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IN THE MATTER OF:

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

(Indian Point Station, Unit No. 2)

Docket No. 50-247

ORAL ARGUMENT

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Place - Bethesda, Maryland

Date - Wednesday, 9 January 1974 Pages 1 - 176

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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
	ORAL ARGUMENT
(Indian Point Station, Unit No. 2)	

Fifth Floor
East-West Towers,
4350 East-West Highway
Bethesda, Maryland

Wednesday, 9 January 1974

Oral Argument in the above-entitled matter was convened, pursuant to notice, at 9:15 a.m.

BEFORE:

WILLIAM C. PARLER, Presiding Chairman

DR. JOHN H. BUCK, Member

DR. LAWRENCE R. QUARLES, Member

APPEARANCES:

LEONARD M. TROSTEN, Esq., 1821 Jefferson Place, N. W., Washington, D. C. 20036; on behalf of the Applicant.

MYRON KARMAN, Esq., Office of General Counsel, United States Atomic Energy Commission, Bethesda, Maryland; on behalf of the AEC Regulatory Staff.

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JAMES P. CORCORAN, Office of Attorney General, Two World Trade Center, New York, New York 10047; on behalf of the State of New York.

ANGUS MACBETH, 15 West 44th Street, New York, New York 10036; on behalf of Intervenor, Hudson River Fishermen's Association.

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P R O C E E D I N G S

CHAIRMAN PARLER: The oral argument session will now commence.

The purpose of this session is to hear oral argument on various issues which concern the impact of operation of Indian Point Unit No. 2 on the environment. These issues have been raised by certain of the exceptions which have been filed to the September 25, 1973 initial decision of the Licensing Board.

That initial decision authorized issuance of a full-term, full power license for Indian Point Unit 2 subject to certain conditions.

One of those conditions is that operation of Unit No. 2 after May 1, 1978 be permitted only after a closed cycle cooling system has been installed and placed in operation.

For the benefit of the record, I will now ask counsel who will present argument this morning to give us their names.

MR. TROSTEN: Mr. Chairman, my name is Leonard M. Trosten. I will present argument on behalf of the Applicant.

CHAIRMAN PARLER: Thank you.

MR. MACBETH: Mr. Chairman, my name is Angus Macbeth. I will present argument on behalf of the Hudson

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River Fishermen's Association.

MR. KARMAN: My name is Myron Karman. I will be representing the Regulatory Staff.

CHAIRMAN PARLER: Thank you, Mr. Karman.

Is counsel for the Attorney General of the State of New York here?

I note that the weather conditions outside are not good. We have experienced this morning snow, sleet, and freezing rain, and in view of that, in view of those conditions, we will recess for an appropriate period of time to await the arrival of Mr. Corcoran or inquire as to his whereabouts.

We will recess at this time.

(Recess.)

CHAIRMAN PARLER: The oral argument session is reconvened.

About a minute or so ago we recessed to await the arrival of counsel for the Attorney General's Office of the State of New York. Up to that point, prior to the recess, I stated the purpose of this session and also received the names of counsel for the Applicant, the Hudson River Fishermen's Association, and the Regulatory Staff, who would present argument this morning.

Is Mr. Corcoran here?

MR. CORCORAN: Yes, sir.

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CHAIRMAN PARLER: You will present argument for the Attorney General's Office of the State of New York?

MR. CORCORAN: Yes.

CHAIRMAN PARLER: The time alloted for the respective parties is set forth in our December 21, 1973 order. That order also identified the areas of inquiry and their related portions of the evidentiary record which we want the oral argument to focus on.

In presenting their argument, counsel can proceed on the assumption that we are familiar with the assertions made by the respective parties in their briefs that have been filed with us. We plan to take a luncheon recess around 12:30 and reconvene at 2:00 p.m. this afternoon to complete the argument.

We will hear first from the Applicant.

Would you please proceed, Mr. Trosten?

ORAL ARGUMENT OF LEONARD M. TROSTEN, ON BEHALF OF THE APPLICANT.

MR. TROSTEN: Mr. Chairman, Dr. Buck, Dr. Quarles, the issues facing you today are critically important for a number of reasons.

It has been concluded by the Licensing Board that an irreversible commitment to a closed cycle cooling system must be made, and this decision is going to cost the people in Con Edison's service area about $20 million a year

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for almost the next 30 years, and it is going to result in a significant derating of the Indian Point 2 facility, thereby increasing the demand for oil and other scarce energy resources.

Furthermore, it is going to pose an unquestionably major esthetic burden on people who live in and enjoy the Hudson River Valley around the area. It may subject these people to an environmental burden of an as yet undetermined magnitude.

There have been thousands of pages of testimony and exhibits that have been produced in this hearing, and yet in the last analysis the issues that you have to decide are relatively straightforward.

As a matter of logic, you should not adopt the Licensing Board's decision unless you are convinced that it is likely that there will be an irreversible impact on the Midatlantic striped bass fishery during the period from May 1, 1978 to September 1, 1981 as a result of the operation of a once-through cooling system as Indian Point, and that a research program to evaluate the actual, as opposed to the speculative, environmental significance of operating the once-through cooling system can produce the necessary information quickly enough to avert such possible damage.

If, as we argue, the evidence does not support

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both of these conclusions, then it follows that you should modify the Licensing Board's initial decision to allow time for completion and evaluation of Con Edison's research study on the impacts of both once-through and closed cycle cooling, and the best means of mitigating that impact.

DR. QUARLES: Mr. Trosten, you mentioned 1981, and are you committing the Applicant to that date under any circumstances?

MR. TROSTEN: We have suggested that a condition be put in that once-through cooling cannot continue beyond September 1, 1981, unless the results of our research program demonstrate and Con Edison is able to demonstrate that there is a better means than closed cycle cooling to have in operation by September 1, 1981.

DR. QUARLES: That last is what I was getting at. Thank you.

MR. TROSTEN: Yes, sir.

Now, Con Edison, with the advice of its expert consultants, has analyzed the probable impact of the Indian Point operation on the river over the next decade and has concluded that it will neither be irreversibly or substantially adverse.

In addition to the opinion of the experts, there has been introduced in evidence in this hearing a computer simulation model which is designed to predict the impact

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on the striped bass population of once-through cooling. This model that has been introduced on behalf of the Applicant conservatively predicts a 2 to 4 percent reduction in the annual recruitment of the striped bass and a result of the Indian Point Plants, 1 and 2, in contrast to the 30 to 50 percent reduction that has been predicted by the Staff.

This prediction assumes some degree of compensation, which is a biological phenomenon shown by the expert testimony to be present in all animal populations.

It also makes more realistic predictions concerning the actual behavior of larvae in the river and the extent of mortality of the entrained organisms than set forth in the testimony of the Staff and the Intervenors.

Where did the Licensing Board commit its fundamental error, as we assert? That is what we are seeking to explore today.

On the first of the two basic issues I mentioned, the Licensing Board found the postulated damage would not be irreversible during the period prior to September 1, 1981, and we contend that this flaws the Board's entire ruling.

Stated very simply, we contend that the Board did not carry out an adequate balancing of cost and benefits as required by NEPA, and it is up to the Appeal Board to do this job correctly.

The Licensing Board's errors resulted in part

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from a misinterpretation of the law which led it to believe that protection of a fishery from possibly substantial damage was the Commission's primary responsibility under NEPA, and that the burden rested upon the Applicant to prove conclusively that such possible substantial damage could not occur.

As a result, the Board failed to give adequate weight to the evidence presented to it concerning the anticipated environmental impact of once-through cooling, as well as the possible effects of closed cycle cooling, and the best means of proceeding with the operation of the plant in the light of the admittedly existing uncertainties.

The Licensing Board performed a cost-benefit balance, all right, but what they did was to place their thumb on the scale, and it is up to the Appeal Board to rectify this error.

In your order of December 21, you carefully identified the crucial point which should be identified, and I will go into these in order.

The first and more important issue concerns the nature and extent of the impact upon the mid-Atlantic fisheries, particularly the imposition of a proposed closed cycle cooling system.

In responding to the question, one must remember that the impact of the plant operation on the Hudson River

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itself is acknowledged to be insignificant. It is the impact on the mid-Atlantic fishery that is crucial here.

The possible adverse impact upon the mid-Atlantic fishery of once-through cooling operations for the period through September 1, 1981 alone could not possibly justify on the basis of a cost-benefit analysis and the record of this hearing the imposition of closed cycle cooling prior to that date, unless it were also concluded that the fishery would probably be irreversibly harmed by once-through operation during that period of time.

Surely this statement has to be correct when the balance is drawn on a monetary basis as the Board correctly recognized on page 106 of its decision.

The importance of this conclusion is underscored by the Board's recognition that the actual impact on the striped bass fishery may be much less than the $3 million to $6 million that the Board postulated, and in light of Applicant's testimony that indeed it very probably is much less.

It is also true that by no stretch of the imagination can the postulated impact of this plant on any unquantified esthetic and spiritual values, in quotes, which may be assigned to the fishery over the next five to eight years offset the other disparity in these monetary values.

In this respect, both the Intervenors and the

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Applicant set up a straw man and then proceeded to knock it down. Their arguments that the Applicant wants this Board to ignore unquantified values are specious. We want the Appeal Board to give such values their appropriate weight.

So it is the essence of the position of both the Applicant and the Regulatory Staff that it is the likelihood of the irreversible damages that have to be averted here. NEPA requires a rational attempt be made where possible to ascertain and weigh the costs and benefits of proposed actions, and unless it is likely that irreversible damage will occur to the mid-Atlantic striped bass fishery during operation of Indian Point 2 prior to September 1, 1981, an adequate opportunity should be afforded to evaluate the benefits and costs of proposed alternative measures for reducing the observed environmental effects of operation.

This is precisely the course of action that we have recommended.

In sum, we say it would be utterly inconsistent with NEPA and the Calvert Cliffs decision to require an irreversible and irretrievable commitment of resources in the absence of a demonstrated need to avoid an irreversible impact on the mid-Atlantic striped bass population, and indeed such a result would constitute just such an arbitrary and capricious act as the courts have refused to uphold.

Even if the Board's inflated estimates, we submit, of reductions in the mid-Atlantic striped bass population were correct, and we assert they are not correct, the actions of the Board could not be justified on a reasonable cost-benefit basis, unless it were also probable that the results of these percentage reductions would be an irreversible adverse impact on the mid-Atlantic population.

You have asked for clarification of the term "irreversible." We believe that the definition given by the Staff in the Final Environmental Statement is the correct one, and I quote from the Final Environmental Statement, page 9-1.

"Irreversible commitments generally concern changes in environmental resources that could not be restored at some later time."

This definition expands somewhat on the dictionary definition of "irreversible."

"That which is incapable of being changed or reversed." And both the Staff's definition and the dictionary definition convey the notion that irreversible damage is permanent and that if it were possible to restore a situation at a later time, an act could not be considered irreversible.

There should not be disagreement on the basis of the record in this proceeding that the operation of Indian Point 1 and 2 Plants through September 1, 1981 will

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not create irreversible effects.

Con Edison's witnesses express their opinion based upon their years of professional experience, and first-hand familiarity with Indian Point Plants, and the Hudson River, that operation through this period will not create irreversible effects.

The record contains ample evidence which supports the opinion of the Applicant's experts.

For instance, there are numerous instances in which fish populations sustain annual removals of 25 to 30 percent and in some cases rising as high as 75 percent of many years without harm to the population.

DR. QUARLES: Could you give us a reference to some of that?

MR. TROSTEN: Yes, sir. That particular reference appears in the testimony of Dr. McFadden of October 30, on page 14, and in other portions of the testimony.

I can give you the specific references to the series of these, or I can supply these for the record, if you would prefer, Mr. Chairman, whichever you would rather have me do. As I go along, or after the argument, whichever you would prefer.

CHAIRMAN PARLER: If you supply them for the record, which you may do so promptly, within five days, and send a copy of whatever you supply to the other parties, and the

other parties should be given and will be given time to comment on those references, an additional five days after they receive your citation.

MR. TROSTEN: This would be acceptable to me, Mr. Chairman. I was thinking merely in terms of time. I would be delighted to do it either way that the Board would prefer.

CHAIRMAN PARLER: I think it will be fine for the record under the guidelines I have just stated.

MR. TROSTEN: Thank you.

Striped bass populations fluctuate in abundance because of natural causes in a six-fold range, and there are larger variations in year class strength. This indicates that there is a substantial capability of a population to absorb changes which exceed even the exaggerated predictions of the Staff and the Intervenors.

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CHAIRMAN PARLER: I would like to ask you a question, Mr. Trosten. These natural fluctuations, do they apply to the age group zero striped bass, or subsequent to age group?

MR. TROSTEN: Mr. Chairman, the particular changes that I was referring to apply to total population fluctuations. There are -- I would have to go back to check the record to see the particular extent of the fluctuations of the less than 1 year old striped bass.

It is certainly known, as I tried to indicate a moment ago, that the variations in year class strength are much larger than a six-fold variation. That part is known. It is generally considered that the striped bass is -- that the size of the striped bass year class is set, I would say, approximately at the end of the first year.

I think that is a correct statement. I will make that subject to checking. So I would say that in general the answer to your question is that there are very large fluctuations in year class size and that this would imply, this would infer, that there are very large fluctuations in the size of the less than one year old, the zero-plus year class.

CHAIRMAN PARLER: I asked the question, and I had in mind page 4-24 of the environmental technical specifications requirements which are a part of this license, and there is a statement there that, "the calculations of the fractional year class affected by entrainment are not sensitive to yearly

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fluctuations in year strength,"and so forth.

Why don't you proceed?

MR. TROSTEN: Yes. Let me perhaps in the break, Mr. Chairman, examine that particular quotation that you read. The striped bass in New York waters have persisted or even increased in numbers during periods of increasing exploitation by man, and recent catches have been 9 times greater than those in the early 1930's.

Furthermore, it is common for natural survival of striped bass to be reduced over a number of successive years without damaging the fish stock. A single year class may dominate the population for several years. The fact that striped bass spawn over a period of up to ten years also provides a buffer against the impact on the total population of even a succession of weak year classes.

In addition to these facts that have been introduced into evidence and are part of the record here, there are the results of the applicant's model studies which have also been introduced in evidence, which show relative modest reductions in striped bass populations.

I want to emphasize at this point that the applicant's position that the impact of the plant is not going to have an irreversible effect is not dependent upon the results of the applicant's model studies. The applicant model studies support and confirm the opinions that have been expressed, but they are

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not the sole basis by any means. They are a supporting basis for the opinions that have been expressed.

The staff agreed with the applicant that operation of the plant through May 1, 1978, will not create irreversible effects. More importantly, the board itself found that operation through September 1st, 1981, would not create such effects, and thus, and I can trace this for you in the following manner. In referring to the period prior to May 1, 1978, the Board said "It is the further opinion of the Board that the increment of damage to the fishery that would be avoided by restricting operations during the winter and early summer over this period is reversible, and that the fishery will rapidly recover from such increment of damage if appropriate measures are then taken."

Then in discussing the Applicant's request for additional time to complete its research program, that is, to delay the start of construction of closed cycle cooling, the Board concluded on page 100, "the Board agrees with the Applicant that there is unlikely to be a serious permanent effect on the fishery by delay of a year or two in starting construction of a closed cycle cooling system."

I also refer the Appeal Board specifically to the licensing board response to the Applicant's finding, D-35, H-10, and O-28 and 29. Thus the Applicant and the Board agree that no irreversible effects will occur prior to September 1, 1981.

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CHAIRMAN PARLER: Excuse me. What was the reference that you gave to the initial decision to reinforce your statement that the Board found there would be no irreversible effect upon the fisheries by -- if open cycle cooling were allowed to continue until September 1, 1978?

MR. TROSTEN: I gave a series of four or five references. The quotation from page 92 that I read, the quotation from page 100 that I read, and also the licensing board's response to our finding D-35, H-10 and O-28 and 29. The reason why those particular responses were cited, Mr. Chairman, when you take the initial decision and look at it, you will see that it is clear that where the Applicant suggested that the impact would neither be substantial nor irreversible, the Board proceeded to reject our finding in part and to conclude that it would be substantial, never rejecting the part of our finding, and indeed I argue impliedly accepting the finding that it would not be irreversible.

In other words, they have taken the position that it would not be irreversible, but it would be substantial, and this is the basis for their decision.

CHAIRMAN PARLER: Your position is that if it would not be irreversible, but would be substantial, substantial to the point that there would be an obvious impact on the Hudson River Fisheries under the National Environmental Policy Act, that that is all right?

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MR. TROSTEN: Under the conditions of this case, Mr. Chairman, I would say, as the Appeals Board pointed out, in the Maine Yankee case, it is not necessary that a minimal environmental standard be met by the licensing or the operation of a reactor. You can license a reactor even if there is some damage to the environment. I am saying that under the conditions of this case, given the evidence that has been introduced, given what we have termed an irreversible and irretrievable commitment of resources to cooling towers, it would be appropriate even if there were some damage, even if there were damage on the order postulated by the Board, which we say is not a correct estimate, it would still be proper to give more time to allow an estimate to be made as to whether this was a real amount of damage.

CHAIRMAN PARLER: What is the Applicant's position as to the real amount of damage that would require mitigating action?

