by tomorrow morning to indicate what, if any, contentions we have with respect to that issue.

MR. TROSTEN: Mr. Chairman, I would like to have a brief recess while I try to organize for this shift.

CHAIRMAN JENSCH: Very well.

At this time let's recess, to reconvene in this room at three-forty.

(Recess)

End23

24 ebl

CHAIRMAN JENSCH: Please come to order.

As I recall, just before recess the Citizens Committee intended to interrogate the Staff witnesses on the thin walled valve subject.

Are the witnesses for the Staff available?

MR. KARMAN: Mr. Chairman, the Staff witness with respect to thinned wall valves is Mr. Joseph Tillou, the Atomic Energy Commission's Office of Regulatory Operations, Region One. Mr. Tillou has previously testified in this very hearing, and a copy of his professional qualifications is on record.

CHAIRMAN JENSCH: Having been previously sworn, he need not be sworn again.

Whereupon,

JOSEPH TILLOU

resumed the stand on behalf of the Regulatory Staff and, having been previously duly sworn, was examined and testified further as follows:

xxxxx

CROSS-EXAMINATION

BY MR. ROISMAN:

Q Mr. Tillou, I would like to show you two exhibits of the Citizens Committee for the Protection of the Environment and ask if you would identify them:

Exhibit A-2, a letter dated March 23rd, 1973 from the Region One Office to Consolidated Edison, and an exhibit

eb2

1 marked Exhibit A-3, dated April 6th, another letter from the
2 same Atomic Energy Commission Office to Con Ed.
3 (Handing documents to the witness.)
4 MR. KARMAN: Where are these exhibit numbers
5 coming from? Did you just number them?
6 MR. ROISMAN: I started a set of numbering at this
7 point for this phase of the hearings. Since our proposed
8 findings on other radiological matters are in, I thought it
9 would be simpler.
10 MR. KARMAN: I have no problem. I was just curious.
11 (Whereupon, the documents were
12 marked CCPE Exhibits A-2 and A-3
13 for identification.)
14 BY MR. ROISMAN:
15 Q Would you examine them and tell me if they are
16 true and correct copies of the letters sent by Region One
17 Office to Consolidated Edison?
18 A Yes, they are.
19 Q Did you participate in the preparation of each of
20 those letters and the underlying documents attached to them?
21 A Yes.
22 Q And do the two letters and attachments to them
23 together constitute the written report of the review of the
24 Compliance Division of the Consolidated Edison Company's
25 analysis of the problem of thinned wall valves at Indian

eb3 1 Point No. 27

2 A Yes, they do.

3 MR. ROISMAN: Mr. Chairman, I have previously made
4 a copy of these two exhibits available to the Reporter, two
5 copies, and one to each member of the Board. It is my under-
6 standing that all the other parties who are interested in
7 this also have copies.

8 I therefore move that Exhibits A-2 and A-3 be
9 received in evidence.

10 CHAIRMAN JENSCH: Is there any objection?
11 Regulatory Staff?

12 MR. HARMAN: No objection.

13 CHAIRMAN JENSCH: The Applicant?

14 MR. TROSTEN: No objection, Mr. Chairman.

15 CHAIRMAN JENSCH: Exhibits A-2 and A-3 are
16 received in evidence.

17 (CCPE Exhibits A-2 and A-3,
18 marked for identification,
xxxxx 19 were received in evidence.)

20 BY MR. ROISMAN:

21 Q Now, Mr. Tillou, I would like you to look at the
22 letter which actually you have a copy of, dated June 22nd,
23 1972, from Mr. O'Reilly to Consolidated Edison Company.

24 Do you have that in front of you?

25 A Yes, I do.

eb4

MR. ROISMAN: For purposes of identification, Mr. Chairman, I would like to mark that Citizens Committee for the Protection of the Environment Exhibit A-4. The copy that is here is Mr. Karman's and he will make the copies available tomorrow, which I will submit with the appropriate exhibit identifications on them.

(Whereupon, the document was marked CCPE Exhibit A-4 for identification.)

xxxxx

MR. KARMAN: As an exhibit we will just need a few copies.

MR. ROISMAN: That's correct.

BY MR. ROISMAN:

Q Now Mr. Tillou, can you tell me, did you participate in the preparation of that letter?

A No, I did not.

Q Do you know from your working at the Region One Office if that is a true and correct copy of a letter that was sent out by Mr. O'Reilly to Consolidated Edison Company?

A To the best of my ability to evaluate it quickly, yes.

Q Have you previously seen that letter?

A Yes, I have.

Q Does that letter represent the explanation in writing of what the Compliance Division laid down as the

eb5

requirements for Consolidated Edison in order to verify the wall thicknesses of the valves in the primary coolant system at Indian Point No. 2?

A Will you please repeat that question?

MR. ROISMAN: Will the Reporter read it, please?

(Whereupon, the Reporter read from the record as requested.)

THE WITNESS: The answer is yes.

MR. ROISMAN: Mr. Chairman, at this time I would like to move into evidence the letter identified as Exhibit A-4 with the stipulation that tomorrow morning I will provide the necessary copies to the Reporter and the members of the Board.

CHAIRMAN JENSCH: Any objection?

The Regulatory Staff?

MR. KARMAN: No objection.

CHAIRMAN JENSCH: The Applicant?

MR. TROSTEN: No objection, Mr. Chairman.

CHAIRMAN JENSCH: Exhibit A-4 is received in evidence.

xxxxx

(CCPE Exhibit A-4, marked for identification, was received in evidence.)

BY MR. ROISMAN:

Q Now, Mr. Tillou, did you participate in the review

eb6

of the materials that were submitted by Consolidated Edison of their investigation on the question of thin walled valves at Indian Point Number 2?

A Yes.

Q In the course of your review did you have occasion to determine whether or not the methods which were to be used by Consolidated Edison to detect the existence of thin walled valves were appropriate methods designed to come up with the answers to whether or not thinned walls existed?

A Yes.