MR. TROSTEN: Well, Mr. Chairman, we have taken a position on that, and in response to the licensing board request we have taken the position that if we see a 40 percent impact on the less than 1 year old striped bass in the Hudson River or a 32 percent impact on the mid-Atlantic region at the conclusion of our research program that we would propose a mitigating measure which would be closed cycle cooling towers unless the results of our research program and our study of

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alternate mitigating measures indicated there were another better means of it mitigating such damage.

Now we have not taken this -- that position, Mr. Chairman. I would like to emphasize, on the basis that we feel that such impact would be irreversible. We have taken that position on the basis that this was the order of magnitude of harm that was postulated by the staff and all the evidence we have seen thus far indicates that we are not going to see this order of magnitude.

Furthermore, it is clear to us that we are able to measure impacts of that magnitude readily, and so we have taken the position that if we see impacts of that sort, we will take the mitigating measures that I have indicated. Am I being responsive?

CHAIRMAN PARLER: Well, yes. What do these percentages actually mean? What does the 40 percent mean? Forty percent of a year class, or 40 percent of the entire population of the fish in the Hudson River, or what?

MR. TROSTEN: The percentages that we are referring to are percentages of a year class. That is the percentage that we are looking to, that our program is designed to protect. Our program is designed to detect a percentage impact on a particular year class. It is then possible by the use of one of the mathematical models, of the Applicant's mathematical models, and only the Applicant's, to translate such an impact

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conservatively into the total population, into the long-term impacts on the population, because the Applicant has developed a 13-year life cycle model of the striped bass. It is not actually possible to do this with the other models, because they only deal with the annual recruitment on the striped bass but that is the answer to your question.

CHAIRMAN PARLER: Won't you continue?

DR. QUARLES: May I ask a further question on that? Will your research program distinguish between the 40 percent effect due to the plant and the 40 percent natural fluctuation that you just mentioned as being possible?

MR. TROSTEN: Yes, it will be, and this is the essential part of our position. We have taken the position in the face of the criticisms of the program that have been voiced that our program is capable of distinguishing a 25 percent impact of the plant on the less than 1 year old striped bass in a particular year at the 95 percent confidence level, and that we can distinguish these through mechanisms that are used, that are commonly used, for example, in distinguishing the effect of the percentage mortality due to automobile accidents and on a known human population relative to the percentage of mortality on that population due to heart disease, cancer, tuberculosis, and so forth, but we can use those techniques and the careful measurement of the biological and physical parameters present in the Hudson River to distinguish the

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plant impact from the natural variations.

DR. QUARLES: Thank you.

MR. TROSTEN: We turn to what the position has been of the other parties on the question of whether an additional 3 and 1/3 years of operation from May 1, 1978 until September 1, 1981 would probably have an irreversible effect. We note that the Regulatory Staff's position was quite tentative. They theorize that the effect of once through cooling for the additional 3 and 1/3 years might possibly cause irreversible effects, and I refer you to transcript page 9408.

However, they cited no cogent reason for their choice of one date over another. Moreover, the record contains ample evidence which demonstrates that the Staff's hypothesis is unfounded, including the testimony of the Staff's principal witness, Dr. Goodyear, that the Hudson River fishery improved markedly in a few years after the size limit was increased in 1938 which allowed more and younger fish to spawn, and I refer you to transcript page 6677.

There is also similar evidence of marked increases after changes in fishing regulations in the Chesapeake Bay, and I refer you to Dr. Lawler's testimony of February 5, 1973 on the contribution of the Hudson River to the Mid-Atlantic at page 9. Now the Hudson River Fishermen's Association has tried a different tack. First they advance what I submit to you is an absurd definition of irreversibility, namely that an effect

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which occurs during a particular period is "irreversible and permanent during that period."

I refer you to the Hudson River Fishermen's Association brief, page 32. In addition to disregarding the English language, that concept utterly distorts the underlying NEPA, Section 102(2)C(5). Obviously what Congress had in mind when requiring federal agencies to describe and consider any irreversible commitment of resources should it be imposed in the action if implemented, refers to the harm which if once taken cannot be repaired.

The AEC is directed by the statute to consider the consequences of steps out a ten-story window before stepping out of the window.

The Hudson River Fishermen's Association argument that agencies must consider other than irreversible effects is beside the point, because nobody quarrels with that. It is the weight to be given the cost-benefit analysis in this case that is at issue here. FRHA also considers the time necessary to reverse the effect, and I don't argue with that, but their suggestion that we have not considered the time frame in which substantial damage to the fishery would be repaired is contrary to the record, and I refer the Appeals Board to pages 36 and 38 of the July transcript.

Instead the evidentiary record demonstrates that if such a severe adverse impact should occur, it would be reversible

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by natural means within a period of a few years. This is because of the reasons I cited a few moments ago which show the natural resilience of the striped bass stock in the face of population fluctuations, and this would be the case even without considering the effects of such measures as have been proposed in this case as stocking or changing the fishing regulations which could be used to supplement natural reproduction and which the evidence shows has had a marked and very rapid effect on changing the natural reproduction.

In summary then the Appeals Board should rule that to justify the imposition of an irreversible commitment to a closed cycle cooling system prior to September 1, 1971, it is necessary to find that your reversible damage would be done prior to that date, and the evidence does not support such a conclusion.

I would like to address briefly a point I believe the Board had in mind in formulating its point of inquiry and which the Chairman raised a moment ago, namely the various mitigating methods alternative to once through cooling and the adverse effects which might be of such significance that these mitigating measures should be employed.

I want to lay at rest a point which runs through the brief of the intervenors, namely that Con Edison opposes cooling towers and is offering the research program as an alternative. This is not the case. It has been the company's

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position that the present information is not adequate to describe whether closed cycle cooling is necessary, but if the information developed during the Hudson River research study shows that modification of the once-through system were necessary, Con Edison itself would propose it.

It is extremely significant that there are a number of mitigating measures under study which could be used to reduce the environmental impact of once-through cooling, and these are, for example, reduced flow during periods of entrainment and impingement. The use of air curtains and various alterations of the operation of the once-through cooling system, mitigating measures which apply to both entrainment and impingement losses could be implemented if substantial adverse effects were observed anytime before September 1, 1981.

So there is no need to wait until the end of this period to decide whether these measures are needed or to use them.

CHAIRMAN PARLER: What would be the criteria for these substantial adverse effects? The environmental technical specifications have some details in them, as I understand them. What has to be done in the case of impingement losses, that is, but what are the criteria for mitigating actions in the event of entrainment losses?

MR. TROSTEN: I would submit that there are several criteria that we have put forward, and these are contained in

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the testimony of Dr. McFadden and Mr. Woodbury on the research program. We have suggested that we could employ mitigating measures if we were to see a large decrease in the -- in a particular year stage of fish which we could not account for by natural means, or if we were to see, for example, a change in the growth rate in the fish, or an apparent change in the sex ratio of the fish which would indicate to us that there was possibly a significant impact occurring on the fish population.

Are the types of criteria that we would use to determine whether we should implement one of these mitigating measures -- now, of course, and this, I think, is a terribly important thing to bear in mind, the judgment that Con Edison would apply as to what the cost-benefit balance was in a particular case, whether we should reduce flow, whether we should use less pumps, whether we should use any of the mitigating measures available is not a judgment that it would exercise in a vacuum by any means.

All of the data would be available to the Atomic Energy Commission Regulatory Staff, to the intervenors, to the State of New York. They have the authority to require us to take action, and they have required us to take specific action that they developed in the case of impingement losses. If one of these agencies felt that there was some action that was so significant in their judgment, whether Con Edison agreed with that judgment or not, that it was necessary to take a mitigating

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measure, they could order us to take a mitigating measure.

CHAIRMAN PARLER: What agencies other than the AEC specifically conduct surveillance over your research?

MR. TROSTEN: The Department of Environmental Research of the State of New York. The extent to which the EPA or other New York State Agencies monitor this I can't say at the moment, sir. I know the Department of Environmental Conservation definitely does this, so there are those two.

CHAIRMAN PARLER: Are these research data provided informally or otherwise as a matter of course?

MR. TROSTEN: Yes, sir, both formally and informally as a matter of course to the other agencies.

CHAIRMAN PARLER: What arrangements do you have, if any, for providing this information to the Hudson River Fishermen's Association?

MR. TROSTEN: We have made a commitment to the Hudson River Fishermen's Association that all research reports when they are completed will be submitted to the Hudson River Fishermen's Association. This was an understanding we reached with them at the time the technical specifications were being developed.

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DR. BUCK: Mr. Trosten, has the Staff or the Hudson River Fishermen's Association, or both, had any input into the formulation of the research or the monitoring program?

MR. TROSTEN: Yes, sir, they very definitely have. We propose to the Staff a research program which is essentially the research program that was set forth in the testimony in this hearing. The Staff examined that research program, the Oak Ridge National Laboratory examined it in conjunction with the Staff and the Staff made a number of modifications in the research program.

In some respects, they modified it to be more extensive than the research program that we can actually propose, and we accepted those modifications. The Staff in some cases actually imposed criteria. The particular criteria on impingement losses was required by the Staff.

We never had proposed that specific requirement, but they imposed it, and they required that it be included in the technical specifications. They could have required a similar technical specification concerning other aspects of mitigating measures and harm, had they chosen to do so.

DR. BUCK: They have been brought up to date on the program as it developed, is that right?

MR. TROSTEN: Yes, sir, and they will be kept up to date on the program as it develops.

DR. BUCK: The reason I ask that question, Mr. Trosten,

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is that in the last day's record, I believe it was, of the regular hearing, if I can find this, following transcript page 11220, there are some papers by, first of all, Mr. Lawler, and then there are two papers by Dr. Goodyear.

The second paper, dated April 24, 1973, is entitled "Staff Comments on Applicant's Research Program," and on the next page following the title page, it is entitled "Research Program."

Dr. Goodyear states, and this is the second sentence, I believe, "it is the Staff's belief that the research program underway will be quite capable of producing beautifully quantitative information related to the description of the changes which may or may not be occurring in the population of fishes in the river."

Do you know on what basis he makes the criticism that your research program may or may not be measuring the population changes?

MR. TROSTEN: Dr. Buck, I cannot say that I understand the reasons why Dr. Goodyear has expressed this opinion. On several occasions during the course of the hearing, Dr. McFadden introduced testimony in response, and I will supply for the record the particular response to that assertion that was made, I believe on April 24, by Dr. Goodyear, and this matter is also dealt with in our findings and conclusions. We are aware that Dr. Goodyear is of the opinion that we cannot -- that our research

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program will not be able to distinguish between plant-induced effects and those effects which result from natural year to year fluctuations in the populations.

We have never been able to learn to my satisfaction the reasons why he feels that we cannot do this, although we know that he definitely feels we cannot do this.

It is particularly confusing to us as to why he feels we cannot do this when the Staff has specifically agreed that we will be able to detect a 25 percent change in the less than one year old striped bass at the 95 percent confidence level.

They have accepted that particular finding. Why Dr. Goodyear or the Staff feels that somehow we are not going to be able to distinguish this, I am frankly not able to say, but I know that he has maintained that opinion, he has expressed it and the Staff has expressed it in their findings.

DR. BUCK: You know of no evidence on record, then, that would back up that statement?

MR. TROSTEN: I know of no evidence other than the opinion of Dr. Goodyear.

DR. BUCK: I know the opinion is there. I found that, but what I am interested in is whether you know of any evidence.

MR. TROSTEN: Dr. Buck, I cannot point you to any evidence that would support the opinion of Dr. Goodyear other than the fact that that is his opinion.

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DR. BUCK: All right. Thank you.

CHAIRMAN PARLER: In addition to the Staff accepting your finding, it is my understanding that the licensing board in its initial decision at Page 109 also found that should adverse environmental effects be observed during the period of time, up until May 1, 1978, appropriate steps could and would be taken to limit such effects.

MR. TROSTEN: That is exactly the case, Mr. Chairman. The licensing board specifically agreed with us, and the Staff specifically agreed with us that if adverse effects were seen before May 1, 1978, that steps could and would be taken, and that licensing board mention, or stated as I mentioned earlier, that if adverse effects occurred, they would be reversible.

So these are two very, very important facts about the licensing board's opinion.

Now, just to conclude on this point, I would like to reiterate that there is certainly no need to wait until the end of this period to apply measures. Everyone agrees that at least one of the methods that has been discussed, reduced flow, would be effective, particularly if one makes the same assumptions of 100 percent mortality of entrained organisms that are used by the Staff and the Board in its initial decision.

In other words, if they are all going to be killed, when you run them through -- it doesn't make any difference if you decrease flow, which increases time and temperature and the

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delta T across the condensors.

We don't find ourselves in a situation where, if the dire predictions of the Staff and the intervenors actually turn out to be correct, if we really are talking about a situation of 30 to 50 percent, which we say is not the case, that we would find ourselves in an out of control situation with nothing to do until the cooling towers are built.

This is not so. We have a range of mitigating measures that could be employed during this period of time.

Now, you have asked for argument on the adequacy of the applicant research program to detect biologically important changes in sufficient time to protect, or to permit corrective action to be taken. We have covered this to some extent already.

On this critical question, the Staff and the Intervenor suddenly reversed their field. They have been predicting severe consequences to the fishery, and they insist that these data and the modeling techniques that have been developed in this hearing are adequate to justify these dire predictions.

Yet somehow, when they are confronted with the unquestionably better organized, better financed, more closely supervised research program that is undertaken by Con Edison now, now they decide that this program is inadequate to detect whether these serious consequences are even being borne out. I submit this is a non sequitur.

CHAIRMAN PARLER: Is this research program proceeding

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on schedule, or has there been some slippage? What is the situation?

MR. TROSTEN: The recent program is proceeding on schedule, Mr. Chairman, and I might add that during 1973, I think it is fair to say that more information has been collected about the range and occurrence of life stages in the river than has been collected in all the previous years.

DR. BUCK: The plant has been shut down for some period of time?

MR. TROSTEN: Yes.

DR. BUCK: How are you carrying out the research as far as entrainment?

MR. TROSTEN: During 1973, the pumps were run, but because the plants were not at power, we did not have the delta T.

DR. BUCK: You were able to get entrainment information?

MR. TROSTEN: That's correct, we were able to get entrainment information.

DR. BUCK: Thank you.

MR. TROSTEN: The Applicant's program is generally described in the environmental technical specifications. As I say, the specifications were reviewed, revised, and approved by the regulatory staff, and the program is monitored also by the federal and state agencies, Hudson River Policy Committee and by the Fish Advisory Board.

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We have repeatedly stated the willingness to modify the program so that we are confident that new perspectives that arise can be factored into the program. The basic purpose of the program which began four years prior to the startup of Indian Point 2 is to observe changes in key biological and physical parameters and project the short and long-term effects of any changes.

The study is intended to be completed in 1976, thereby allowing the effects of partial plant operation in 1973 and full operation in 1974 and 1975 to be taken into account. The key part of the study which goes to the heart of the controversy is the population study of bass and white perch.

What our plan involves is to estimate the abundance of striped bass in the estuary prior to entrainment and then estimate by actual counting at the plant the number that are entrained and impinged at the plant and then to estimate the number surviving at the estuary at the end of the year.

Then as I mentioned before, we are then able to separate out by using standard computational devices, the percentage mortality caused by the plant and the percentage mortality due to other causes in the estuary.

If we have the three basic pieces of information, what we start with, what went on at the plant and what we end up with, we can then figure out what was the result of other causes in the estuary other than caused by the plant.

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Now, an integral part of this study is the monitoring of certain key fish population parameters to determine the significance of the impact on striped bass and white perch. What I talked about determining a percentage impact, that does not tell you what does this mean in terms of the population. What we will do to determine that in addition to having the basic information about how many of the less than one year old fish are being killed, is an estimate of the age composition of the population, the growth rate, the population density of various age groups, and if we should see some unusual change in these various 6 or 7 parameters that we are looking at, we will then be able to form an informed judgment as to whether or not the impact that we are actually seeing at the plant is significant from a population standpoint.

Now, these changes will be monitored to determine whether there are serious exploitations of the population occurring, and as I mentioned, we have established 7 or 8 criteria to determine whether such exploitation is occurring, and I refer the Board specifically to the testimony of Dr. McFadden and Mr. Woodbury of February 5, 1973.

Such methods of monitoring impact on other populations have been demonstrated with other species.

Now, a critical aspect of our program which will separate out the year to year, the known year to year variability in the striped bass population is that we will be estimating the

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striped bass egg production as a point of departure in each particular study year. This feature helps remove the year-to-year variability of egg production from the analysis and it gives us a firm beginning point.

This feature together with a measurement of a large number of physical and biological parameters and our ability to correlate these parameters with observed effects will enable us to distinguish plant impacts from normal year to year variations and other man-induced changes, such as the operation of other power plants.

An additional reason for confidence in our approach is that the major area of impact of the plant is expected to be on the less than one year old class of striped bass. Therefore, if we confine our assessment to that less than one year old year class, and we show that we have a relatively minor impact, then it is clear that there can be more of an impact passed on into later years.

On the other hand, if a substantial impact were actually detected in those earlier years, it would be relatively conservative to estimate that the thing passes on unmitigated onto the older stages of the population even though it is possible. It might very well be that such an impact would be partially offset by a compensatory response in the older age group.

We would do this through the 13-year life cycle model.

Therefore, it is not necessary for us to have a

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research program which would actually physically monitor the complete life cycle of the striped bass empirically, because of the method that I have just explained.