Q In that analysis did you examine the question of whether or not all valves had to be checked directly by ultrasonic or some other method of examination as opposed to examining one of several similar valves?

A Repeat that again, please?

Q I will try to rephrase it.

A I would prefer that.

Q In analyzing the method by which Consolidated Edison Company was going to determine whether it had thin walled valves at Indian Point Number 2, did you analyze their proposal to test only some rather than all of the valves within the primary coolant system?

A Yes, we did, rather extensively.

Q Can you tell me, what did you do for purposes of that analysis? Did you have further communications with

eb7

Consolidated Edison?

A No.

Q Did you conduct some analysis in your own offices that involved examination of valves?

A Yes, we did.

Q Can you please describe that to us?

A This program, as proposed by Consolidated Edison for the evaluation of the reactor pressure boundary valves for Indian Point 2, was tested for the confidence and reliability of its results by comparison to the Military Standard Number 414, which is inspection by random sampling by use of variables.

This is a Military Standard provided by the Government and utilized and completely accepted by NASA, by the U. S. Navy, by the United States Army, the Air Force, all of the military branches as well as the commercial suppliers of material throughout the country.

Q Is it used for purposes of nuclear examinations, to your knowledge, other than the use that was put by the Compliance Division in this case?

A Yes, it is.

Q Which one of those that you mentioned uses it in that manner?

A It has been used by the Navy very extensively for the evaluation of fuel pellets, for the evaluation of fuel

eb8

clad, tubing, and for the evaluation of closure welds on fuel tubings.

Q Has it ever been used for the purpose of evaluating valves in the primary coolant system of a nuclear reactor, for instance at the Navy?

A I am unable to answer that question.

Q What would constitute -- I think you used the words "random sampling"? How would you determine among 19 valves what was a random sample check of 19 valves, as an example?

A The proposal by Con Edison was that they would assure a program which contained randomness by selecting the most accessible valve of each size from each supplier to avoid any possibility of selecting a good one and using the results of that to identify and accept the lot.

Q Would there be a point at which the number of valves from which you were selecting one would no longer be an adequate sample, albeit random? For instance, what if there were 1,000 valves from one manufacturer, what would your Military STandard 414 suggest as the number that you would have to sample?

A The Military STandard has sampling tables for a minimum selection of samples for each various sized lot.

Q And what is the figure?

A I cannot give it to you off of my head.

Q Did you check that table with--

eb9

A I did indeed.

Q Now can you tell me, would it make a difference in terms of determining whether the sample was adequate, again holding aside the question of randomness, how complicated the procedure was by which the thing to be checked was put into final form; thatis, how it was manufactured or cast or forged or what-have-you? Would that affect it?

A No, because in inspection of the selected sample you check all of the characteristics which you are looking at. You will check it in every reasonable way possible and any one deviation from the requiremants, the minimum requiremants, will automatically reject the entire lot.

That's why the 414 inspection by variables is a much more stringent inspection actually than 100 percent inspection by an inspector, because you eliminate the operator error completely. You have statistically brought yourself down to a sample which, if anything, if any one thing is wrong, the whole thing is no good.

Q Can you explain to me the way in which you think or you understand thinned wall valves came about? That is, how did that error occur in the original manufacturing process as you understand it?

A Well, we are discussing two different generic problems. One is cast valves and the second one is forged valves.

eb10

Q Let's concentrate on the forged valves.

A That is very prudent since Con Ed did all of the cast valves.

Q That's what they claim, yes.

A They did.

In the forging process, forgings are put through a die which gives you the external form and refines the metallurgical grain flow of the material to provide uniform physical characteristics in the areas which willbe the pressure restraining boundaries of a valve.

During this operation there can probably be no problem developed by thin walled valves because you are making just a solid form of a mass of metal. Your problem with forged valves will come in during the machining operation, provided they are not under a quality control program. An acceptable quality control program in machine shops is a lot of material which is running through one machine operated by one operator and used by using one set of stops and tools and machine settings.

It is customary in machine shop operation to inspect the first piece which the man produces from the machine set up on this basis and at the end of the lot, to inspect the last piece. If there are no deviations it is assumed then that the material in between is all acceptable because it has run through a similar operation by a similar man with a similar machine setting all the way through.

25 wb11 This is the only place it can be done eccentrically. The
2 machine can be set up so instead of boring truly on the axis
3 it will be off on one side; it will be a thin wall on one
4 side and a thick wall on the other.
5 This is the source of thin wall in forty valves.
6 Q Do you know whether or not, as to the following
7 valves -- and these are the numbers that ConEd uses: 857-A,
8 C, D, F, G, H, I, J, K, M; 211; 251-A, B, C, D, E, F, G, H --
9 whether all of those valves were machined by the same person
10 operating the same machine, essentially in the same time
11 span, by the manufacturer of the valve?
12 MR. KARMAN: What are you reading from, Mr. Roisman?
13 MR. ROISMAN: Some notes of mine that I took from
14 a sheet of material that Consolidated Edison prepared on
15 what valves they had checked.
16 MR. TROSTEN: Would it be helpful if we gave--
17 MR. KARMAN: I think it would not only be helpful
18 but necessary for Mr. Tillou to have something in front of him.
19 MR. ROISMAN: Before Mr. Trosten explains:--
20 BY MR. ROISMAN:
21 Q Mr. Tillou, have you seen this before?
22 A Yes, I have.
23 Q You are familiar with it?
24 A Yes, I am.
25 MR. KARMAN: I think I would like to have him look

wb2 1 at it while he is answering the question.

2 THE WITNESS: I think I have to answer your

3 question by saying that the basis of this selected sampling

4 program was one valve from each size, from each manufacturer.

5 These are not all from the same manufacturer; they are from

6 a series of four different manufacturers, the valves on this

7 listing.

8 BY MR. ROISMAN:

9 Q Will you chek the list and tell me whether or

10 not the ones I just read off to you are all from the same

11 manufacturer?

12 A Is that 857A-D through 251A-H?

13 Q That's correct.

14 A They are from the same manufacturer.

15 Q I will ask you the same question again:

16 Did the same machine, with the same operator, in

17 a continuous time span, machine those nineteen valves?