As part of our research program, we are going to be carrying out an electophorectic study. This is a means for determining by different protein levels in the various fish where they come from. There will be a tagging program conducted by the federal and state governments which was undertaken in 1972, by the way, in August of 1972, and is scheduled to be completed just over a year from now.

We submit that this federal-state tagging study will reasonably be expected to provide in concert with our work by 1977, the information needed to confirm the significance of the Hudson River's contribution to the fishery.

The argument made by HRFA that a 5-year program can't do this, because you have to follow the whole life cycle are, I would submit, completely off-base, because the way to find out what the Hudson River raise of striped bass is contributing to the fishery is not to trace a live group for 7 or 8 years, but to taking the fish and see if they go out in the Mid Atlantic, and vice versa. That is what this program is about.

You can do that now. You don't have to wait for 5 years.

The licensing board has expressed concern that the Applicant's research program would be unlikely to resolve what

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the Board considers to be the questions. We submit they have approached this from the wrong viewpoint. The key thing here is not whether the research program can detect small, subtle effects. The key question here is whether the program could probably detect by January, 1977, the plant impact which was potentially so serious that it might produce irreversible damage before September, 1981, unless mitigating measures were taken.

If the program is capable of doing that, then a proper evaluation of cost and benefits indicated the program should be allowed to become completed, because as the Board recognized on Page 100, there is unlikely to be a serious permanent effect upon the fishery in a delay of a year or two in starting the construction of a closed cycle cooling system.

CHAIRMAN PARLER: You have about 10 minutes of your allotted time left, and the Board would certainly like to hear from you during the time that you have left on Item 5, which concerns the environmental impact, the closed cycle cooling system.

MR. TROSTEN: Yes.

Mr. Chairman, let me address that question first, and then I would like to cover it, and cover two other points.

The licensing board, we submit, as far as the environmental impact of the closed cycle cooing system has certainly failed to look at this from the proper viewpoint.

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Whereas before their entire approach was characterized as one of complete conservatism, there certainly is no such evidence of conservatism in the case of reviewing the possible effects of the closed cycle cooling system.

Where does the Board, for example, where does it conclusively demonstrate that the salt drift from a tower will not harm the vegetation. Where does the Board get the assumption that the vegetation will not be harmed by the salt drift.

No one could dispute that such damage might occur in the same sense that all factors might be equal to one and there might be no compensation operative in the river, but where is the evidence that shows this is the case?

The fact that this might be the case, evidenced by the recent comments by the New York State Department of Environmental Conservation on Indian Point 3 draft environmental statement, which is not in the record in this proceeding, but it indicates as follows:

An additional negative condition is the possible defoliation of Bear Mountain and Hudson Highland State Park by the saline spray from wet cooling towers. The report of the Directorate of Licensing of the AEC fails to account for the prevailing southerly winds. The Hudson Valley is unique in that for --

CHAIRMAN PARLER: I assumed you would contain yourself to matters in the record, unless there is something you want us

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to take official notice of.

MR. TROSTEN: Yes, Mr. Chairman. No, we are not asking official notice be taken of this. We are suggesting this is illustrative of a point we are saying.

Now, take the matter of severe fogging and icing of roads and airports and other facilities that might be in the environment of Indian Point. We do not have high level meteorological information applicable to the emission that is going to be coming out of this very tall 400 to 500 feet tall cooling tower.

We have meteorological information which has been collected with regard to the Indian Point 1 and 2 plants covering ground level releases and aspects of meteorology, but we have not collected information on the building of cooling towers, because we had not planned to build cooling towers at Indian Point.

The same could be said with regard to the acoustic emissions on nearby residences and chemical blowdown from the cooling tower. We are not suggesting that the environmental impact from these things are so serious that they actually are going to be severely adverse.

We are suggesting that we do not have the information at the present time, and we submit that a review of the record in this proceeding, particularly transcript pages 6965 to 6983 indicate that the Board has given a perfunctory consideration

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based on a feeling it has that everything is going to turn out all right.

We submit that kind of feeling is not a substitute for the analysis NEPA calls for here, and enough time should be allowed to enable us to complete the analysis of closed cycle cooling so a correct judgment could be made in this situation.

DR. BUCK: I believe you have such a research program underway.

MR. TROSTEN: Yes.

DR. BUCK: What is the status of that program, and what are you doing to obtain meteorological data at the 500 foot level, for example?

MR. TROSTEN: There is a program underway that commenced in September, 1973, which involves the tower and the floating of balloons, and which involves an estimate through the use of the tower and the balloons --

DR. BUCK: What height tower is it?

MR. TROSTEN: 400 feet on a 100 foot elevation. 500 feet in all.

DR. BUCK: Excuse me. I interrupted you.

MR. TROSTEN: Essentially, the answer to your question is that the program is underway, it is a year's program, we do not have the information available and will not have all the information available for all of the four seasons by March 1, 1974. The program will be concluded for the four seasons in

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September, 1974.

DR. BUCK: I believe the AEC has a research program going on on salt drift. Is that still going?

MR. TROSTEN: Yes, research program is going. We are going to have the benefit of that particular program. The thing we are particularly concerned about, and the reason why we have requested the Boyce Thompson Institute to study this is that we are concerned with the saline drift on the vegetation in the Hudson Valley.

We are concerned that saline drift does not have an adverse effect upon vegetation which does not accommodate to saline drift which would be the case on a site located near the ocean.

DR. BUCK: Do you have any idea what the status of that program is?

MR. TROSTEN: I can't give you an answer.

DR. BUCK: You don't know whether that will be available by September, also, then?

MR. TROSTEN: I am sorry, sir, I would have to supply that answer.

DR. BUCK: Thank you.

DR. QUARLES: I have a question regarding the initial decision. You are due to submit an environmental report by March 1, 1974. What is the status of that. Your research program is not going to be complete, from what you said.

MR. TROSTEN: We have been directed to submit an

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environmental report by March 1, 1974. It is going to be inadequate, because we don't have the information we feel necessary in terms of what AEC will want of us, and probably in terms of what other agencies will want of us.

We have said that over and over again. We will have it by March 1, 1974.

CHAIRMAN PARLER: You have an exception to that, I believe.

Assuming this Board does not grant your requests for leave in that regard, to extend the date to December 1, 1974, you will comply with the March 1, 1974 date, and submit an incomplete report?

MR. TROSTEN: Yes, sir, we must submit the report as it is a condition of our license.

Mr. Chairman, I gather that my time has expired.

CHAIRMAN PARLER: You have a couple of minutes left.

MR. TROSTEN: All right.

I would just like to address myself to two points, Mr. Chairman, and one concerns the basic standard of proof that has been propounded to us here.

What the Board in effect has done here is to say that the standard of proof that must be used is invariably adverse to the Applicant. Time after time, and in all the really critical issues in this case, F factors, compensation, the ability of a research program to detect serious harm, the

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feasibility of a stocking program, and in fact, all the major parts of the case except the closed cycle cooling system, the Board demands that the Applicant "conclusively prove" its case.

What the Board has done is to accept implicitly the notion advanced by the Intervenors that the Applicant has the burden of proof, and until the Applicant proves its case, the Board must accept the contention of the other parties even though they have not proved this case.

This is sheer nonsense and has lead the licensing board into reversible error.

The portion of the record cited "HRHA" means that the prponent of an order in this proceeding, that is, the Regulatory Staff and the Intervenors proposing an order be issued conditioning our licenses on closed cycle cooling, have as much of a burden of proof as the Applicant does.

Furthermore, it is clear from an analysis of this provision and the regulations and the section of the APA from which it was adopted, Section 556(d). That that provision is irrelevant by the conditions conducted by the AEC.

Section 2.732 was included in the Commission's regulations to implement the Commission's licensing responsibility under the Act. The entire statutory scheme of NEPA is different from the statutes from the concept of the burden of proof --

CHAIRMAN PARLER: What is your point, Mr. Trosten,

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that with regard to NEPA issues that the Applicant doesn't have any burden?

MR. TROSTEN: I would say with regard to NEPA issues, every party has an equivalent burden of proof. With regard to NEPA issues, the burden essentially, Mr. Chairman, is placed upon the Agency in a sense to justify that the action has been procedurally and substantially in accordance with NEPA. The Applicant does not bear a unuque burden of proof under NEPA.

What should be done is to take the evidence and weigh it impartially and not place any artificial burden on any party to the proceeding. That is the basic point I am making. Fundamentally, what the Intervenors are saying here, and this is a terribly important point, because in view of the extremely uncertain area of ecological matters, if you were to adopt the reasoning of the Intervenors, and it were up to the Applicant to prove that something is going to happen, but it were not up to them to make equivalent proof that something is going to happen, you would tilt the balance in favor of those who are postulating a severe adverse effect, and we submit that that is not at all what NEPA says.

Furthermore, to do that would utterly subvert the underlying purpose of NEPA. What the Board is supposed to do is weigh the evidence on the basis of what the evidence is, not on the basis of who offers the evidence. It is supposed to perform an independent balancing, and not decide, when in

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doubt, decide in favor of the Intervenors and the Staff, or when in doubt protect the environment.

That is not what NEPA is about. It is supposed to perform an independent balancing, and not impart some artificial burden to any one party.

CHAIRMAN PARLER: Suppose the preponderance of the evidence one way or the other isn't conclusive, you have maybe a standoff. What is an agency supposed to do?

MR. TROSTEN: If you ever got to that case, Mr. Chairman, of a complete standoff, I would suggest that the thing to do would be to look at the consequences of the action that is being proposed in this case, which is to spend $20 million a year for the next 30 years and then I would say, "Let's give ourselves an extra three and a third years to decide whether we really have to do this." It if ever got to that case, I think that is what you would have to do.

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Thank you, Mr. Chairman.

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CHAIRMAN PARLER: Thank you, Mr. Trosten.

Mr. MacBeth, would you proceed, please, in support of the Hudson River Fishermen's Association, etc.?

ORAL ARGUMENT ON BEHALF OF
HUDSON RIVER FISHERMEN'S ASSOCIATION
By
ANGUS MACBETH

MR. MACBETH: Mr. Chairman, Dr. Buck, Mr. Quarles: I will in the course of discussing the basis for the exceptions taken by the Hudson River Fishermen's Association to some extent go over the ground that Mr. Trosten has covered in his opening statement, but, of course, I have a period of response, and I do not want lack of covering all of the range of issues that the Applicant touched on to indicate that I do not have a response later in the argument to those points.

CHAIRMAN PARLER: That is quite all right, Mr. Macbeth. Proceed along those lines.

MACBETH: The case before the Board today is extremely important for the Hudson River. The Hudson is a great estuary, one of the major estuaries of the East Coast, rich in spawning grounds and habitat of anadromous and resident fish. Contrary to the popular belief that large parts of the Hudson River are little more than an open sewer, the reach of the River from the north to Haverstraw Bay in the south are becoming more clean, with the investment that the State of New York is making in pollution control and they are

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indeed, an extremely rich area for aquatic biota.

This particular proceeding, this proceeding is concentrated on the striped bass population of the Hudson River for the very obvious reason that it is one of the most important game and commercial fish in the River, and it is also the fish about which we know most. Most research over the years has been done on the life cycle and habitat of the striped bass. But the Board should not forget that many other fish are also resident in the River, and the striped bass can be assumed to be the same for the fish with similar spawning habits and life cycles. Alewifes, American shad, and one can go down a long list of fish that are in the Hudson River affected by this decision. We concentrated on the striped bass, but that should in no way indicate the other fish are not of concern, in his environment on the banks of the Hudson, which has been changing very rapidly over the past 10 years.

Ten years ago, there were two power plants with once-through cooling on the River, the Lovett plant and the Danskammera plant. We have added Indian Point 1, and, of course, today we are addressing Indian Point 2 at 865 megawatts, and five miles downstream last year and this year, the 1200 megawatt plant at Bowline, 2600 megawatt units, and 22 miles north of Indian Point, Roseton plant, again with 1200 megawatts and once-through cooling.

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So there is an enormous impact from once-through plants on the River, and the Indian Point 2 plant must be seen in the context of that overall assault on the River's aquatic biota by the once-through cooling systems.

The case is also very important in terms of NEPA, and in terms of the research that has been done on the River. I think it is fair to say that the National Environmental Policy Act had as its major precursor the First Scenic Hudson Case, which, in 1965, the Second Circuit Court of Appeals said to get a license for the Storm King plant. An entire study of the fisheries of the Hudson River would have to be undertaken. So nine years ago the Applicant in this proceeding, which is also the Applicant in the Storm King license undertook to finance that kind of research and exploration of the River. That produced the Hudson River Fisheries Report of 1965 and 1968, a fundamental body of factual material which in connection with a number of other studies that have been made, has been the large factual basis on which this enormous hearing record has been based.

We also see in terms of NEPA in this case that the so-called action force and requirements of the impact statement have in fact here truly forced action. I think there is probably no other case where an alteration in a existing project or scheme of this magnitude has been undertaken as a result of NEPA, and I think to a large extent that is true

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because we have had the long years of research and work on the River that came out of the First Scenic Hudson Case. Con Edison's research has borne fruit. The problem for Con Edison is to research the results of the research and see when the bad news comes in, the answer is not put off to another day, but when nine years of research have been done, and they indicated the kinds of effects and the great magnitude set out both by the licensing board and the staff of the AEC and the Fishermen.

DR. BUCK: Is there reference to the tremendous damages that will be caused by Storm King you are referencing now? You are saying that there have been results, and the results show very serious damage.

MR. MACBETH: I meant to say, and I am afraid I phrased that badly, in a great deal of research that has been done in connection with the Storm King application, that the Hudson River Fisheries Investigation was a document prepared for that case. Both the staff of the Atomic Energy Commission and the Fishermen have presented evidence to the AEC that there will be great impact from the Storm King Case.

DR. BUCK: That is what I am trying to get at. You are saying evidence is in this case that there will be a major impact?

MR. MACBETH: No, I did not say that, and I did not

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want to introduce it. What I wanted to say was that we have had a course of nine years of research, and the document prepared for the Storm King Case was the basic document on which the evidence in this case was founded and from which all the experts work. Out of that, the indication of major impact at Indian Point has come. It is on the basis of that data.

DR. Buck; That is what I am trying to find out, what basis, what data is it in this report that indicates the major damage, and what report is it you are talking about. Are you talking about the Carlson-McCann report?

MR. MACBETH: Yes.

DR. BUCK: At what point do they indicate major damage?

MR. MACBETH: They do not.

DR. BUCK: I would like to know what evidence there is there.

MR. MACBETH: The Carlson-McCann report does not show major damage; both the AEC and the Hudson River Fishermen's Association indicated in this record, but more fully before the FPC that the calculations at the end of the Carlson-McCann report which calculated the amount of withdrawal of eggs and larvae from the River are fundamentally flawed and , in fact, something like ten times the damage that Carlson and McCann themselves indicated would, in fact, take place.

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DR. BUCK: So you are saying that the Carlson-McCann report does not indicate a damage, but now you are saying that those data are at fault?

MR. MACBETH: No. I am making a distinction between the factual data on which everyone has relied in this proceeding and the conclusions and calculations that Carlson and McCann made from those data. I think there has been no dispute in this proceeding that the Carlson-McCann data are very good data, but there has been great dispute as to the calculations Carlson-McCann made on the basis of the data. Principally, they treated the withdrawal of water by the Storm King plant as coming from what is planned at 100,000 cubic feet per second, which is the average tidal flow, rather than calculating the downstream flow, which is considerably less, and thus the withdrawal by the plant is considerably more.

DR. BUCK: You are saying there is a belt effect here that is being calculated on Indian Point that should have been calculated at Storm King?

MR. MACBETH: Yes. I think the models built --

DR. BUCK: Is that introduced in this hearing?

MR. MACBETH: Yes, there is evidence in the proceeding that there are flaws in the Storm King calculations, and in the Carlson-McCann conclusions.

DR. BUCK: But not with the data itself?

MR. MACBETH: No, not with the data itself.

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DR. BUCK: Thank you.

NR, MACBETH: On the basis of the data from the Carlson-McCann report and other studies undertaken on the river, and of course knowledge of the life cycles of striped bass both in other parts of the country and particularly in the Middle Atlantic region, the parts of each buildup have a complex model that follow the striped bass when they come back from the sea and drop their eggs in the fresh water area and these eggs are carried in the salt wedge area and they are circulated for a certain period of six, eight to ten weeks after hatching, and are bouyant in the water.

Then they are withdrawn from the river and passed through the pumps of the plant into the water box, they are given a heat shock of approximately 15 degrees, and then passed back into the discharge canal and down the channel, and on the analysis of the period when Indian Point 1 was operating, the Delta T, the present Indian Point 2, something like 7.5 percent of the organisms that were there were found dead at the end of the discharge canal.

No studies were down on the effect of the living organisms.

DR. BUCK: What organisms are swept back and forth for a period of 3 to 10 weeks?

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MR. MACBETH: The striped bass as eggs, young larvae and young juveniles. They gain more mobility, but in the first eight weeks, they are not truly free swimming.

DR. BUCK: Are you saying that all the eggs and all the larvae hatched, are hatched in the Indian Point area?

MR. MACBETH: No, they are largely hatched upstream, and the eggs float only for a couple of days before hatching.

DR. BUCK: How can they all be down in the Indian Point area for ten weeks?

MR. MACBETH: They are not all there.

DR. BUCK: But you say all are swept back and forth for a period of eight to ten weeks.

MR. MACBETH: The organisms move downstream--

DR. BUCK: How long does it take them to get down there?

MR. MACBETH: You cannot put a precise period on it.

DR. BUCK: How long does it take the ones further up to get there and what size are they when they get there?

MR. MACBETH: I would like to be able to check

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the transcript, but my memory of the situation is that the bulk of the organisms reach the salt treated region a few days after hatching.

DR. BUCK: Is it not true that a great many fingerlings of the striped bass are found above Indian Point 2?

MR. MACBETH: There are fingerlings found on the shoals in Newberg Bay but the vast majority of them are further downstream than that. I am not contending all are there.

DR. BUCK: What is the evidence of that?

MR. MACBETH: The evidence is in the final environmental statement itself where the AEC staff says that 70 percent of the striped bass in the river passed the Indian Point plant before becoming juveniles.

DR. BUCK: Do you know on what basis they state that?

MR. MACBETH: The Carlson-McCann basis.

DR. BUCK: Thank you.

MR. MACBETH: In the salt-intruded reach, the organisms are circulated by the fact there are upstream currents on the bottom of the river and downstream flow on the top of the water column.

On the basis, then, of a hydraulic element which models the hydraulic forces which power the

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organisms downstream, an analysis of the so-called F factors which look at the distribution of the organisms across the river in front of Indian Point and their mortality through the condenser tubes and the analysis of the likelihood or unlikelihood of compensation of the system, both the Hudson River Fishermen's Association and the Staff of the AEC came to the conclusion that something in the region of thirty to fifty percent of the annual production of striped bass in the Hudson would be killed by passage through the Indian Point 2 Plant.

The Applicant, of course, came to quite smaller numbers but when the biological assumptions of Staff and HRFA are employed with the hydraulic assumptions of the applicant, then the annual reduction of the Applicant's model becomes fifteen percent and of course that is for the first year.

DR. QUARLES: Thirty and fifty percent are killed by passage through Indian Point 2. Is the same percentage applicable to the other plants in the vicinity?

MR. MACBETH: They vary, and obviously the plant further upstream has more impact on the eggs.

DR. QUARLES: There are three very close.

MR. MACGETH: The Lovett Plant is almost

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directly opposite. It is smaller and is only five hundred megawatts and is fossil fueled.

DR. QUARLES: What about Bowline?

MR. MACBETH: I would like to check the figures on it, but it adds a substantial percentage to the effects of Indian Point.

DR. QUARLES: Does Indian Point have a significantly greater effect than one of the other plants?

MR. MACBETH: Yes.

The fact that it is a nuclear plant means it is discharging almost all of its heat in the water, no significant part up the stack.

DR. QUARLES: Isn't the kill, though, primarily as evidenced by the runs made in 1973 when the plant was not running and the pumps were, a very large portion killed are due to mechanical reasons?

MR. MACBETH: We believe that is true, but in 1972 there were studies made when Indian Point 1 was running and for a period Indian Point 1 was brought up to the Delta T that would be present when Indian Point 2 was operating at full power, and it was on the basis of that study with a Delta T that the 97.5 percent figure was produced.

So that there certainly is a mechanical component to the damage. I do not want to underestimate that at all,

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but I think there is a heat component as well.

I think the temperature would show that but my point really about the heat discharge was that that means that the nuclear plants, Indian Point 1 and 2 have to withdraw more water from the Hudson per megawatt of electricity generated than do the fossil fuel plants. They are also slightly less efficient than the fossil fuel plants, and they take more water from the river.

DR. BUCK: Is there evidence of the rate of flow through Bowline and the temperature increase and if you can, have you made any estimates of that with regard to Indian Point?

MR. MACBETH: The estimates show it is less than Indian Point. If I can supply the exact numbers from the transcript, I would be happy about it.

DR. BUCK: This is fifty percent less or ten percent less, or what?

MR. MACBETH: My memory is that on the model that shows Indian Point having an effect of about forty percent, Bowline is about 20 or 25 percent. I really would like to check that.

DR. BUCK: Then the adding of your figures would be sixty percent?

MR.MACBETH: You cannot simply add them.

DR. BUCK: It is the same river and the same

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water flowing back and forth.

MR. MACBETH: But if you kill them at Indian Point, you cannot kill them later at Bowline?

DR. BUCK: What should we be doing here--the water, you say, flows back and forth, and it flows back and forth across the whole river.

Now, if the kill is of 50 percent in Indian Point 2 and 20 percent in Bowline, why isn't the total 50 percent?

MR. MACBETH: If you have done a model that has both plants on the river when you run the model, that would be the right answer, if you run a model of the river with only Indian Point on it and another model with only Bowline on it, you cannot add them together.

DR. BUCK: You have an F. factor coming in here.

MR. MACBETH: Well, could you call it an F factor?

DR. BUCK: Isn't that what it is? Isn't it a fact factor, because the concentrations would change?

MR. MACBETH: Yes, if you design F factor as changing concentrations.

DR. BUCK: So they would not necessarily be one, then.

MR. MACGETH: In this proceeding, no one can define--

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CHAIRMAN PARLER: Speak one at a time, please.

DR. BUCK: The Board has taken the attitude that F factors must be one. Now, I am trying to find out on the basis of your statements on the combined effect of the plants if the F factor is always one, then you have to have an additive effect here. If it isn't, then the F factor has to be taken with something less than one.

MR. MACBETH: I agree with that if you look at the F factor in the larger terms.

In the course of the proceeding, the F factor has been looked at in the cross section in front of Indian Point. Assuming 100 percent of the organisms are in the cross section, what is their distribution relative to the plant? Is the plant situated so that it will draw more of the organisms or less than the organisms than the cross sectional average? That is really, then, I think, the emphasis of the first two F factors.

DR. BUCK: One further questions. On the so-called "belt" effect of the water flowing back and forth past Indian Point, you say they stay there for six to ten weeks. What flow are you using? What fresh water flow are you using?

MR. MACBETH: The Oak Ridge Staff used a variety of fresh water flows. The Fishermen's Association did not have resources to do a complete hydraulic model, so

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ours is modeled on the results of the 1966 and 1967 data from Carlson-McCann, but it uses the fresh water flow for those years. It does not have an independent hydraulic mechanism that can be altered for various fresh water flows. The Staff's model did have one.

DR. BUCK: You are basically relying on the Staff model?

MR. MACBETH: For the hydraulic element.

DR. BUCK: Thank you.

MR. MACBETH: The models also dealt with the question of compensation and the sensitivity analysis done by the model showed this was by far the most important element altering the result of the model. There the Applicant relied on general biology indicating that in many animal populations there are compensatory effects but could produce no evidence on the striped bass in the Hudson River indicating compensatory effects.

Both the Oak Ridge Staff and the Fishermen's Association looked at items like the growth rate and the lack of crowding and the general growth of the striped bass population since the sixteen-inch size limit was imposed and concluded on the basis of that that there was no compensatory mechanism operating in the striped bass population of the Hudson and, again, in relation to other fish populations, particularly popular

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sports fisheries, like the Pacific Sardine and Menhaden in New York, shows there is no mechanism present, and therefore there is nothing in violation of the general laws of biology indicating there is no compensatory mechanism operating in the life cycle of the Hudson River striped bass.

DR. BUCK: This bothers me. What do you mean by "compensation" in the first year?

I do not understand this, how you have a compensatory effect.

MR. MACBETH: As I understand compensation, if there is a compensatory mechanism operating and more than the natural number of young fish were killed in the early part of the fish year of life, you would have a result by the end of the year at some later stage where either the mortality rate would decline there if you come out with the number of fish or close to the number of fish depending on how effective the compensatory mechanism was than you would have from the interference of the natural mortality rate or perhaps a greater growth rate among the fish.

DR. BUCK: I don't see the differences here, Mr. Macbeth.

If you have compensation ,supposing you double the amount of food that is available to these fish that are left, the fingerlings that are left, and they grow larger and more of them manage to survive

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R12 and so forth.

You do not increase the number of fingerlings in that year. Your compensation shows up in the years following and in the laying of more eggs so I donot see what you mean by saying there is no compensation in the first year, I do not see the point of that.

MR. MACBETH: The point as I understand it is that the present population models, at those points, that the Hudson River is not super-saturated with striped bass eggs at spawning time, and there is presently plenty of food and there is no crowding or competition for food. When one reduces below the natural mortality rate the number of eggs or larvae in the population, they continue to grow at the rate they would have grown otherwise, and do not get either a greater number of fingerlings or the declines in the mortality rate at later stages of the year that one could have.

It is the opinion of both the Staff and the Fishermen on the basis of the evidence in the record that such compensatory mechanism would not be found.

DR. BUCK: Are you saying this would be found, or would be true of any fish species?

MR. MACBETH: No.

DR. BUCK: Not necessarily bass?

MR.MACBETH: I am saying under present conditions

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it is true of the striped bass in the Hudson River. There might well be a situation where the river would be super-saturated with eggs and the population would increase enormously and then perhaps the compensatory mechanism would be present again but the present population models show there is no indication--there is positive evidence to the contrary which shows there is no compensatory mechanism operating with the striped bass in the Hudson.

DR. BUCK: Couldn't that be considered this way, the greater the crowding, the greater the effect and the less the crowding, the less the effect? Isn't there always some compensation in a biological area? It may be that it will get smaller, I will grant your argument in that respect. All I am asking, is there any evidence that there is a cutoff level?

MR. MACBETH: In which at this precise point there would be no compensation? It would certainly be the position of the experts, and obviously I am not among the experts on compensation but both the Oak Ridge scientists and our own scientists, that present levels of population of the Hudson River striped bass, there is no visible compensation. Certainly, if you go on changing the level of population, you may well eventually get a compensatory effect, but it does not always work.

With reference to the other particular fisheries, the Pacific Sardine and so forth, they indicate that there

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is not compensatory mechanism working in these populations.

DR. QUARLES: Could you submit later a transcript reference to the positive evidence?

MR. MACBETH: Yes.

DR. QUARLES: Thank you.

MR. MACBETH: My time is running out on the first round, but I would like to say that, just to put our own exceptions into context that it is the position of the Fishermen's Association that the Licensing Board is right in saying that the closed cycle cooling system should be installed on an expeditious basis, tnat it is our firm opinion on the basis of the evidence in the record that that can be done by December 1, 1977, with cessation of once-through cooling on May 1, 1977, and that if any other alternative were to be taken, particularly the one proposed by the Applicant, that a research program be undertaken of a further evaluation in two years, that one of two things would certainly have to be true, that there was first--both things have to be true--that the present record before the Licensing Board and the Appeals Board was not a complete record on which a reasoned decision could be made, and that the research program could, in fact, give the answers within another year or two which would produce a reasoned decision.

It is the position of the Fisherman's

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Association, and I will return to this in the second half hour that I have, that, in fact, there is a full record before the Board, nine years of research have gone on, very complicated models have been developed which are extremely competent pieces of work, and on top of that, the research program proposed by the Applicant in the time allotted would not be able to answer the questions, any remaining questions, with any more thorough or complete answer, if, in fact, there are any major questions left that need answering.

We are in a situation where we have almost a dedication of data and analysis, and the time has come when action must be taken.

We can not put over from year to year endlessly the decision that action has to be taken to protect this enormous fishery that Hudson supported and the Coastal Fishery which, in turn is supported by the Hudson stock.

CHAIRMAN PARLER: Mr. Macbeth, you do not mean to leave the impression, do you, that this research program has been under way in the Indian Point sector of the Hudson River for a decade?

MR. MACBETH: A large part of it has. The Carson-McCann study from 1965 to 1968 sampled the distribution of white bass up and down the river, south south of Indian Point and all the way up to Coxsachie, almost

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R16 80 miles north of the plant.

The Second Circuit ordered that the whole fisheries questionbe taken into consideration and it was, a thorough study over three years was done. The company then went forward with more detailed studies in the immediate area of Indian Point.

In fact, Carson-McCann actually went to the Indian Point site and studied impingement at Indian Point, and in the years after the end of that study, Raytheon and Texas Instruments and a number of other companies, as well as NYU and others have continued investigation right there in the vicinity of Indian Point.

CHAIRMAN PARLER: I gather, then, that the Hudson River Fishermen's Association position is that these environmental technical specification requirements are not adequate to give sufficient notice so that action can be taken.

Is that correct?

MR. MACBETH: Our position on the technical specifications is first that, if cooling towers are ordered on a closed cycle cooling on a most expeditious basis, we do not think a monitoring program of this sort is necessary at all, and we excuse the Applicant from that. We arrived at this before the Licensing Board reached the decision.

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We do not think research is necessary and if the Board upholds the position taken by the Fishermen's Association in this proceeding, we donct see the need for the continuous and fine-grade research program that the Applicant has proposed.

DR. BUCK: In your response, later, Mr. Macbeth, will you get into the problem of the Towers and the dollars, and also the source of the Mid-atlantic Fisheries?

MR. MACBETH: Yes.

CHAIRMAN PARLER: Are there any o ther points you would like to cover at this time? You can have a few more minutes if you like.

MR. MACBETH: Perhaps I could give just a brief indication on the issue of the irreversible impact, which Mr. Trosten has made so much of in his opening statement.

The position of the Fishermen's Association is that if you reduce a year class of Hudson spawned striped bass by 15 per cent or 40 percent, that that is an irreversible impact, and if you look at it from the larger view of the fishery, you can say it is not irreversible in those terms but you can apply that to cooling towers.

You can build towers and take them down. You provide the electricity from the plant, but if you did not, the effects will not be irreversible. You could supply this later.

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What the Calvert Cliffs decision says clearly is that we must look a t any and all impacts. They come in different levels of substantiality, and last for different periods of time.

But there is not any way of carving out some as being irreversible and others as not being so and you can simply shift the framework of that argument and that discussion so that you come up with the impacts that you are opposed to being irreversible and those that you are willing to accept being not, being reversible.

It seems to me clear that if, as the Applicant proposes, the plant is run for twice as long as the period that the Hearing Board was going to accept for once-through cooling for 8 spawning seasons rather than for four, that we are going to have an irreversible impact on the striped bass fishery.

Eight years of classes will be reduced. That will be on through the population for a very long time, and those fish are gone, and it simply becomes a quibble to then say, "Well, we are not wiping out the entire species of striped bass on the Hudson River,and decimating everything and there is going to be nothing left and you can never bring it back.

If that were the case, we might try the case under

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the "Endangered Species Act."

DR. QUARLES: You are assuming that the monitoring program is not adequate to protect the species and that the decimation would continue for eight years?

MR. MACBETH: I think there are two problems with the monitoring program. One, to start with, they cannot, by their own admission, differentiate changes in abundance of less than 25 percent of the population.

Therefore, the position taken by the Hearing Board that a fifteen percent reduction is impermissible is correct on the facts and the law, they will not even be able to identify the kind of impact that the Licensing Board found impermissible.

There are further a series of problems with research programs, and I think particularly in Dr. Goodyear's testimony of April 10, following transcript page 10826, there is a problem of natural fluctuations differentiating the effect of this plant from that of other plants and natural changes.

There are problems with sampling errors, and problems with alternative treatment, any control treatment so, if there is a change in birth rate or sexual maturity, there is something to measure that change, some way of telling whether that is in fact natural or not.

There is no particular compensatory mechanism.

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identified that the company is going to try to test for, they are simply going to look at the effects generally and hope from that that something will arise, rather than having some mechanism they are focusing on. There is nothing in the research program on hydraulics, so the whole hydraulic aspect of both the Staff model and the Applicant's model will not be further illuminated by the research program.

As far as their differences between the results reached by the Applicant's model with the biological assumptions of the Staff, the so-called most conservative estimates and the Staff's own analysis, the differences in the hydraulics and there is no research onthe hydraulic at all.

Perhaps the final point, since I have mentioned this most conservative estimate, I ought to point out that the Board by no means has taken the most conservative estimates. Just to look at the chart on page 42, I think or page 43 of the initial decision, that shows that both the staff and the HRFA had more conservative estimates on the F factors and obviously, F-1 and F-2 could be greater if fish were concentrated close to the plant rather than on the opposite side of the river or some other path or part of the water. I think the Board has taken a reasonable and prudent analysis of the testimony and evidence that it had before them.

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It has in no way taken the most conservative, much less speculative position on the basis of the evidence.

CHAIRMAN PARLER: Thank you, Mr. Macbeth.

These citations that you said you would supply in response to the questions by the Board, will you do so, please, within five days and under the same guidelines that I told Mr.Trosten, that is, send copies of the citations to the parties and the parties will have an opportunity to comment on those citations if they wish.

One thing I want to emphasize, the evidential record in this proceeding has been closed for some time and it is still closed. All that we want is citations and nothing more.

MR. MACBETH: Yes.

CHAIRMAN PARLER: And the same opportunity will be afforded to Mr. Corcoran and Mr. Karman if they wish to supply us citations to questions which they may be asked later on.

We will now take a ten-minute recess.

(Recess)

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CHAIRMAN PARLER: The oral argument session is now resumed.

Mr.Corcoran, will you please proceed with your argument? I would like to note that two prior arguments ran a few minutes over and, if you need a few minutes additional time, you may take it.