18 A I cannot answer that question. However I know

19 it is a given type of valve from a manufacturer in a size.

20 Q But it could have been machined by several different

21 individuals?

22 A It could have been machined by any number, yes.

23 Q And if there were a defect in the quality assurance

24 as applied to one of the individuals doing the manufacturing

25 andnot as to the others, then it could be that as to some of

wb3

those valves that they did not -- if the random sample of one valve from that group was not a sample of that particular machinst working on that particular machine, then you would not have detected the thin walled valve; isn't that correct?

A Yes.

Q Now, looking at the same chart there, can you tell me if valves 505-A and B, 508-B, 511-A and B, 515-A and B and 243-A to D were all manufactured by the same company?

A I really don't know that. I happen to have remember the other one. But I don't have the details of the manufacturer on this sheet.

Q All right. We can ask the applicant with respect to that.

Is it true as to all of the forged valves on there that you do not know whether or not the same machinist at the same manufacturer machined each one of the valves from his company?

A That is true, I do not.

Q I would like to show you what we will eventually introduce into evidence as an exhibit. And I would like to mark it now, if I may as Exhibit A-1. It's a sketch. The number is sort of cut off here, but it is QAP-UT-3-2, I believe.

(Whereupon the document referred to was marked for identification as CCPE Exhibit A1.)

wb4 1 BY MR. ROISMAN:

2 Q It is, according to my information and belief, an
3 outline of where on each valve checks would be made to
4 determine thin walled valves at Indian Point No. 2.
5 Have you ever seen this sketch before?
6 (Handing document to the witness.)
7 A Yes, I have.
8 Q Is that your recollection of what it purports
9 to show, where on the valve the UT examination will take place?
10 A I cannot answer that with any certainty.
11 MR. TROSTEN: May I see that exhibit, please?
12 (Document handed to Mr. Trosten.)
13 MR. ROISMAN: Mr. Trosten, inasmuch as this was
14 attached to what was provided us by ConEd would you be
15 willing to stipulate at this time that that does represent--
16 looking at page 3 of the document entitled QAP-UT-3....
17 MR. KARMAN: To whom are you talking?
18 MR. ROISMAN: I'm talking to Mr. Trosten.
19 (Continuing) --paragraph 10, subparagraph 10.2,
20 is it a correct statement that this sketch which we just
21 identified a moment ago as Exhibit A-1 represents ultra-
22 sonic thickness measurements shall be taken at the approximate
23 locations indicated on this particular sketch?
24 MR. TROSTEN: I'm not quite sure what you're
25 asking me to stipulate, Mr. Roisman.

wb5 1 MR. ROISMAN: Merely that this sketch does
2 represent an approximation of the locations on all of the
3 valves where the ultrasonic examinations were to be made.
4 MR. TROSTEN: I would prefer to reserve on that
5 until I've had an opportunity to confer, Mr. Roisman.
6 Why don't you put that to one of our witness;
7 or, if you prefer--
8 MR. ROISMAN: Well I will have to ask for
9 Mr. Tillou back again, and my question won't have any meaning
10 to him unless we establish this does represent roughly where
11 the areas are on the valves where the testing was to be
12 done.
13 MR. TROSTEN: On all of the valves?
14 MR. ROISMAN: Yes; that's my understanding of this
15 paragraph, 10.2.
16 MR. TROSTEN: If you will give me a moment.
17 MR. ROISMAN: All right.
18 (Pause)
19 MR. TROSTEN: Mr. Roisman, it is not feasible
20 for me to stipulate with you that all valves were measured
21 at the location indicated on that sketch. The story is more
22 detailed and somewhat more involved than that.
23 I can tell you that this represents the general
24 way in which the measurements were taken, if that is satis-
25 factory for this purpose.

wb6

MR. ROISMAN: I think the words in the document were "approximate locations." Would that be an adequate description, that the sketch represents the approximate locations where the ultrasonic thickness measurements shall be taken? -- I'm reading again.

MR. TROSTEN: If you apply that to all valves that would still not be a fully accurate statement, Mr. Roisman.

As I say--

MR. ROISMAN: Would it be accurate that it represents the general distribution of the spots at which ultrasonic thickness measurements were taken?

MR. TROSTEN: It's representative of the places that were looked at.

MR. ROISMAN: Okay.

When we come to the applicant's witness you can explain it more. I don't want it to be confusing.

BY MR. ROISMAN:

Q Mr. Tillou, did you understand what Mr. Trosten said, that these are representative of the locations on any particular valve where ultrasonic measurements were made of wall thicknesses?

A If you will substitute "representative" for "typical."

Q I thought I said "representative."

wb7 1 A I accept that.

2 Q All right.

3 Now, can you tell me: Did the Compliance Division

4 with respect to each valve that was inspected make a deter-

5 mination as to the criteria used for selecting the spots on

6 the valve for ultrasonic examination?

7 A The answer is, No.

8 Q Did the Compliance Division have its own criteria,

9 assuming that something other than 100 percent volumetric

10 testing of each valve was to be done, as to how one would

11 select spots on the valve for purposes of testing?

12 A We had professional judgment. We have no written

13 criteria for this. Knowledge of the casting process and

14 knowledge of the forging and machining process would be the

15 basis for our evaluation of this type of locations.

16 Q Now in the thin walled valves which had been

17 discovered and where the precipitating cause of the June 22nd,

18 1972 letter, marked here Exhibit A-4, was there a pattern

19 to how the thin walledness would show up in the valve?

20 In other words, did it always appear in a certain way on

21 valves, or in certain patterns on the valves; or was it really

22 different valves and different places and different shapes

23 and configurations?

24 A It's generally a pattern.

25 Q Can you tell me what was the pattern?

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A The pattern in cast valves occurs when you get a core shift during the casting process. The pattern in the forged valves is, as I mentioned before, a deviation off the centerline of the valves during machining.

Q All right.

Now, in respect of the cast valve, would the existence of the thin wall area have an anticipated length and width in reference to the total valve? I don't mean inches. But it represents a certain percentage of the width of the valve and a certain percentage of the length of the valve?

A This will vary in each individual case.

Q You mean each individual case of where a thin wall is found?

A This is right.

Q So this core shift that you talk about might be a shift not only from left to right but also it might be a tilt, so that you would be a little thin at the top and a little thick at the bottom?

A No, instead of being that it would be more of a shearing effect.

Q All right.

Now with regard to the machined valve, the forged valve problem, there again would there be a definable percentage of the width and the height and the length of the

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1 valve which would show the defect for all valves, or for a
2 group of valves? A standard kind of defect? Or was there
3 also not a pattern in that?
4 A No, these run in a very distinct pattern. You
5 will find the thin wall down literally through one side
6 and a thick wall at the opposite side where the machining was
7 done out of concentricity.
8 Q So you would expect to find it all along the length
9 of the valve, or all along the width of the valve?
10 A No; because it's machined from two ends. It will
11 in through one neck of the valve and then again through the
12 other neck. And it may be on opposite sides or it may be on
13 the same side, depending on the way the machine was set up.
14 Q How wide would this strip be in reference to the
15 width of the neck of the valve? Looking at Exhibit A-1, for
16 instance, I see -- I assume that the portion on which the
17 numbers, 10, 11 and 12 appear is a neck; is that correct?
18 and that this would show three spots on the neck that were to
19 be examined ultrasonically, two on the front portion of the
20 neck that we see, and one -- the diamond, you will note here,
21 indicates the rear piece.
22 Now when you say that there could be a problem on
23 the neck, do you mean that the problem would always be such
24 that assuming this valve were being tested, the one that is
25 pictured here, and assuming that these spots were the spots

wb10 1 at which it would be tested, that you would always find
2 that drill imperfection by testing three spots in the way
3 that they are shown there?
4 A Yes; because those are 120 degrees apart.
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And the thinning would show up within 120 degrees.

Q And that is true for all drilled valves -- I am sorry, forged valves?

A I think I can say without reservation, yes.

Q You said it without reservation, but you said it somewhat haltingly.

Is there an exception in your experience or knowledge? Can you imagine occasion in which the defect caused by the machining process would not necessarily appear within 120 degrees?

A I could postulate a condition where you could be machined eccentrically to a point where you would be marginally low, but you would still be within the acceptance range but might not show up. If there is a deficiency which would be substantially below the thin wall, the minimum wall requirement, it would be picked up.

Q What if it would only be below the minimum wall requirement by two percent?

A I refuse to start talking numbers in this case.

Q Well I have to request that you do talk numbers or indicate that the compliance division doesn't have numbers.

In other words, what I am trying to find out is, can you tell me, is this method using 120-degree arc so to speak, as the area within which you expect to find thin-walledness, is that guaranteed to find all wall thicknesses

mm2 1 below the minimum requirements of the applicable codes?

2 A Yes.

3 Q And it doesn't matter how far below, whether

4 it is a 50 percent deviation, or a 2 percent deviation, is

5 that right?

6 A Let's back up and start that question again.

7 Q Well where we started was when I had asked you

8 about this, you indicated that if it were only marginally

9 acceptable, you might not be able to detect that it was

10 only marginally acceptable.

11 All right?

12 Do you remember that?

13 I guess in effect what I am saying is, if it is

14 only marginally unacceptable, would you be able to detect

15 that?

16 MR. KARMAN: Do you understand the question?

17 THE WITNESS: Yes I do.

18 I think that my answer would have to be the same

19 thing, that you are giving a tolerance allowance in these

20 wall-thinness calculations and anything below the minimum

21 tolerance allowance would be identified by this technique.

22 BY MR. ROISMAN:

23 Q You mean you are given that by the code?

24 A Yes.

25 Q Now can you tell me if these valves were not in

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the plant at all, but were back at the manufacturer and you were going to test to determine whether the wall thickness of a particular valve did or did not meet the criteria, would you use this method of selecting individual points, or would you use 100 percent volumetric examination with ultrasonic testing? Or, would you use some other method altogether other than ultrasonic?

MR. TROSTEN: I object to the question, Mr. Chairman.

CHAIRMAN JENSCH: On what grounds?

MR. TROSTEN: It is speculative, it is hypothetical, no showing of pertinence to the particular inquiry at hand.

CHAIRMAN JENSCH: I take it he has selected one method and the interrogator is trying to test the validity of that method, what alternatives he had for selection.

MR. ROISMAN: That is correct.

I can ask Mr. Tillou and I am sure he will answer that it is possible to remove a valve from a plant. And therefore have it in the condition such as you would have it if it had never been installed.

And the question I want to findout is, what method would be used if that were the condition of the valves since that certainly was a possibility, although not the one chosen by Con Ed.

MR. TROSTEN: My understanding of the question was

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if you were looking at this back in the manufacturer's facility, unless I misunderstood what Mr. Roisman was saying. Therefore I objected to the question on the ground that it is a hypothetical question dealing with a situation that was not present, not confronted by the witness.

MR. ROISMAN: I will restate it to take care of that minor objection.

BY MR. ROISMAN:

Q If this valve had been removed from the plant and inspected in the field, what method of inspection would have been used if you were then trying to determine, or what method would you have recommended, if you wanted to determine whether the valve had a thin wall or not?

I want to know what you would have recommended?

A You have asked two questions.

Would you place them in sequence?

Q All right.

The first question, if this valve were removed from the plant and examined in the field, which would you recommend as the way to determine whether or not the valve had a thin wall? The method used here, that is, selected areas of the valve, or 100 percent volumetric testing?

A I think this would have to be the licensee's decision in every respect because there are many, many bases for using the volumetric as opposed to the direct measurement

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method, not the least of which is position and condition of the valve on site.

Q Well now I am assuming the valve is not physically connected in any way to the plant.

Would position still be a problem?