ORAL ARGUMENT OF JAMES P. CORCORAN,
OFFICE OF ATTORNEY GENERAL, STATE OF NEW YORK.

MR. CORCORAN: Thank you.

I would like to discuss the State of New York exception to the initial decision. I will take exception two first, if I may.

The State of New York believes that the cost-benefit analysis adopted by the Licensing Board underestimated the cost of the closed cycle cooling system, and one main reason for this is that the Board did not take into account the section of the New York State Environmental Conservation Law, Section 11-1321, which prohibits the taking of fish from the river by drawing off water.

This statute was enacted many years ago. It has lain dormant for many years, much like the revenues Act did, but in light of the Applicant's Division of Fishery Resources of the Hudson River, the statute has been used against Applicant and suit was brought in May of

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1972 to collect a penalty under the Environmental Conservation law of $10 for every fish so taken from the river.

The incident involved the same power plant which we are considering today, Indian Point 2. In February of 1972 during one four-day period, the Applicant impinges 130,000 fish, mostly white perch on its intake screens. At the time it was testing its pumps at fifty percent of capacity.

On February 29, Commissioner Diamond, the Environmental Commissioner, ordered the Indian Point plant closed down under his summary abatement powers under the Environmental Protection Law, Section 710301.

After a hearing was held, the Commissioner recommended that suit be brought against Con-Edison and it was.

In the lower court, the summary judgment was granted against Con- Edison and a hearing to assess the penalty was set down.

On appeal, the Appellate Division, the State's second highest court, reversed the motion for summary judgment, saying that the Applicant or the Defendant as it were, was entitled to a trial on the issues as to whether it intended to take the fish and on the question of whether it was employing the best available technology. That decision has been appealed by the State of New York to the Court of

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Appeals, the State's highest Court and that case should be heard sometime next month.

I think the important point, though, to be made about the case is that all six judges who have considered the case, the one judge in the State Supreme Court and the five judges in the Appellate Division all in effect held that this statute applies to Con-Edison's activities at Indian Point.

Now, if that is the case, the penalties for impinging those fish are going to be tremendous. The record indicates that Con-Edison estimates that one and a quarter million fish are likely to be impinged every year at Indian Point.

Under the statute, this would impose a penalty of 12.3 million dollars on the company every year. The estimate of the Staff is that impingement will kill between two and five million fish.

This might bring the amount of the penalty to twenty to fifty million dollars a year. H.R.F.A. 6.5 million, that would bring the penalty to $65 million a year.

I might note that the penalty under the statute is not a discretionary matter. If the statute is held applicable to their activities, thepenalty is mandatory and, it is $10 for every fish that is so taken.

Another point that I would like to make along the

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same lines is that regardless of the statute, the Commissioner of Environmental Conservation does have the power under state law to close the plant down if, in his determination, the plant is causing irreparable or irreversible harm to natural resources of the state.

A precedent for this has already been established, as I noted, on February 29, 1972.

Therefore, the company might not only have to pay substantial penalties but the plant might have to be closed down several months during high impingement and high entrainment seasons.

So, to sum up on that point, Mr.Chairman, it was the State's feeling that this should have been considered by the Licensing Board in its cost-benefit analysis.

CHAIRMAN PARLER: Mr.Corcoran, as I understand the record, there is some evidence in there which suggests that even with a closed cycle cooling system, there will be a considerable number of fish impinged, approximately 600,000 as I recall.

You would make the same point in connection with the closed cycle cooling system that the prospects of the state penalties that might be imposed should be taken into consideration in the cost-benefit analysis for the closed cycle cooling system?

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MR. CORCORAN: Mr.Chairman, I was not aware that the record indicated that such a large number of fish would be impinged with the use of closed cycle cooling.

It was the state's understanding that the closed cycle cooling system would require only five percent, approximately, of the water which is presently being taken in by the once-through cooling system, and therefore, that a much, much smaller number of fish would be impinged upon the screens.

I think the entrainment issue was of more concern to the state and in that regard the Commissioner does have power to take action to close the plant down if entrainment reaches severe proportions.

It is also the State's position that--let me lay a foundation for that.

In Con-Edison's brief, they stated if it were shown that only ten percent of the annual reproduction of striped bass were being entrained at Indian Point, then the licensing Board decision would not be justified. We disagree very strongly with that.

Indian Point 2 is not operating in a vacuum. Soon there will be three power plants at the same location, two at Bowline, two at Roseton, one at Lovett and one at Danskammera, and one perhaps eventually at Storm King.

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To permit just one power plant to destroy ten percent of the annual reproduction of a most valuable species of fish necessary to the well-being of the people of the State is totally unacceptable.

DR. BUCK: Are you proposing, then, Mr.Corcoran, to apply these proposed penalties of Indian Point 2 to the other plants as well?

MR. CORCORAN: Yes, sir, we are.

DR. BUCK: In proportion, how about the ones that have been operating for some time?

MR. CORCORAN: Mr.Buck, we have no evidence at the present time that damage of the magnitude that has occurred at Indian Point 2 on the occasion mentioned has occurred at other power plants.

DR. BUCK: The point I am getting at is this: Are you basing this on a magnitude situation, or are you basing it strictly on the statute, which says "any fish"?

MR. CORCORAN: We are basing it on the statute. The magnitude matters in terms of the penalty.

DR. BUCK: But your decision as to whether or not you apply the penalty, is it based upon magnitude?

MR. CORCORAN: It is to a certain extent, yes, sir. If a power plant is impinging a very small, insignificant number of fish, then it is obviously not having an adverse effect on the ECO-system.

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Then certainly that might influence our decision.

DR. BUCK: Small and insignificant with respect to what, Mr.Corcoran?

MR. CORCORAN: I am sorry. I do not understand the question.

DR. BUCK: You say, if it has a small or insignificant effect. I'm asking you what you mean by "small and insignificant," and with respect to what?

MR. CORCORAN: If the plant were impinging a very small number of fish, say a few hundred fish a year or something of that order, then it would appear that this is not having a severe adverse impact on the ecosystem.

That is simply what I am saying.

CHAIRMAN PARLER: Does the State of New York have any standards now in the area that you are discussing as to how significant an impact would have to be before action should be taken?

MR. CORCORAN: No, sir, I know of no precise standards that exist.

DR. BUCK: You are relating the significance of the destruction of fish at Indian Point 2 to wash the Staff's estimate of the number of fish in the river, or do you have estimates of your own that give the population of the fish in the river?

MR. CORCORAN: The state has no estimates of

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its own as far as I know.

DR. BUCK: You are basically relying on the AEC Staff or the Carlson-McCann report and information like that?

MR. CORCORAN: Yes. Shall I proceed to Point 2 now?

CHAIRMAN PARLER: Proceed.

MR. CORCORAN: In light of the dire projections made by the Staff's estimates in the Indian Point 2 proceeding for the ASOB, it is the opinion of the State of New York that the closed cycle cooling system should be installed at Indian Point 2 as soon as possible. We believe that the record supports our contention that a closed cycle cooling system can be completely installed at the Indian Point 2 by December 1, 1977, one year earlier than the time period allowed by the Licensing Board.

DR. BUCK: Have you considered the environmental effect of the tower?

MR. CORCORAN: Yes. sir, we have considered it.

DR. BUCK: New York has looked into it as to what the effect would be? Can you tell us what you have done in that respect?

MR. CORCORAN: Mr.Chairman, the State Department of Environmental Conservation has looked at the questionof cooling towers. It has not produced any

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particular work product in this respect. It has examined the Burns and Row report. It has examined the evidence that has been presented in the Indian Point 2 hearing. It is aware, also, that there are cooling towers in other parts of the country which have been constructed and which are in operation.

DR. BUCK: Salt water?

MR. CORCORAN: But I do not know whether it is necessary to use salt water at Indian Point.

DR. BUCK: I am asking you if you have looked into the effect of the salt water spray.

MR. CORCORAN: They are looking into it. I do not think they have reached any firm conclusions about it and I would like to make note at this point of a statement made by Mr.Trosten earlier which was very misleading in which he stated that the State Department of Environmental Conservation in its comments on the Indian Point 3 draft statement referred to the possibility of salt drift, or salt deposition from cooling towers, but the important thing to be noted in the DEC's comments was that they approved, they supported the decision in the draft statement to install the closed cycle cooling system at Indian Point 3.

DR. BUCK: Do you consider the environmental effect on the towers should be as thoroughly treated as the environmental effect on the river?

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MR. CORCORAN: Yes, sir, I think it should be.

DR. BUCK: Do you think it has been?

MR. CORCORAN: To the best of my knowledge, I think it has.

DR. BUCK: Could you justify that on the basis of meteorological data and so on?

MR. CORCORAN: I believe the Burns and Row report also went into the effects of environmental cooling towers.

I am not sure those are the most critical studies to be made here.

DR. BUCK: What are the most critical?

MR. CORCORAN: It seems to me the questions of fogging and icing is something that has to be considered but that does not really relate to the meteorological studies, as I understand it. I am not an expert on this.

DR. BUCK: When the plume comes down to the ground depends on meteorological conditions.

MR. CORCORAN: It is my opinion that the studies have shown no adverse impacts on the environment other than the question of esthetic intrusion which is a highly subjective question to begin with. The Applicant is not alleging that there are any real adverse environmental effects from cooling towers. I know of no cooling towers in this country which have had severe adverse environmental

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effects.

It seems to me that it is kind of a straw man, that studies have been conducted and that no evidence has been forthcoming that there are such adverse effects.

DR. BUCK: The point I am making, Mr.Corcoran, you say this thing should be thoroughly studied, and I think it is a fact that some data--there are data that have not been obtained, apparently.

You say you know of no effect of environmental towers. Do you know of any irreversible effect on rivers in the country due to power plants?

MR. CORCORAN: Do you mean in terms of impingement or entrainment?

CHAIRMAN PARLER: The answer to these questions, of course, will be in terms of your knowlege of what is in this evidentiary record.

MR. CORCORAN: Yes.

Well, I don ot know if the evidentiary record contains any references to other power plants.

DR. BUCK: Thank you.

MR. CORCORAN: With regard to the time period for the installation of a cooling tower, it is the State's judgment that six months is more than sufficient time for governmental reviews of the project.

DR. QUARLES: Could you justify that? These are

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agencies which the State and the Applicants and the Board have no jurisdiction over. Could you cite justification for something like that?

MR. CORCORAN: At the present time, Dr.Quarles, the State Department of Environmental Conservation would not require a permit for the construction of a cooling tower. It would not be a source of pollution emission so it would not have to be certified under the Air Pollution Code or anything of that sort.

At the present time, there appear to be no laws or no regulations which would require a permit from the State to construct such a tower.

DR. QUARLES: How about the environmental statement?

MR. CORCORAN: Excuse me.

DR. QUARLES: It would take an environmental statement and this must go to a number of federal agencies, as well as state agencies.

So the question is really how fast these federal agencies, some of which may be slow, will act and the tower cannot be built until this is done.

I am wondering if this is a number which has been brought out of someone's hat, or if there is some justification which shows these agencies will act as promptly as six months.

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R13 MR. CORCORAN: Yes.

Well, the AEC Staff has estimated that AEC review would take between three and six months. Certainly that would be the most complete review. I cannot imagine any other agency taking much more than that and I do not see why it would take any other agency more than the same period to review the question of cooling towers and the environmental impact.

So, we believe six months would be a reasonable period for government review in this respect.

In terms of the construction, itself, the Staff has estimated that 39 months would be a reasonable time after government review for construction of cooling towers. This is contained at page 6939 of the Indian Point 2 transcript. This is exactly the period of time which we are proposing should be required for the installation of the cooling tower, six months for review and 39 months--excuse me--for installation of the cooling towers.

I think the important thing, because it would save a year's time and it would protect the striped bass young of the year of 1977 from the effects of entrainment and thermal pollution at Indian Point 2, and if the power plant has been in operation for three years at that time along with all the other power plants on the Hudson

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R14 River with their once-through cooling systems, we believe the impact at that time on the striped bass species and perhaps on other species would perhaps be very severe and that a year's time may be a very critical time, and if we can save that extra year, we should.

DR.BUCK: You are relying in that belief on the Staff's data.

MR. CORCORAN: Yes, Dr.Buck.

The Staff considered construction of other power plants and I believe the time for construction ranged from three years to three years and eight months, which certainly is in line with the proposal that the State of New York and the Hudson River Fishermen's Association has made.

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It is also our belief that under the Federal Water Pollution Control Act Amendments of 1972, that a closed cycle cooling system at Indian Point 2 will be deemed to be the best practical control technology for that facility, and that the Board should if at all possible, require the completion of this facility or at least the termination of the once-through cooling system by July 1, 1977, the date set forth in the Federal Water Pollution Control Act Amendments of 1972.

CHAIRMAN PARLER: What is your basis for that belief?

MR. CORCORAN: That is the best technical control technology.

CHAIRMAN PARLER: Yes. I asked the question because as I understand the amendments of 1972 have to be promulgated by the EPA under various sections of the amendments of 1972 that deal with effluent limitations, and also there is another section, 316, that deals with water intake structures. For the most part those standards are yet to be promulgated.

MR. CORCORAN: It is our opinion that the guidelines will require the installation of such a system. I realize there is probably nothing in the record which indicates what the EPA intends to do in this matter, but it is our considered view that they will require the installation of such a system.

That is all I have on that point, Mr. Chairman. Do you have any questions?

CHAIRMAN PARLER: One other question I have with

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regard to the timing for the review of the environmental report on the closed cycle cooling system.

The question is this: Does the Attorney General of the State of New York or any other agency in that state have the authority to direct a state agency to complete an environmental review within a specified period of time?

MR. CORCORAN: No, Mr. Chairman. I am not aware of such a requirement.

CHAIRMAN PARLER: That is all that I have.

MR. CORCORAN: If I might add one point, Mr. Chairman, if it turns out that the Applicant through no fault of its own cannot complete construction by December 1, 1977, then certainly the Board would consider granting them an extension, but we feel that it would not be proper to give them such an extension if it is at all possible for them to complete the facility.

Thank you very much.

CHAIRMAN PARLER: Thank you, sir.

Mr. Trosten, will you now proceed with your response to Hudson River Fishermen's Association and the Attorney General of the State of New York?

MR. TROSTEN: Mr. Chairman, may I ask you a preliminary question, and that is, I would request respectfully that I be given an opportunity to divide my time, the 45 minutes, so that I can take a portion of it at the present time and complete the remainder of my argument at the conclusion of the

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argument of the other parties. Would that be acceptable to the Board?

CHAIRMAN PARLER: Well, the December 21st order does provide if any party desires that they may reserve some of their allotted time for rebuttal. Is that what you are talking about?

MR. TROSTEN: Exactly.

CHAIRMAN PARLER: Very well.

MR. TROSTEN: Thank you very much.

Mr. Chairman, I would like to address several of the points that have been raised by the parties in the context of a question that was raised by the Board concerning the entrainment models.

Now I want to make it completely clear that the Applicant is not resting its case on a model analysis. I tried to make that point before, and I want to explain now why we feel that this is the case.

There is just an absolutely fundamental difference between the parties on this question of the use of the model analysis. We believe that the most appropriate method of determining the impact of a power plant is by direct measurement of the conditions in the river prior to the operation of the plant, careful measurement of the effects during plant operations, and then a projection of the impact by direct observation.

This is an empirical method which is different in

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a very fundamental way from the use of the existing experimental, mathematical, biological models in order to model the impact of plant operations on a biological system.

We submit, sir, that these models, although these recently developed biological models, although they may be, and probably are useful to highlight the elements of population dynamics, are unverified, untested, that they rest upon an extremely limited data base, and they rest on a lack of understanding of the biological realities so that good confidence can be placed in the realities of these model projections, and we are not conducting a research program in order to find out whether the AEC staff model or Con Edison's model is the best model.

That is not what we are trying to do. We are trying to find out what the impact of the plant is on the river, which is the basic reason why the HRFA argument that we are not looking at hydraulics is beside the point. We don't need to look at hydraulics to test the plant's impact on the river.

What we need to do is measure the impact by the way I described earlier, the population at the beginning, the plant impact and the population at the end. Certainly, gentlemen, these models have never been used before as a basis for a decision of the magnitude involved here, and it will take at least several years of model development and data collection

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before sufficient confidence can be placed in them so that a decision of this magnitude can be made on the basis of them.

It is our position that the existing data do not sufficiently describe the range of occurrence and the behavior of the various life stages in Hudson River to allow for an accurate evaluation of entrainment and impingement effects whether by modeling methods or any other methods.

In this connection, I would like to take extreme objection to disagreement with the assessment of the adequacy of the Carlson-McCann stuides. They were adequate for determining the impact of the Cornwall pump storage plant on the river, but not the Indian Point plant. The studies, although they had a range which did encompass the scope of the river near Indian Point, were concentrated in the area around Cornwall, and the really good data, as an examination of the Carlson and McCann studies will clearly demonstrate, were collected around the Cornwall project, not in the vicinity of Indian Point.

For this reason, we have urged that the results of the Hudson River Research Study that we have suggested are necessary and that these will give valid results and will better reflect the impact of plant operations than the results of today's experimental models based on the limited studies relative to the Indian Point plant that were conducted by Carlson and McCann.

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Our first exception to the Licensing Board's decision relates to this very fundamental point. By implication, the Board has decided now that it is prepared to make a decision on the basis of mathematical model projections and the present data base. We say the record does not support this, and the Board itself has recognized the limitations of the model when it mailed the statement that was quoted in our brief, when they described the limitations of models of estuarian behavior. The Board specifically recognized the generic limitations of these models.

They did the same thing on pages 49 and 50 of the initial decision when they compared the projections between the two models, the Applicant's models and the Staff's models, and they said these calculations are interesting, but the models assume average conditions and assume smooth increases and decreases in population.

The data show 4 to 6 increases in catch. The data don't match the present models, because the models are primitive, and they are only as good as our understanding of the biological system, which is inadequate at this time.

CHAIRMAN PARLER: In that regard, Mr. Parler, what is your response to the point that Mr. Macbeth made that since the Carlson-McCann report was published, it has been about 9 years in which additional research has been engaged in by the Applicant.

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Why hasn't that effort produced more, and in view of the success of that effort, why is there reason to be optimistic about the success of the current efforts?

MR. TROSTEN: I would say two things about that. First of all, the Carlson-McCann report covered the years 1965 to 1968. We have started a program in 1969, essentially four years ago, so we are talking about -- we are not talking about 9 years. We are talking about a period since 1969, to the end of 1973, which was a four-year period in which we have been studying this.

This information was collected in order to obtain base line data with which to compare the preoperational conditions before startup of Indian Point 2 with the postoperational conditions and that is what we have been doing. To say that this data has been collected, and if we don't have the answer now, how will we get the answer, is to completely overlook the fact that what we need to do is test the situation in the river, measure the situation in the river, before plants startup, and measure it after the plants startup. There is a research program and a data collection effort that is specifically designed to measure empirically what has happened in the river, what has happened -- what the conditions are before the plant starts up, measure them while the plant operates, and measure the effect of the plant's operation on the system.

The idea here is to pulse the system and see whether

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there is an impact that we can discern by the measuring techniques that have been specifically devised for this purpose. That is the answer to Mr. Macbeth's assertion.

Unfortunately, the Board's skepticism, understandable and justifiable skepticism, about the use of these biological models wasn't carried over when it made its ultimate decision. In order to appreciate the significance of this objection, I want to examine with you several basic points that have to be measured at the present time in order to determine whether any -- whether the plant is having a serious impact.

Now the basic parameters that have to be measured are the ones that I indicated to you before in describing the basic scope of the Applicant's research program, but there are certain other areas that I want to call your attention to specifically that represent uncertainties, and these are the sorts of uncertainties that are reflected in our so-called F factors and in our use of the term "compensation" in our model.

It is known that spawning areas of the striped bass vary from year-to-year as a result of changes in river flow and that such changes will affect the number of eggs, larvae and juveniles available for entrainment. The data currently available on spawning location and the consequent distribution of young striped bass are of a very limited nature, and they may not reflect either the average or the range or the

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actual conditions that exist in nature. Here again, the Carlson-McCann studies were designed to study a very specific matter, that is the impact of the Cornwall plant.

These data are not an adequate basis for the staff to conclude that the 70 to 90 percent of the young striped bass pass Indian Point in an entrainable period. The record reflects the notion that these data are not adequate to support such a function.

All the studies performed to date have expressed their concerns in terms of relative conservations of life forms in the river, and difficulties with efficiencies in the past have made it difficult for the authors to express these abundancies in absolute concentrations and it is fundamentally important and necessary to be able to reflect these concentrations in absolute numbers in order to compare these numbers with the intake numbers which are absolute numbers, and with the impingement numbers, which are absolute numbers.

If you have these relative concentrations, you are comparing apples and oranges, and it doesn't work. Third, it is known that the larval striped bass undertake vertical diurnal migrations. During the day, they tend to be concentrated near the bottom and during the night they rise to the surface. A further investigation of this phenomenon is necessary to determine whether at Indian Point where the plant is drawing the water this phenomenon will have a significant impact on the

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availability of the larvae to the intakes. This is the whole point of the so-called F-1 factor, to determine whether they are there, because of this phototaxic characteristic of theirs.

The juvenile striped bass have an active tendency to go to the shoals as they go and avoid capture in nets and to escape predation. If this is the case, it will further control the number of juvenile bass that are available to the intakes, because they will go to the shoals, and they will avoid the intakes, and therefore will not be there to be entrained.

Further, the study is necessary to determine the areas of conservation of these young fish before the effect of the plant on this life stage can be determined. Here again in 1973, a great deal of data was obtained which has not been reduced, which we believe will be strongly indicative of whether the phenomenon of the F factor, F-1 and F-2, really exists, and to what degree less than unity these factors should be assigned.

Next the preliminary result of studies being carried out by New York University have indicated the possibility that the concentrations of larvae at the intakes are substantially lower than concentrations in the river.

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There is testimony in the record that indicates that the NYU researchers have never seen larvae above three quarters of an inch in length in the intakes, and if that is so, this has a fundamental impact on the length of time that these organisms are available to be entrained.

CHAIRMAN PARLER: Are you talking about striped bass larvae?

MR. TROSTEN: Striped bass larvae, that is correct.

Now, both these facts, if they are true, that is, that the larvae do indeed remain in the lower portion of the water column and that they do not actually appear in the intakes, this will have a very substantial effect upon the impact of the plant.

Apart from the philosophical and legal question of the extent to which one should place one's reliance on these models, predictions in reaching a conclusion of the significance of this one, where the stakes are as great as they are here, there is a question whether the present inadequate data which we say are inadequate, reasonably justify drawing certain tentative conclusions.

We have addressed this in our explanation of the use of the F factors and compensation. We have never contended that the existing data were sufficient to

resolve the questions now of the values to be assigned to the F factors and the precise values to be assigned to compensation.

It is because of the needs to get more information on that that we have to have a research program.

You have asked for clarification of the evidentiary support for F-1 and F-2.

With respect to F-1, we used available measurements from three field observations. These measurements showed that if one compared the mean conservation values for the upper East River quadrant where we consider the plant draws the most river water from, with the average conservation for the cross section, the ratio is significantly lower than unity.

We used the NYU data which are the most complete and we assigned the best estimate value of about .4 for the various life stages of striped bass. With regard to the F-2 factor which is the relationships of the concentration of the organism actually seen in the intake, measured in the intake, relative to the upper east quadrant, it is correct that prior to 1973 there was a relatively small amount of plant sampling data available upon which to draw a conclusion.

Nevertheless, since it is known that the older larvae tend to seek the shallow area as seen by

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the Staff's final environmental statement and the Carlson-McCann studies and the fact that the studies reported in the record have never shown larvae above three quarters of an inch in the intakes, it is reasonable to assume that the intake concentration is not equal to unity, as the portion conservatively assumed.

The factors for assignment of a value less than unity are found in the transcript and in the testimony of Dr. Lawler, which I will supply for the record in accordance with the Board direction.

With respect to the Staff's and Intervenor's suggestionthat there is no significant difference in larvae concentrations as one moves laterally across the river, Dr. Lawler indicates that although there is difference in the data used, the difference between the surveys and the bottom data is the controlling data.

If it is calculated using just the upper east quadrant or the entire upper quadrant has little effect upon the numerical value of F-1, because in each case they are substantially less than unity.

The Staff and the Intervenors have indicated that, since Indian Point 2 intakes extend near the shoreline that the full water column is subject to withdrawal. That would negate the effect of the F-1 factor. For this reason the Staff and the Intervenors claim F-1 should be set

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at unity. Now, the Staff and the Intervenors have misconstrued the Applicant's testimony in this regard. When Dr. Lawler discussed the concept of F-1, he shows that far more than merely the local area around the plant was involved in the withdrawal of the water. That is rather than being limited to the source of water some 150 feet in front of the plant, as has been implied by Dr. Goodyear, water is withdrawn, and therefore, organisms are entrained from a more intensive area from an upper layer of the river, and we believe the evidence fully justifies this.

DR. QUARLES: Will your research program get this much of the hydraulics? You indicated that you were not particularly concerned with hydraulics but it seems to me this might have a bearing on the validity of your remarks.

MR. TROSTEN: We believe this research program will enable us to resolve the problem of what is the product of F-1 and F-2, because we will be measuring the concentrations of larvae near Indian Point and up and down the river.

DR. QUARLES: I had something more direct in mind. Will you get flow patterns in the adjacent cross section?

MR. TROSTEN: I would have to check the story on that. I know we have information on model studies on that, but if I may, I would like to be able to

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specifically respond to that question. I think the answer is yes.

Now, I just want to respond at this time to a point that Mr. Macbeth made, and that is while the Board did not take a conservative value, they said F factors are not equal to unity, and they took a medium position. That is not a correct argument at all.

No one even suggested that the values in this case were more than unity. No one produced any evidence that they were more than unity. That is the sheerest of speculation.

So, I do not regard that as being significant in the slightest way. The Board specifically agreed that there was some justification for the Applicant's combined best estimate of F factors and found that the combined F factor is not equal to one.

We submit that the Appeal Board needs to focus on two issues. First, is there a reasonable basis, giving the admitted lack of data, to assume that the F factors are equal to one, when the limited evidence in the record suggests that the assumption is incorrect and data collection effort is under way now and which will resolve the questions and could demonstrate that this critical assumption is false, and I think it is quite clear that the assumption, when the F factors, the F factors are equal to

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one, it can clearly be demonstrated within the period of this research program. I think the record is clear that we can do that part of it. The question of compensation presents a complex issue, but on the F factors, I think the record is clear we can do this by January 1,1977 as we say we can.

Now, I would like to turn to the other point that the Board wanted to have argument on which is the evidentiary support for the effect of compensation.

And, now what we face here basically is a conflict of opinion. Data have not been collected which demonstrate that there is or is not a compensatory mechanism operating in the striped bass population of the Hudson River, data that is,and by the same token, I do not think data have been collected which demonstrate that the forces of gravity are in operation in the population.

Dr. McFadden has testified there would be a compensatory response that would mitigate the impact on the striped bass population.

Since September, 1971, he has been closely associated with field research on Hudson River fish populations and hence he has had an opportunity to test the general conclusions with respect to whatever information is available about the Hudson River striped bass.

Dr.Rainey is perhaps the leading expert in this

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country on the history of the striped bass.

Relying on the opinions of these experts together with an extensive literature survey which indicated there would be a compensatory response in the striped bass population which would mitigate the effect of a power plant operating at Indian Point, this was equated into the model.

The mathematical expression is based upon the collective judgment of the Applicant's expert witnesses which in turn rests on general principles of biology and such data as are available concerning the Hudson River striped bass.

Dr. McFadden testified and he relied in the testimony on the comprehensive review of the ecological literature and pertinent data cited in his testimony.

The commendation occurs in animal populations studies. Compensatory processes have been shown to operate in estuary and seas populations, including striped bass.

This, in the opinion of Dr. McFadden, indicates that these populations versus a potential for growth would constitute a substantial compensatory research.

The removal of some of the stock would encourage the compensatory increase now in the survival of the remainder in a fraction characteristic of all animal population

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studies.

Dr. McFadden testified in his October 30 written testimony that, "Relevant data from other striped bass populations and general principles of fish population dynamics can be applied directly to the Hudson River situation."

Now, it is not necessary, and I would like to counter two particular points that Mr. Macbeth has made to show that compensation occurs just in that year class, that there is a point that has run through the brief and I submit it is based on a complete misconception.

Although Dr. McFadden has testified that compensation is likely to be most effective in early stages of fish life rather than later stages, he also testified that it could occur at any time and it is not necessary for the Applicant to demonstrate that compensation occurs at a particular time.

Secondly, the statement that we haven ot proposed a specific test for the compensatory mechanism I submit is beside the point, because we have suggested a variety of things such as increased growth, increased spawning, a change in the sex ratio and these are described in our testimony, of the mechanism, and hence it is not necessary to go through the exercise of describing the mechanism when that might not be the one that was operative.

The thing to look for is whether it is working,

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not which one of the mechanisms is working.

Here again, the Applicant's basic objection to the approach adopted by the Licensing Board relates to the standard whereby it judges the evidence. The Applicant's witnesses presented their conclusions which are based upon years of experience, the general principles relating to population dynamics and some Hudson River data to support these general principles.

In response to this testimony, the Staff and the HRFA stated their own conclusions which we submit were not as convincing as those of the Applicant.

When it weighed the mass of testimony in the balance, the Licensing Board required the Applicant to prove its case. It placed the burden of proof on the Applicant, which is what the Intervenors told them they should do, and thus the Board stated it is desirable to take compensation into account, but it does not find convincing evidence that the effects of present levels of population are not likely to reduce the plant's impact as much as Applicant's figures indicate.

Where is the convincing evidence that compensation will have no effect?

At this point in the decision and elsewhere in the decison which we point out in Exceptions 5 and 6, the Board does not place the parties on an equal footing.

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There are admittedly great uncertainties about the basic questions submitted in the hearing. Our basic position is this, as best we can determine on the basis of existing data, the plants will not have an irreversible or substantial impact during these three years.

Let us operate with the plant and test these assumptions with actual operating data.

Mr. Chairman, I would like to reserve the rest of my time.

DR. QUARLES: I would like to take a minute of time, if I may. I am going to ask him to comment on a remark of yours, Mr. Macbeth, and if I misstate it, please correct me before he replies.

As I understood Mr. Macbeth, he said something to this effect, that the monitoring program can not detect the 15 percent decrease and this could then continue at 15 percent for 8 years or thereabouts and that the Licensing Board set the decrease would not be acceptable.

MR. MACBETH: I would make one slight change. The monitoring program, of course, it is tied to the research. The 15 percent number after five years would probably rise when the fish came back to spawn. But, during the first five years of operation, the number would be fifteen percent and the Applicants testified that they did not detect anything smaller than 25 percent.

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DR. QUARLES: Will you comment either now, or when you come back?

MR. TROSTEN: Let me comment now. I was going to reserve that until later.

DR. QUARLES: It is all right if you do.

MR. TROSTEN: No, I will comment on it now.

That does not imply that you cannot detect a lower impact. It does mean, however, that if you are going to detect a lower impact, the confidence levels are going to be greater. You would have to have a greater uncertainty than the 95 percent competence level. We picked the 25 percent number not because that was an absolute firm number, but because we felt it was so far below what the Intervenors had said, because it was so much within the levels of reduction which our experts told us were easily sustainable by fish populations over many years and because of the nature of the sampling program that we were getting into in the river and the sort of confidence we wanted to have, the 25 percent number appeared to be a reasonable number. Had the Board insisted to use that level rather than 15 percent, the program could have been restructured and perhaps can be restructured.

What it depends on is the level of certainty that you want to have, and what you are interested in preventing. There is nothing in this record to suggest, and

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we have never said that we cannot detect something less than 25 percent. It is a matter of how much certainty you want to have that the number you are seeing is actually the real number.

Thank you.

CHAIRMAN PARLER: We will recess now, to resume at 1:40.

(Whereupon, at 12:10 p.m., a recess was taken until 1:40 p.m. of the same day.)

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AFTERNOON SESSION

(1:40 p.m.)

CHAIRMAN PARLER: The oral argument session is resumed. Mr. Macbeth, would you please proceed with your response?

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ORAL ARGUMENT OF ANGUS MACBETH ON BEHALF OF HUDSON RIVER FISHERMEN'S ASSOCIATION.

MR. MACBETH: I would like to start by turning to the question of the impact on the closed cycle cooling system, particularly the natural draft closed cycle cooling towers that have been the mode of closed cycle cooling that all parties have agreed would be most preferable at the site.

I think that understandably, in terms of the way the initial decision was written, an impression was left that there was little evidence in the record as to what the effect of the closed cycle system would be, particularly natural draft towers, and that there might well have to be a considerable amount of research into that issue.

I think that that really is a misapprehension from the reading of the initial decision, and I think that the short space that was devoted by the licensing board to the impact of closed cycle cooling is really the result of the fact that there is no contest on the point between any of the parties to the hearing. All three parties put in evidence as to the effect of closed cycle cooling.

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The Applicant had evidence included in its Supplement 3 to its environmental report which I believe is Exhibit 3-C in the hearing. The foundation document for that was a report from Burns and Rowe which the company received in June of 1972, and that is in the proceeding as Hudson River Fishermen's Exhibit V, and there is evidence, further evidence from the Applicant in testimony at the transcript 7562 in which one of the company's experts says that as of last December, the company knew of nothing to indicate any new impacts other than those already set forward in the supplement.

Chapter 11 of the final environmental statement contains the staff analysis, the major problems, and testimony on behalf of the Fishermen's Association by Dr. Ainsley, which was dated October 30, 1972 and follows Transcript 6276. It has further analysis on behalf of fishermen.

Uniformly, the analysis there indicated that there would be no significant effect at all from either saline drift, salt deposits, or fogging and icing which have typically been the things that have most disturbed the Board.

I would like to read briefly from page VII-6 of the Burns and Rowe report, Exhibit 5, which deals with the salt deposition problem, in which they determined that the worst area for salt deposition would have a rate of 7.9 pounds per acre per year, and this is clearly a conservative number.

They state that the drift recommendation is based on

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Homer City measurements which indicate 0.0025 percent with a 50 percent increase to allow for uncertainties. Other drift rates and/or concentration factors would result from salt deposition. It should also be recognized that the above is based upon the worst consecutive month's drought in approximately 50 years of records.