A. It could very easily be done by either.

I don't like to make that decision. I know what I would recommend.

Q Well, what would you recommend?

MR. TROSTEN: Mr. Chairman, I object to the question because I don't see why that is a relevant question as to what method Mr. Tillou would recommend.

CHAIRMAN JENSCH: Objection overruled.

THE WITNESS: I would recommend a direct measurement using micrometers.

BY MR. ROISMAN:

Q And would that involve measurement of all areas of the valve with the micrometer measurements?

A. Only spot measurements. Exactly the same as ultrasonic is done.

Q. Is the micrometer in your opinion, a more accurate measurement of whatever area it chooses to measure than is the ultrasonic, and that is the reason you would recommend it?

A. It can be. However the ultrasonic within the plus

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1 or minus two percent accuracy, is a thoroughly reliable
2 technique.
3 Q Within plus or minus two percent?
4 A Yes.
5 Q Let me direct your attention, if I may, back to
6 what has been marked as Exhibit A-2. That is the compliance
7 division report.
8 On page 1 of the Summary of Findings which are
9 attached to the letter, paragraph A-2 makes reference to,
10 and I will quote from the last sentence of that paragraph:
11 "One valve is the subject of continued
12 investigation by the licensee and has not yet
13 been finally dispositioned."
14 Can you tell me, is that statement still correct
15 to the best of your knowledge?
16 A It is not.
17 Q Would you please tell me what has occurred with
18 regard to that one valve?
19 A. I am not first-hand familiar with this. HOwever
20 I have been told that an investigation has been completed
21 and evaluation has been made that this valve is indeed an
22 acceptable valve based on the information in the hands of
23 the licensee's technical people to date.
24 Q Now does that represent -- you say you have been
25 told. Have you been told that by a compliance division person

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who has reviewed what the Applicant has done and in effect completed an additional compliance division report?

A. No.

Q. You have been told this by the Applicant?

A. Yes.

Q. -- I mean the Applicant's representative.

Has compliance had a chance to verify that or is there something more that compliance will be doing to verify that?

A. That will be verified.

Q. Do you know if the valve had a thin wall? That is a wall that fell below the minimum wall thickness required by the applicable code but was acceptable for other reasons along with the acceptions?

A. I do not know the details of that.

Q. Incidentally, in that regard reference is made with respect to that valve, to the problem of porosity and in examining the sheets for the individual valves that Consolidated Edison has done, some of them showed wall thicknesses below the minimum required but were ignored because they were the result of porosity.

Are you familiar with --

MR. KARMAN: Are you quoting from this report?

MR. ROISMAN: I am not quoting verbatim, no.

I am now asking Mr. Tillou if he is familiar with

mm8 1 the problem of porosity thinness areas on these valves?

2 MR. TROSTEN: Where is the section in the report

3 that dealt with porosity, Mr. Roisman? Could you help me

4 with that please?

5 MR. ROISMAN: It is not in the reports that you

6 gave me. But it is in the series of sheets that look like

7 this -- (Indicating.) -- which is Exhibit A-1, which

end 26 8 recorded the results of each individual valve analysis.

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27 wbl 1 BY MR. ROISMAN:

2 Q If you want, I can give you some help on this.

3 Well, let's start at the beginning.

4 Did youlook at the individual sheets, the reports

5 of the investigation as recorded by the person who was there

6 at the time the investigation took place?

7 A You mean ultrasonic?

8 Q Yes.

9 A Yes, I did.

10 Q Are you familiar with the phrase that was used

11 on several of those reports, "low valve due to porosity

12 type inclusion in casting?"

13 A Yes, I am.

14 Q Do you remember whether there were any valves

15 that had porosity type inclusions in casting?

16 A Yes.

17 Q Now can you tell me what is the difference between

18 a porosity type inclusion in the casting and an unacceptable

19 thin wall?

20 A I don't think I could do that in less than about

21 an hour of cross-sectional discussion.

22 Q Well let me explain my problem.

23 In looking at the sheet, for instance, for

24 Valve 200-A, the sheet demonstrated that the minimum wall

25 thickness was .437. There were several areas to which this

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nomenclature, "low valve due to porosity type inclusion,"--

MR. KARMAN: Pardon me; I wonder if we could have something so that Mr. Tillou could--

MR. ROISMAN: It does not appear on that summary.

MR. KARMAN: I think it may be difficult for him to catch the numbers without having something to refresh his recollection.

MR. ROISMAN: The numbers are not pertinent. It's simply that, as I understand what happened -- and maybe Mr. Tillou can correct me if I'm wrong -- at the various points in the valve readings came out on ultrasonic examination that were less than the .437, as to which each of those readings said "low valve due to porosity type inclusion in casting."

THE WITNESS: That's correct.

BY MR. ROISMAN:

Q I'm trying to understand why that isn't a thin wall. Maybe it's because I don't understand what porosity type inclusions in casting means.

Is that a fancy word for a hole?

A Yes, it is a void. A porosity area is a void area, where a bubble existed within the state of the casting during its moving from the liquidous to the solidous state.

Q And that is within the walls, as opposed to being something on the surface where you could put your finger into

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a little hole; is that correct?

A That is right.

Q And a certain number of those type holes, if you will, are allowable within the codes?

A Yes, they are.

Q Now this one valve that had delayed the final completion of Consolidated Edison's work, as I understood the problem -- is this correct? -- that it had a large amount, although an acceptable amount, of that porosity?

A It had an acceptable amount of porosity.

Q Right. But that there was enough of it that it was hard to find places where you could get an ultrasonic measurement of the real thickness of the valve, and that was the problem; is that correct?

A That is my understanding.

Q Would it be your understanding, then, that in checking a valve everyplace that was found where there was a reading that said "low valve due to porosity type inclusion in casting," would, in effect, be a reading that did not tell you whether the valve had a thin wall or not, because it was not a meaningful reading for that purpose?

MR. KARMAN: Possibly you could rephrase that. Unless Mr. Tillou understood it. I know I didn't

THE WITNESS: I didn't.

wb4 1 BY MR. ROISMAN:

2 Q Each of these valves was tested at selected

3 spots; correct?

4 A (Nodding affirmatively)

5 CHAIRMAN JENSCH: You will have to answer vocally.

6 THE WITNESS: Yes.

7 BY MR. ROISMAN:

8 Q Some of the valves, at the spots at which they

9 were tested, showed a reading below the limit of acceptable

10 wall thickness for that spot; correct?

11 A Right.

12 Q The cause of that was -- at least in many

13 instances -- porosity type inclusions in casting; correct?

14 A Yes.

15 Q If that reading, the one that is identified as

16 porosity type inclusion in casting as being the cause for

17 it, is thrown out, ignored, would there have to be another

18 reading near the same spot in order to determine whether

19 the valve was thinned at that spot?

20 A Yes.

21 Q So that as to all those valves -- let's just

22 hypothetically take a valve there: seven readings showed

23 readings below the minimum wall thicknesses required, but

24 due to porosity type inclusions. You would have to do

25 seven other ultrasonic tests in order to have an appropriate

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coverage for that valve. Is that correct?

A Not necessarily.

Q Okay. Would you explain that?

And would it help if you looked at what is marked as Exhibit A-1, and let's just pick out any seven of the 12 spots marked on the valve there, and assume that they were the ones that had the porosity type inclusion in casting.

Why would it not be necessary to find another spot very near in order to do the test?

A Your rephrased question, I would agree, is correct.

Q You would need to find another place somewhere near the first spot?

A Right.

Q Now as to these valves, am I correct that the methodology used by Consolidated Edison was to test 12 spots selected in a manner which was, in your opinion, designed to find any thin walled valves?

A Yes.

Q So as to those valves, if the reading showed low spots in seven, then there would in effect have to be 19 different ultrasonic test results, seven that we have to throw out and seven new ones to replace it, plus the five that were good from the beginning? Is that correct?

A If all of the ultrasonic measurements were recorded your question is correct.

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Q Do you know or do you have any reason to believe that all the ultrasonic measurements would not have been recorded?

A I have no reason to believe that.

CHAIRMAN JENSCH: No reason to believe what?

THE WITNESS: That all the ultrasonic indications were not recorded.

BY MR. ROISMAN:

Q And if one failed to do a second test where they had found porosity type inclusion in testing, then as to that particular examination would it be your opinion that one could not say with certainty that all possible thin walled areas had been examined and passed as okay?

A Let me think about that for just a minute. Because you are stretching the credulity of the ultrasonic process.

The ultrasonic process, first of all, is not a directional completely columnar type of energy excitation.

Q I'd like to think about that for a moment.

(Laughter)

All right. Could you put that in what I would call layman's English?

A Yes. The ultrasonic process does not provide a columnar type of measurement. It contains a certain amount of beam spread.

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Q Now when you get this beam spread, how many different readings do you get from the beam?

A Well, you get all your read-out back on the display screen.

Q I understand.

Assuming that you don't move the beam at all will you get just one reading from each shot down, or will you get an infinite number of readings?

A This is why I'm having a problem trying to answer you and keep it at an intelligent level here for both of us. Because a very slight movement of an ultrasonic transducer can eliminate one out of the porous areas and come up with a good reading. Or a very slight movement of a good reading can come up with a porous area.

Q I understand that.

A And you are dealing with a technique which compares a known against an unknown -- or, rather, an unknown against a known.

Q Right.

My only question was, assuming that every separate reading -- that is, every time the digits on the digital read-out changed, and it was recorded, would it be the case that you would have to have a reading that exceeded the minimum wall thickness requirements for each of the twelve areas identified roughly -- what's the word we used? -- repre-

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sentationally on Exhibit A-1 in order to guarantee that as to that valve it did not have a thin wall?

A Yes, that's right.

MR. TROSTEN: Mr. Chairman, at this point I think the record ought to be clarified, because I hear Mr. Roisman referring to these twelve areas. And, as I have indicated before, this is a representative drawing. We are not talking about every single valve, as I indicated before. And yet the thrust of the question seems to be directed to the idea of twelve areas and measuring each valve that way. And I thought it was clear before. And I don't want the record to become confused.

MR. ROISMAN: Mr. Chairman, I didn't think it was confusing. We were not focusing on how many areas, except to use some number. I could have said 'x', and talked about 'x' minus 1. I'm not attempting to say that as to every valve only twelve areas were required to be checked. And when we talk to the witnesses from ConEd we will talk about whether all areas for all valves that were required to be checked were checked. That's a different question.

CHAIRMAN JENSCH: It's illustrative entirely.

MR. ROISMAN: That's correct. And the number 12 I think made it simpler for Mr. Tillou and I to talk about a number.

CHAIRMAN JENSCH: While there is a pause, may I

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ask the witness again, to be sure:

Did you understand that all the ultrasonic readings were recorded?

THE WITNESS: I did indeed, yes.

CHAIRMAN JENSCH: It's your belief that they were recorded?

THE WITNESS: It is, to the best of my knowledge and belief.

CHAIRMAN JENSCH: Thank you.

Proceed, please.

BY MR. ROISMAN:

Q Would that be standard procedure, that you would record all of them?

A Yes, it would.

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MR. ROISMAN: I have no further questions of Mr. Tillou at this time.

CHAIRMAN JENSCH: Any examination by the Applicant?

MR. TROSTEN: Not at this time, Mr. Chairman.

CHAIRMAN JENSCH: Will you gentlemen indicate when you will have cross-examination, if any, of Mr. Tillou?

MR. TROSTEN: I would say possibly after the cross-examination of Applicant's witnesses it is possible that we may wish to have some additional examination of Mr. Tillou.

CHAIRMAN JENSCH: Is there any redirect?

MR. KARMAN: No, Mr. Chairman.

CHAIRMAN JENSCH: Very well.

Thank you, Mr. Tillou, you are temporarily excused.

(Witness temporarily excused.)