Those figures are compared to other figures on salt drift to provide a basis for comparison, salt fall out in coastal areas will normally reach values of 25 to 300 pounds per acre per year, highway salting indicates 1,000 pounds of salt per acre per year would cause damage.

So we face the situation where the conservative calculations indicate only about 8 pounds in the worst sector from the salt deposition, and the level at which damage has been recognized is at 500 to 1,000 pounds. I think that really is the reason that not very much emphasis was put in salt deposition. One witness considered the Applicant's report to be realistic.

The Applicant indicated there was no indication of anything worse as of last test. The Staff also reviewed the figures and did independent calculations and came to the same result, that there simply would be no damage from salt deposition.

On the question of fogging and icing, the plume is a thousand feet above ground level. This is a high natural tower, as has been pointed out time and time again, and there

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simply would not be fog or icing directly from the tower at ground level. That is reported again in this whole series of documents that I have just cited to the Board.

There would be a moderate effect from noise, but the information on that is certainly available. There would be an aesthetic intrusion. We know as much about that now as we will ever know. I suppose the way to find out about it is to build the tower.

So I think the heart of the question on the closed cycle cooling system is the fact that there simply wasn't a great deal, or hardly any controversy as to the environmental effects of the tower between the parties, unless it wasn't addressed by the Board as a truly serious issue demanding a great deal of discussion in the initial decision.

The Staff also made clear that when they said they wanted a report from the Applicant, what they wanted was a report from data presently available. That is discussed at Transcript Page 6960. They, of course, wanted that as of July 1 last year. Their business was that they were not in the business of designing closed cycle cooling systems for the Applicant.

Was the Applican't job to come in with a design for a closed cycle system, whatever the Applicant thought was best, and the Staff would then review it and give its approval, and there might be minor changes here and there. They were not expecting a program of a year of meteorological studies and wind

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direction studies. What they wanted was a report based on presently available material.

So I think the whole question of extended meteorological studies, at least as far as what the Staff of the AEC wanted, and I think that is what the licensing board was addressing itself to in the initial decision, is frankly a straw man.

The staff has made it clear that the information they want is present now, and the studies and analysis that has already been done indicates a level of damage or possible damage so far below what could be considered serious that there really isn't an issue except about fine details as to what should happen with the closed cycle cooling system. A long period of study isn't necessary.

CHAIRMAN PARLER: Mr. Macbeth, that is fine what the Staff said they wanted. What does NEPA require? Doesn't NEPA require thorough environmental analysis?

MR. MACBETH: I think a thorough environmental study has been done on the facts of the study. This is a report --

CHAIRMAN PARLER: That is a thorough analysis?

MR. MACBETH: I think it is. There may be fine details of design that are needed, but we have a balance where we see enormous effects on the fish and really miniscule effects from stall or fogging.

DR. BUCK: Have you done just as much research on the river as was done on this? How would you know whether there

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was an enormous effect on the fish or not, if that tower research had been done for the river?

MR. MACBETH: They are marginal as a cooling tower --

DR. BUCK: Why is it that the AEC has extensive programs on the effect of salt now underway?

MR. MACBETH: That I don't know.

DR. BUCK: Do you know if the drift arrestors are adequate or not? Do you know whether the calculations on drift arrestors are adequate?

MR. MACBETH: They have been studied by the company, by our consultant --

DR. BUCK: Isn't it true that the AEC is now requesting experimental work on drift analysis to prove out those calculations?

MR. MACBETH: At this site? No.

DR. BUCK: At any site. This site is an important one, by the way. It is different from other sites.

MR. MACBETH: I won't dispute that.

DR. BUCK: It is different here from most other sites.

MR. MACBETH: There is evidence in the record that it is quite comprable to that in the Appalachian region?

DR. BUCK: Can you quote the evidence. There is a state. Here that work has been done on towers in the Appalachians, but I know --

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MR. MACBETH: It is Dr. Ainley's cross-examination of January. I will get you the page number.

DR. BUCK: I would like to see that.

MR. MACBETH: I cannot address myself to what AEC's concern is in the general study. I wasn't familiar with it. But the Staff certainly didn't feel it was necessary here, and again it has been reviewed by experts on the Staff, an expert for the fishermen, and consultants --

DR. BUCK: Who is your expert?

MR. MACBETH: Eric Ainsley. It has been reviewed by the company and its consultants, and no one has ever stepped forward and said, you know, that they have any evidence or any indication that a serious adverse effect will take place. They say there is a possibility and you have to nail down every last little detail.

DR. BUCK: Is that what you are saying as far as the river is concerned?

MR. MACBETH: No, I am saying we have enough knowledge of the river, so that we can take action. I am opposing the Applicant's notion that again with the river, we must go on and on and on when we can see the magnitude of the impact to, you know, nail down what I think are points which are not necessary.

There is a vast body of data here. It has been gone over very carefully by a large number of experts.

DR. BUCK: The point I am getting at here is that I

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know of no data which under the inversion conditions and so on that may exist around Indian Point 2 that the plume will not come down to the ground. Do you know of any data which shows that the plume will not come down to the ground?

MR. MACBETH: I do not know the study.

DR. BUCK: Just answer the question. Do you know of any data on the record that says and shows that this plume will not come down to the ground?

MR. MACBETH: There is data in the record that say that the Appalachian Region is comparable to that of Indian Point, and that that has not happened in the Appalachian region.

DR. BUCK: I am asking you if you know from the meteorology of Indian Point 2, is that there is data that shows that the plume will not come down to the ground?

MR. MACBETH: I do not know of a study that precisely says that. There are studies from the Applicant's consultant and from other places across the country that indicate that that will not happen. They have not been done by having a balloon or tower 400 feet up at Indian Point. I agree that has not happened, but there have been thorough studies at other sites like Keystone site.

There is knowledge as to what the meteorology is at Indian Point, and from that, experts for all the parties have come forward with this conclusion. There simply isn't an allegation from any of the parties that there will be fogging

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and so forth. The Applicant couldn't contend it, the Intervenor doesn't contend it, the Staff doesn't contend it.

DR. BUCK: The licensing board implies, at least, that the only effect of the tower is the noise.

MR. MACBETH: There will be some noise effect.

DR. BUCK: They don't say that. They say it would be aesthetic. Have the people of Buchanan, for example, had a chance to present their views on the aesthetics of the tower?

MR. MACBETH: The Mayor of Buchanan was served with all the papers in this proceeding. There have been many public hearings near the site. The fact that the AEC was proposing this has been publicly known through the newspapers and elsewhere. No one has stepped forward, no one has opposed the construction of the cooling tower anywhere in this proceeding.

Even the Scenic Hudson Preservation Conference, which has certainly been a group that has defended the aesthetic area of the valley, said they did not oppose the construction of the cooling tower. That is in the second volume of the second environmental statement.

I wanted to turn from the cooling tower problem to the research question, and just to provide the Board with references to indications of the amount of research that has been undertaken at the site, the Applicant's Exhibit 3-C, Appendices S and T, reflect the course of research, as do a series of letters between Mr. Hall and Mr. Woodbury, following the

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Transcript at 9386.

I think in light of the emphasis that has been put on possible mitigating measures that could be taken, the statement of the licensing board at Page 85 of the initial decision should be remembered. They say that these mitigating measures, and they are listed out, the proposals that have come forward, are in various stages of research and engineering and little can be concluded regarding their cost or effectiveness.

There is also again testimony in the record that at the present time, the Applicant cannot produce any estimates of what the effectiveness of the various measures would be. Again, I will provide the actual transcript reference for that. I didn't have it prepared with the argument.

So that, again, it seems to me that the mitigating measures, the kind of proposal, they are the kind of proposal that is virtually impossible to contest. There may or may not be mitigating measures. That, again, it seems to me, is a strong reason for imposing the requirement that a closed cycle cooling system be installed, because that is a mitigating measure that we all know will have the effect of preserving the fishery in the river and will not have, beyond the aesthetic impact, a minor effect on the rest of the environment in the Indian Point area.

Another point that Mr. Trosten made at some length was that the program that the Applicant is proposing is

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essentially one that is aimed at seeing how the plant works and then from true empirical data, discovering what the effects of the plant are. There are a number of points I think which can be made about that.

The first, of course, is that that is not what the National Environmental Policy Act is designed to achieve. I think the decision of the D.C. Circuit Court in Scientists Institute for Public Information vs. the AEC makes that clear. The point of the Act is to make an estimate of what the effect will be before you go ahead with the program.

The point is to analyze the project in advance, not to go forward with the project and then when you have it built, well, see what you can do to mitigate the environmental effects if environmental effects occur.

So that while Mr. Trosten may be proposing a program that under some other circumstances would make sense, it certainly doesn't under the Act here and it doesn't under the actual facts of what is going on on the river.

Not only, of course, are there vast bodies of data which in our firm opinion present a full record for the Board to make a decision on, but also the policy of the company has not been to build one plant and then see what the results are. The policy of the company has been to build plants all up and down the river, so that we are not in a place where there is any kind of careful testing as part of the company's policy.

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The policy is to put once-through cooling all up and down the central reach of the Hudson River.

There is another further problem. At one point in the hearing, and Dr. Lawler, one of the witnesses for the Applicant, proposed looking at the history of the growth of the population of the striped bass in order to see whether the model proposed by the Applicant or the model proposed by the Staff was the better model to describe the past history, and had set out in his testimony on sensitivity of the model following transcript page 9405 -- it is page 11 of the balance of the prepared testimony.

I reached the conclusion from that that in fact, the Applicant's model was better than that of the Staff. The Staff responded in testimony on the striped bass population which follows transcript 10826 and in testimony at transcript 9916 to 21, indicating that Dr. Lawler failed to take into account the fact that the striped bass population seemed to have been climbing over the last five or ten years, the period when the first plants were being felt, or their impact was being felt, and if you took that into account, then in fact, the model proposed by the Staff was much better than that of the Applicant, and in fact, the history of the operation of the plants on the river indicated clearly that in fact exactly the kind of results that the Staff predicted were taking place.

DR. BUCK: Is this declining in the river?

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MR. MACBETH: Declining in the river. It is measured through the landings in the river.

DR. BUCK: The river, or in the Mid Atlantic?

MR. MACBETH: In the river, and checked against the Mid Atlantic as well.

DR. BUCK: Where were the landings taken?

MR. MACBETH: That I cannot answer.

Dr. Lawler replied to that on April 20 in testimony following transcript 11044, contending that the real problem here was natural fluctuations, and I think that this is an indication of exactly what we are going to run into if we delay a decision in favor of more research.

If new evidence comes in indicating that Staff's model was correct, then the problem of natural fluctuations have been raised again. Since those do take place, it will be a situation where it will be impossible to pin down and demonstrate to the Applicant's situation that the plant is having a serious impact on the river.

I think that that passage of testimony, those three pieces of prepared testimony, demonstrate very graphically the problem that will arise if a decision on the research is put off. Moreover, they go a long way to rebut Mr. Trosten's basic point that we ought to do this and take a look at what the effect of the plant is.

Here is a situation where an attempt is made to look

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at what the effect of the plant is, and the indications are that either that plant, the plants that are presently operating are having a very serious effect already, or there are immense natural fluctuations which means any research we do gets lost, the results get lost in the background noise.

That ties, too, to a final statement made by the Applicant's chief witness on research, Dr. McFadden, who quite bluntly said at transcript 11368 that the standard situation of management is management in the face of real uncertainty.

I am not quoting it exactly, but that is the gist of it. That again indicates that even form the Applicant's own position, they admit that the standard management practice is that there will be uncertainty in the fisheries. I think that indicates again from the Applicant's own testimony that on the kind of full record that is before the Board here, the decision should be made to move forward with the conditions for the imposition of a closed cycle cooling tower and not to allow further research to go forward.

As I believe I indicated this morning, a number of points, there are flaws and errors in the research program, and again Dr. Goodyear's research from April 10, following transcript 10826 probably sets that out as fully and more directly from an expert on it than I could do.

Once more, the example of the Sacramento-San Jaoquin, where after 15 years of research, there is still debate among

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the people as to what the research means. That is relevant here. It is unlikely the voice of controversy will be stilled by 10 more years of research, and it is likely we will be faced with the same kind of problem we are faced with here.

There are other things we could find out, and my position is, and that of the Staff as well, that enough is known now and the magnitude of the problems is so clear that action should be taken.

I should like to turn finally to the question of the middle Atlantic fisheries.

DR. BUCK: Can I ask a question on the R and D that bothers me? You say if you go on with the research program that we may be faced several years from now with uncertainties as to what the effect is, and therefore, we have to continue the research program. If this uncertainty exists, does this not mean that the effects on the fishes in the Hudson River has been relatively minor?

MR. MACBETH: I think that I really didn't put that as fully as I should this. I think that what we will be faced with, the Applicant is raising the same kind of questions that it is raising now, the fishery declines, the Applicant says it is natural flucturations. Then we have to do another long round of research to discover what the natural fluctuation is.

DR. BUCK: But if there are more than natural fluctuations, and it will continue to go down. Before it goes to zero,

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that is, and before it becomes irreversible. You keep stressing the fact that you may be faced with a long series of research. The only time I can see that you will be faced with research is if there is no proof that the damage to the fish is becoming irreversible.

MR. MACBETH: To start with, I think that that evidence is here now, both in the history of the fishery over the last ten years and in the record of this proceeding.

DR. BUCK: What in the evidence right now shows that the damage so far occurring in the Hudson River is irreversible?

MR. MACBETH: That depends what you mean by irreversible

DR. BUCK: I mean unrecoverable. Not the dead fish. I am not talking if you damage a car and it is total that that is irreversible. I am saying you can buy a new car and everything is fine. I am saying here there is a fish kill, and that reduces the population for that particular period of time, but when I say irreversible, it is a continuing decline so that eventually your fish disappear.

MR. MACBETH: And that you would never be able to bring them back?

DR. BUCK: Precisely.

MR. MACBETH: You could probably eventually over the long run bring the fish back. I don't think that is what irreversible means in terms of the National Environmental Policy Act, or the standard by which the Act should be measured.

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The impacts are to be considered, but they are just partof the impacts to be considered under the Calvert Cliffs decision, and the impacts which are irreversible to that year class are impacts which have to be taken into account.

You probably could take out virtually every striped bass in the river and over 100 years bring them back. I don't think that is what the Act means. The Act was aimed at finding, as the Calvert Cliffs decision says, the optimal beneficial action. That, in this case, is to prevent the kind of substantial, permanent, irreversible impact that the plants would have.

DR. BUCK: Go ahead.

MR. MACBETH: I would like to turn at the end to the question of the Middle Atlantic fishery and the relation of the Hudson to the Middle Atlantic fishery, and there are a number of different methods of analysis that the Oak Ridge staff and the Fishermen's Association undertook to demonstrate that the Hudson supports approximately 80 percent of the striped bass population in the waters of Delaware, New Jersey, and New York.

There was an analysis of tag returns from the Chesapeake and the Hudson. Very few two year old fish leave the Chesapeake, and there is the evidence that, some of the geographic evidence, that the fish in the Chesapeake move in the semi-sheltered areas of the Bay itself, while in the Hudson, those semisheltered areas tend to be Long Island Sound and the south

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shore of Long Island.

There is a mapping of the Hudson landings against the Middle Atlantic landings, and I think that is 79 percent of the Mid Atlantic stock which can be accounted for by the Hudson, while the correlation between the Chesapeake stock and the Middle Atlantic produces a spurious correlation.

Again, this is set out in the Fishermen's proposed findings of fact starting at Section 3.43, again with a great number of references to the record so that that would save me going over them one by one.

DR. QUARLES: In connection with that, Mr. Macbeth, at least one of the witnesses, and more, I think, maintained that projection analysis was not legitimate in this case, that the data are not independent.

Is there countervailing testimony somewhere?

MR. MACBETH: I believe there is.

DR. QUARLES: Would you get us that?

MR. MACBETH: Yes.

DR. BUCK: Are you go-ng on to something else now?

MR. MACBETH: Yes.

DR. BUCK: Let me ask a question first.

As I understand it, your conclusions on this are primarily based on Dr. Goodyear's analysis of testimony, am I correct?

MR. MACBETH: Dr. Goodyear's analysis is also an

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independent analysis by Mr. Clokey, which included an analysis of fish that get in the Hudson River, and that is in the transcript at, I believe it is transcript 8560 and following.

Again, I would like to be able to check that.

DR. BUCK: Does he in that unequivocally support Dr. Goodyear's estimate of 80 percent?

MR. MACBETH: I think any scientist always says things with a certain amount of caution. It seemed to him that was the best number.

DR. BUCK: Can you give me a number of a page in there where he says that 80 percent is the best number? Would you send that in to me, please?

MR. MACBETH: Yes.

DR. BUCK: All right. Now, another thing. On, I think it is transcript 8129, yes, here it is -- Mr. Clark was your major witness, as I recall. There were some questions, and he was under cross-examination at the time, and I think it was Mr. Trosten who asked, "Would you say an intelligently conceived research and tagging program could contribute significantly to the knowledge that the contribution of the Hudson River makes to the coastal fishery?"

Mr. Clark's answer was, "It could conceivably do so. The tagging studies to date, including mine, are nothing but hodge podge, a patchwork of miscellaneous attempts that are uncoordinated."