MR. TROSTEN: Mr. Chairman, I was under the impression that we were going to start with the Staff on fuel densification and then go to thinned wall valves. Mr. Roisman then said he would like to go to thinned wall valves first, and then go to fuel densification with the Staff.

I am not prepared at this moment in time, because of my previous understanding, to go on with our witness on thinned wall valves, so I suggest that if we stayed with the original schedule we would be all right.

CHAIRMAN JENSCH: It is somewhat beyond our usual

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recess time. We try to close somewhere around 4:30; last night I think we went to about 5:35. I think it would be better not to change subjects at such a late hour.

What would be the program for the morning?

MR. ROISMAN: I can do it either way. I will be glad to start with fuel densification or, if Mr. Trosten's witness will be ready then, to finish up with thin walled valves and let Mr. Tillou go home.

MR. TROSTEN: Wait one moment if you will, please.

(Pause.)

MR. KARMAN: I'm going to ask my fuel densification people to be excused. I don't think we are going to get into this tonight.

CHAIRMAN JENSCH: The Board prefers that we stay with the subject. If the Applicant is not ready now we would prefer to start in the morning with thin walled valves.

MR. KARMAN: I will have all of my witnesses here in the morning.

CHAIRMAN JENSCH: Applicant Counsel, the Board would prefer to stay with the subject now. If you are not ready it is agreeable to the Board to start in the morning with thin walled valves.

MR. TROSTEN: Very well, sir.

MR. ROISMAN: Mr. Chairman, I would be willing to start earlier if that would convenience the parties; 8:30

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eight o'clock.

CHAIRMAN JENSCH: I can't hear what you said.

(Laughter.)

MR. ROISMAN: I would be prepared to start earlier.

CHAIRMAN JENSCH: We will start at nine o'clock in the morning.

At this time we will recess to reconvene in this room tomorrow morning at nine o'clock.

(Whereupon, at 4:42 p.m., the hearing in the above-entitled matter was recessed to reconvene at 9:00 a.m. the following day.)

BEFORE THE UNITED STATES

ATOMIC ENERGY COMMISSION

In the Matter of	)	
	)	
Consolidated Edison Company	)	Docket No. 50-247
of New York, Inc.	)	
(Indian Point Station, Unit No. 2))		

TESTIMONY
OF
DR. JAMES T. MCFADDEN, DEAN
SCHOOL OF NATURAL RESOURCES
UNIVERSITY OF MICHIGAN
ON

EFFECTS ON HUDSON RIVER FISH POPULATIONS OF THE SIMULTANEOUS OPERATION OF INDIAN POINT UNITS #1 AND #2, PLUS THE BOWLINE AND ROSETON POWER PLANTS

March 30, 1973

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ON

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This testimony supplements that submitted by McFadden and Woodbury, February 5, 1973 on "Indian Point Studies to Determine the Environmental Effects of Once-Through vs. Closed-Cycle Cooling at Indian Point Unit #2." The purpose is to extend this previous testimony to the case of combined impact by Indian Point Units #1 and #2 plus the Power Plants at Bowline and Roseton on the fish populations of the Hudson River. This present testimony takes into consideration the following related documents: Testimony of John P. Lawler, March 30, 1973, on "Cumulative Effects of Bowline, Roseton and Indian Point Generating Stations on the Hudson River"; and the affidavit of John R. Clark, October 16, 1972, on "Calculation of Effects of Roseton and Bowline

Plants on Hudson River Aquatic Life"; and the testimony of C. P. Goodyear, February 8, 1973, enclosure #2 in the testimony of February 12, 1973 by AEC Regulatory Staff on "Consideration of Other Hudson River Power Plants."

The impact predicted for operation of Indian Point Units #1 and #2 is developed in the testimony of John P. Lawler. Although it is recognized that these are inadequate field data with which to quantify the extent of mortality to eggs, larvae and juvenile fishes due to entrainment and impingement at the Bowline and Roseton Plants, it is possible to make certain predictions based upon the existing limited data and modeling techniques. The predicted reduction of about 10% (Testimony of Lawler dated February 5, 1973 on "Sensitivity of the Model Presented in the Testimony of October 30, 1972," page 12) in numbers of striped bass surviving after 10 years of operation set forth in earlier testimony is increased to a predicted 13% reduction when the effects of Bowline and Roseton are included along with the impact of the Indian Point Power Plants (Testimony of John P. Lawler, March 30, 1973, Table II-4). Reductions in first year survival of these orders of magnitude do not constitute a threat to the

productive existence of the striped bass population of the Hudson River. Much higher predictions of reduction in the striped bass population are developed in the affidavit of John R. Clark arguing from an extremely simplistic model which has been shown in previous testimony to incorporate errors which exaggerate the impact of power plants on the Hudson River fish populations (e.g., testimony of McFadden, February 5, 1973, pages 21-27). The same errors afflict both Clark's estimates of impact of Indian Point Power Plants operating alone and his estimates of the combined operation of Indian Point, Bowline and Roseton.

The third set of estimates of power plant impact are those generated by the AEC Regulatory Staff. In Goodyear's testimony of February 8, 1973, Table 1, are presented estimates of the percentage reduction in the survival of striped bass during the first year of life for various power plants operating singly or in combination. The Staff estimates about a 30% reduction in young striped bass due to the operation of Indian Point Units #1 and #2 alone as measured from zero background mortality due to power plants. The Staff estimates that the Danskammer and Lovett Plants operating together will

cause about a 17% reduction in striped bass over zero background attributable to power plant operation. Note that reduction in striped bass due to operation of Danskammer and Lovett is included in Dr. Lawler's testimony as part of background. The Staff also calculates that the simultaneous operation of Danskammer, Lovett, Roseton, Bowline and Indian Point Units #1 and #2 will cause about a 55% reduction in young-of-the-year striped bass. The significant statistic from the Staff's Table 1 is the difference between percentage reduction due to operation of all five plants together (about 55% on the average) and the reduction in striped bass survival attributable to operation of Danskammer and Lovett only (about 17% on the average) because Danskammer and Lovett effects have been included in the base line from which previous arguments regarding the impact of Indian Point have been constructed by Applicant, intervenors and the Staff. On the basis of the Staff's calculations, simultaneous operation of Indian Point plus Bowline plus Roseton will result in about a 38% increment in the reduction of striped bass survival over a background level of reduction which includes the effects of Danskammer and Lovett.

In the Final Environmental Statement (September 1972, Vol. 1, page V-61) the Staff predicted a 30 to 50% reduction in the striped bass population due to the impact of Indian Point Power Plants on young-of-the-year fish. This range readily encompasses the more recent estimate of 38% reduction attributable to the operation of Indian Point plus Bowline plus Roseton. Therefore, the Staff appears not to have introduced any new considerations which alter their previous numerical estimates of reduction of the striped bass population.

Should the impact of simultaneous operation of the power plants at Indian Point, Bowline and Roseton upon Hudson River fish stocks, including striped bass, be substantially higher than the estimates of John Lawler (possibly approaching those developed by the Staff) the greater impacts upon these fish stocks would be readily detectable through the ecological studies now underway. The ecological studies described in detail in the February 5, 1973 testimony of McFadden and Woodbury are believed to be entirely adequate to monitor possible changes in these fish stocks due to the operation of Indian Point Units #1 and #2. Impingement and entrainment

studies paralleling those at Indian Point are being carried on independently at the Bowline and Roseton Power Plants. These studies will enable us to attribute to the respective plants that portion of mortality of young-of-the-year fishes caused by their operation, and hence, to separate from background the effects of Bowline and Roseton as well as those caused by the Indian Point Power Plant. Studies at these several plants are being coordinated by an inter-utility committee. Sampling gear and units of measurement are comparable in the several studies so that the data from each can be integrated in a single assessment of power plant impact upon fish populations. The combined studies now underway are, in my opinion, adequate to detect a substantial or irreversible adverse impact upon the fish populations of the Hudson River which may be caused by combined operation of these three power plants.

The remaining question is whether serious impacts upon the fish population of the Hudson River, if they occur and are detected, can be remedied in time to prevent either substantial or irreversible ecological damage. A significant array of natural and man-initiated conditions exist or can be imposed upon the ecosystem in such a way as to substantially

mitigate any serious impact due to power plant operation which may be detected through the ecological studies. Some of these mitigating conditions would have short-run effects of significance in an interim period during which long-run mitigating alternatives could be initiated. For example:

(1) The natural condition of exposure of fish to competing risks of death is an important source of mitigation (see testimony of J. T. McFadden, February 5, 1973, pages 21-27). It appears that the Regulatory Staff has recognized the fact that the several different power plants operating on the river impose competing risks of death upon the fishes of the Hudson for the effects of various combinations of power plants are not simple sums of the individual impacts (Table 1 Goodyear testimony, February 8, 1973). This appears to account for the fact that the Staff's estimates of impact due to simultaneous operation of Indian Point Units #1 and #2 plus Bowline and Roseton are not significantly higher than their estimates of the impact of Indian Point Power Plants alone, as given in the Final Environmental Statement. While it is not possible to judge with certainty from the abbreviated testimony submitted on February 12, 1973 by the Staff, it appears likely that they have not recognized that

power plants and natural causes of mortality also represent competing risks to the fish population. Clearly, the imposition of additional mortalities upon the fish stock by additional power plants results in an asymptotic approach to 100% mortality.

(2) A second natural mitigating process is that of compensatory survival in fish stocks. Arguments about compensatory processes have been extensively aired in preceding testimony and the most salient principle in relation to the impact of Indian Point Units #1 and #2 plus Bowline and Roseton is summarized in paragraph 4, page 19 of the February 5, 1973 testimony of J. T. McFadden: "First, an additional increment of removal imposed upon a fish stock drives the stock to a lower average parental density at which the population once again equilibrates. The increment of mortality imposed and sustained does not drive the population into a steady downward spiral leading to severe depletion or extinction. Secondly, in order to hold a stock at a reduced level of abundance, the rate of removal must be sustained from generation to generation. Increasingly higher percentage removals are required in order to drive the stock to successively lower levels of density." The last sentence quoted above is especially significant in relation to the simultaneous operation of

the three power plants mentioned above. It reflects an important mitigating condition in the fish stocks of the Hudson River.

(3) The striped bass is a fish adapted by evolution to the occurrence of wide variations in survival of age group zero fish from year to year. It is common for a single highly successful year class to dominate the population and the fisheries it supports over a period of several years. It is common also for natural survival to be reduced over numbers of successive years without permanently damaging the fish stock. This resilience in the face of the occurrence of a succession of weak year classes is attributable to multiple age structure of the spawning stock in striped bass. This characteristic of a population would tend to mitigate any serious impact on the population caused by operation of power plants during an interim period of several years while permanently effective mitigating measures were being implemented.

(4) Stocking of hatchery reared fish might supplement natural production. The successful introduction of striped bass on the Pacific Coast of North America demonstrates the possibility of reintroducing this species in the most extreme case conceivable of extinction of the Hudson River

stock. Reintroduction would undoubtedly occur naturally but could be substantially accelerated through the use of hatchery fish.

(5) A variety of modifications of plant operation are available and could be implemented as interim measures to reduce any serious impact which was detected through the ecological studies.

(6) Further developments in the design and operation of water intake screens could be employed.

(7) A number of possibilities for intensive fish species management exist such as changes in commercial or sports fishing rules.

(8) Structures could be installed as an alternative to once-through cooling, with specified lag time for construction, and constitute a permanent mitigation of potential damage which might be caused by entrainment and impingement.

In summary, it is argued that the ecological studies now underway on the Hudson River are adequate to detect any substantial or irreversible impact on fish populations caused by the operation of Indian Point Units #1 and #2 plus the power plants at Bowline and Roseton in sufficient time to avert such damage to the fish stocks. From the time of detection of a serious impact to the implementation of permanent

corrective measures, a significant array of natural and man-implemented interim mitigations exist.

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