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He was asked a question about Chairman Jensch, and he said, "I was on a striped bass research committee for a number of years during the Sixties, and we always got together and talked about doing that, but nobody every did it. They just couldn't get themselves together enough to carry out any cooperative program that had any meaning."

Now, what Mr. Clark was talking about here was tagging studies that primarily were relied upon by Dr. Goodyear. Now, if these are classified as an uncoordinated hodge podge of tagging, which Dr. Clark says the program had no meaning, how can you rely on the tagging programs to prove that the Hudson River source amounted to 80 percent of the Mid Atlantic fisheries when every previous expert on this situation had a different view?

MR. MACBETH: I think that there are two answers to that. First of all, I think what Mr. Clark is addressing himself to there is a coordinated program up and down the entire Mid Atlantic area, and what we have are a number of individual studies of different places which then have to be put together.

They are a hodge podge in the sense they aren't one vast coordinated study. But I think the record will also show that when Mr. Clark sat down and went over the tagging studies, they were such that he came to the conclusion that you could make estimates from them.

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The other point, of course, is that those are the

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same tagging studies that the Applicants and everybody else relies on. If one takes the position and decides on the basis of the record, nothing can be made of the tagging studies at all, and I don't think that was the considered opinion of any of the experts who testified, that if one did reach that conclusion that it would stand for all sides, and the Applicant would know no more about the Mid Atlantic than anyone else knows in the situation.

DR. BUCK: My point is that the people who did the tagging studies, particularly those in the Chesapeake, and those were concerned with what happened to the Chesapeake fish and so on and where they went up and down the Atlantic coast, and there were many of them that were involved in this, and they all came to the same conclusion that the Chesapeake as a major source of the Mid Atlantic fisheries.

Now, we have Dr. Goodyear coming along with no experience in this thing as far as I can find, and this is a paper review of the situation. He came to a different conclusion from the people who had done the studies, and we have Dr. Clark in a sense, making him up to some extent, but at the same time admitting that the total coast-wise tagging program was a hodge podge.

I am confused as to how one can jump to a conclusion in this respect over the studies and determinations of the people who have done the tagging.

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MR. MACBETH: It certainly has been common belief that the Chesapeake was the main contributor. I think the answer to that is that Goodyear went back to the actual data that underlay the papers that the investigators on both the Hudson and Chesapeake had done and his analysis was built up from the data.

So he wasn't simply relying upon the opinions of the investigators, but analyzing their facts. I think that is how he was able from their data to reach conclusions that they had reached.

Clark himself has done a great deal of tagging work. Clark, too, went back, admittedly after the Staff had put forward this notion and reanalyzed the material and came in with the same result that Goodyear had reached, from a slightly different method, using some different studies, and putting different weights on some of them.

But he was a man with a great deal of practical experience in the field, and he reached the same result.

The Applicant, on the other hand, too, I think, if you really read the evidence on which the Applicant relies, you will find there really is nothing in the way of, you know, a persuasive, coherent statement from anyone --

DR. BUCK: I have some problems about the regression analysis, but I will wait until Mr. Karman gets on the stand on regression analysis, because you brought one fact into the

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hearing, if I recall it, in introducing something that has been done for the Staff by the Staff which they did not introduce, and that was the correlation between the Chesapeake catches and the Mid Atlantic catch, and I have some questions which I will ask Mr. Karman, because it was his witness who brought this up.

MR. MACBETH: In passong on that, I take it it was Dr. Goodyear's position --

DR. BUCK: There was more than that involved.

MR. MACBETH: My time has run out, but in response to the emphasis Mr. Trosten put on the F-1 and F-2 factors, I would ask the Board to read carefully the Fishermen's response to the Applicant's exceptions 5 and 6, which begin at page 36 of our brief. They are all the references and the basic analyses are laid out in some detail.

In closing, I would simply like to return to this, and emphasize again the importance of this case for the Hudson River, for the ends of the National Environmental Policy Act as passed through, for the long line of analysis and work that has been done in the Scenic Hudson case, and fundamentally that view on the emphasis of unquantifiable values that are clearly inherent here, that I think Justice Holmes summed up so well when he said that we, not the river, is a treasure.

I think there is a full record here. Research will produce nothing more to change our conclusions than the licensing

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board properly reached here. It is clear the environmental effects of closed cycle cooling towers are clearly less detrimental than the effects on the fish and really the time has come to take action to preserve the Hudson River, the estuary and the vast aquatic biota that it encompasses.

CHAIRMAN PARLER: Did you have time to cover all the important points?

MR. MACBETH: I believe I have. I believe I covered the points that the Board set out in its order, at least in brief form. Perhaps if anything different comes up from the other speakers later, I can research just a few minutes to respond to them, since we haven't heard from the Staff at all?

CHAIRMAN PARLER: All right.

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MR. MACBETH: Thank you.

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CHAIRMAN PARLER: Mr. Corcoran, please.

ORAL ARGUMENT OF MR. JAMES P. CORCORAN ON BEHALF OF THE ATTORNEY GENERAL OF THE STATE OF NEW YORK

MR. CORCORAN: One matter which is of great concern to the State of New York which really hasn't been discussed yet is the possible effects from thermal pollution which will result from the once through cooling system at Indian Point 2. I realize that the Licensing Board did not find definitely that there would be violation of state thermal criteria through the use of the once through cooling system, but there is substantial evidence in the Final Environmental Statement and in portions of the record, evidence from the AEC Staff, that state thermal criteria are likely to be violated, at least during certain months of the season, if a once through cooling system is permitted to be employed at Indian Point 2.

Now Con Edison rather than dealing with this very serious problem seems to be content to give assurances that the state thermal criteria will be met, but has not produced substantial evidence to indicate this.

I would like also to comment on the research program. Indian Point 1 was put on the line, I believe, in 1961 or 1962, 12 years ago. During that entire period of time and before that time, this applicant has had the opportunity to conduct research to determine what would be the possible effects of impingement, entrainment, and thermal pollution on the biota of the

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Hudson River. It further admits in oral argument today that the present research program which it is using as an excuse to stave off the installation of cooling towers, perhaps forever, may not measure an impact of less than 25 percent.

This would mean, therefore, that the striped bass species could be impacted by as much as 24 percent each year and Applicant's research program would not detect this. This, I submit, is hardly an adequate research program.

Applicant has further given no assurance that it can construct a cooling tower by September, 1981. One can anticipate that after completion of the research program, which may very well be inconclusive on all the major points, Applicant will make the same arguments that it is making here today, that there is no proof that irreversible damage will be done, and therefore they should be allowed to continue with their once through cooling system. It seems to me if Applicant is going to construct power plants on the Hudson River at Indian Point and elsewhere, and is going to be withdrawing water at Indian Point 2 in the amount of 840,000 gallons per minute, it seems to me it is incumbent upon the Applicant to demonstrate to this Commission that no serious adverse impact will be done to resources of the people.

I think Mr. Macbeth has adequately discussed the questions of modeling, F factors, compensation. As we read the record, we believe that the preponderance of evidence is on

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the side of the staff in its presentation. We believe that Con Edison's assertion that there will be mitigating factors has not been demonstrated by them.

It is their assertion, it is something for them to prove. In fact, with regard to the F factors, it appears from the record that the Applicants assumed the water was being withdrawn from the wrong quadrant, from the upper east quadrant when in fact most of the water will probably be withdrawn from the lower east quadrant.

With regard to compensation, I would mention that there has been research done on the question of compensation as it relates to striped bass. That was done in the San Joaquin River in California. The evidence seems to indicate that there is no effective compensatory mechanism at work there.

Finally, I would like to say that I don't read the decision of the licensing board as being all in favor of the environmentalist by any means. It licensed the power plant and will permit the power plant to operate until May 1, 1978, with a once through cooling system.

That is four spawning seasons. It rejected HRFA's request that the plant be closed down during spawning season. I have nothing further.

DR. QUARLES: Mr. Corcoran, going back to your discussion a moment ago on the adequacy of the research program, you made one statement which I believe is contrary to facts,

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and it was presented just before the luncheon break. I would like to back up on that and ask if your statement holds in light of what I understood.

You indicated that Applicant's research program could not detect less of the 25 percent change. Just before lunch, I asked Mr. Trosten to comment on a statement of Mr. Macbeth's in which a figure of 15 percent had been used, and he pointed out if I understood them correctly that they could detect the 15 percent change, but the confidence level would be less.

Would you still hold to that statement if it can detect the 15 percent?

MR. CORCORAN: First of all, Dr. Quarles, it seems to me what he was saying in effect was that he could give us no assurance that it would detect the 15 percent. When he said the confidence level is less, that means the chances are less they will be able to detect it.

DR. QUARLES: My question was, if they can detect 15 percent, would you still maintain that it is not an adequate program?

MR. CORCORAN: Yes, I would maintain it is not an adequate program, because there seem to be so many other questions about this research program that will not be resolved. There is the question raised by Mr. Goodyear in his testimony that the program may not be able to measure the differences

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between natural fluctuations and losses caused by the plant.

There is also testimony that hydraulic factors are not being taken into account sufficiently in the research program. Dr. McFadden in his testimony said there is uncertainty about this research program. I think there are so many questions that it really cannot be used as a basis to permit the Applicant to continue to play games, in effect, with the biota of the Hudson River.

I think further, and most importantly, this record provides sufficient evidence to demonstrate that there will be a serious adverse impact on the biota of the Hudson River to justify the installation of the cooling tower at that site.

DR. QUARLES: Thank you.

CHAIRMAN PARLER: Any questions?

DR. BUCK: No questions.

CHAIRMAN PARLER: Thank you very much, Mr. Corcoran. Mr. Karman, would you proceed, please?

ORAL ARGUMENT OF MR. MYRON KARMAN ON BEHALF OF THE OFFICE OF GENERAL COUNSEL, ATOMIC ENERGY COMMISSION

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MR. KARMAN: Mr. Chairman, Dr. Buck, Dr. Quarles: We have had a long and arduous hearing before us which is now before this Appeals Board. Many, many thousands of pages of transcript indicating testimony; many, many thousands of pages of exhibits and attachments to exhibits, all submitted by qualified, experienced members of the technical fraternity dealing

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in the matter which is the subject of this hearing. The Hudson River, the concommitant effect on mid-Atlantic fishery, and the adverse or possible adverse impact on that fishery.

The hearing B oard had before it, and of necessity under the National Environmental Policy Act had to come to some determination as to whether or not the continuation of a once through cooling system with a plant that was about to be licensed -- when I say continuation, this plant had not been operating.

This was an application for an operating license. The hearing Board had to determine whether or not that operation continuing with once through cooling for any appreciable or long-time range would have -- what impact would it have on this fishery.

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Then we come to the question of what type of impact. The Regulatory Staff fulfilling its mandate under the National Environmental Policy Act and issuing its Final Environmental Statement in September of 1972, after a rather involved and lengthy evaluation of the possible impact of operation of Indian Point 2, came to the conclusion that operation of this plant for a period in excess of 5 years subsequent to the licensing of the plant would have a serious adverse impact on the biota of the Hudson River and concommitantly the mid-Atlantic fishery and could be irreversible in its effect.

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The Regulatory Staff recommended to the Licensing

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Board that operation with once through cooling not be allowed past January 1, 1978, which was approximately the five-year period contemplated at that time from the period when it was anticipated that a license would or could be issued.

CHAIRMAN PARLER: What date does the five-year period run from now, Mr. Karman?

MR. KARMAN: From commencement of the operation of the plant at the end of 1973 -- the license was issued September 25th, and we would assume this is in the last quarter of 1973. The Licensing Board in its initial decision indicated that there was to be no operation of the plant with once through cooling past May 1, 1978, and that closed cycle cooling system would be installed by December 1st of that year, so we are in the five-year period.

CHAIRMAN PARLER: Is the five-year period contemplated by the Environmental Statement; does it contemplate full power operation of this plant during five spawning seasons as acceptable?

MR. KARMAN: Yes, Mr. Chairman. There was nothing in the Final Environmental Statement which required or recommended that there be a reduction of power during that five-year period. The Board heard all the evidence. It was highly technical evidence, and I must admit to this learned Appeals Board with two highly technical members of the Board in addition to the Chairman, who is a legal member of the Board, much of

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this was difficult for the attorney, this attorney anyway, to fully comprehend, and I must admit that I relied quite heavily on my witnesses who were able to convince me, without fully understanding in its depth the very many mathematical formulae, modeling, entrainment, models, regression analyses, and so forth.

Some of these matters were admittedly over my head. My function at the hearing and the paperwork following the hearing and today is to respond as best I can to some of the comments which were made this morning in certain of the questions that may come to the Appeals Board with respect to the record itself.

The record is complete. We have, as I said, many thousands of pages of transcript. We have briefs right from the start. We have findings of fact; we have the initial decision itself. We have response briefs, where the parties have laid out the case before this Appeals Board.

The oral argument, as I contemplated, is for the Appeals Board in its own mind to clarify certain of the open items or questions which it has as the Appeals Board indicated in its order. None of the parties requested oral argument. Possibly they were as timorous as I was in getting into some of the highly technical matters relating to the anadromous species in the Hudson River, et cetera.

CHAIRMAN PARLER: Let me give you a question that

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perhaps doesn't involve delving into technical matters too much. The draft Environmental Statement that the AEC proposed does not recommend a closed cycle cooling system, does it?

MR. KARMAN: That is correct, sir.

CHAIRMAN PARLER: Could you tell me the basis in the record that caused the Staff to change its mind in the Final Environmental Statement?

MR. KARMAN: In response to the draft Environmental Statement, pursuant to the regulations of the Commission in implementation of NEPA comments were received, and the Regulatory

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Staff through its consultant, the Oak Ridge National Laboratory, working with the laboratory, looked at those comments, made a further study, brought up to date the various studies and analyses which had been made, completed certain models which may have been in being at that time, and when September of 1972 came around, the Regulatory Staff, based on the work done by Staff and its consultant came to the conclusion that there would be this serious impact and possibly irreversible damage at the end of the five-year period, and so recommended in its Final Environmental Statement that no operating license be issued which would allow full power operation beyond that period.

CHAIRMAN PARLER: It was not the comments themselves that were received that caused the Staff to change its mind, but further work that the Staff did as a result of those comments?

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MR. KARMAN: I think it is a combination, but essentially the work that the Staff was doing.

CHAIRMAN PARLER: These comments recommending closed cycle cooling towers were received from whom, the Environmental Protection AGency and the Department of Interior?

MR. KARMAN: I believe they were, and the Interior or in this case, the Hudson River Fishermen's Association, also called for a closed cycle cooling system.

CHAIRMAN PARLER: Was any effort made to have the EPA participate in this hearing?

MR. KARMAN: If I recall, Mr. Chairman, and I am not sure I can document this, the Environmental Protection Agency in my discussion with them, and this, of course, was informal, indicated that they were not prepared to come into this case as an intervenor or even as a participant in any form at that stage. This was in September, 1972, and the Environmental Protection Agency was in the early stages of its development.

CHAIRMAN PARLER: Why don't you continue?

MR. KARMAN: Yes. One thing Mr. Trosten said this morning I hope did not lead the Board to an erroneous conclusion, and possibly I did not hear him correctly, but he did indicate that the Licensing Board in its initial decision on page 100, and going through page 101, it states that the Board agrees with the Applicant that there is unlikely to be a serious permanent effect on the fishery by delay of a year or two in starting

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construction of a closed cycle cooling tower system. However, the Board also agrees with the Staff, HRFAA and the State of New York that operation of unit 2, where the once through cooling system can have a seriously adverse effect on the fishery, and that Applicant's research program is unlikely to resolve the questions in that extra year or two, and I just want to make this clear that I am positive that the Licensing Board and this Appeals Board and all the parties realize and recognize that that year that the Licensing Board is talking about is not any year thrown at the end of this five-year period to allow an additional year to have these closed cycle systems installed. That year is from the year 1974 to 1975, which will still enable in the opinion of the Licensing Board, sufficient time for the Applicant to prepare its studies, get its estimates, and its approvals, and have the closed cycle cooling system installed by December 1, 1978.

CHAIRMAN PARLER: So you agree with the Licensing Board that there is sufficient time for the Applicant to conduct all of its research programs and get the results of all of them except three, as I recall, and then if the results of that research are favorable to submit an appropriate application or amendment to the operating licenses, so that the May 1, 1978 date could be amended?

MR. KARMAN: I hope I didn't say that, because I certainly did not intend to say that. What I am saying is

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that the Licensing Board did not give the Applicant an option to come in and say that the time has now come as a result of our research program to allow an amendment to preclude the closed cycle cooling system because it is not necessary.

The Licensing Board did not say that. The Licensing Board said that rather than have this environmental study which the Regulatory Staff had asked for March 1, 1973, they said the Applicant can still come in with this environmental study. This is not the research program we are talking about, Mr. Chairman. That research program I will get into in a little while. This is the environmental study dealing with the closed cycle cooling system.

It said you can come in with that by March 1, 1974, and still have sufficient time, but that closed cycle system will have to be installed. I don't think the Licensing Board gave the Applicant an option. This is what the Applicant is appealing. The Applicant says it wants the Board, the Appeals Board, to reverse the Licensing Board and say,"let's have it by 1981 rather than 1978," because we will be able to show you as a result of this research program, that by 1977 or 1978, we can show you we don't need it.

The Licensing Board did not say that.

CHAIRMAN PARLER: Maybe there is slight confusion that can be straightened out later. I was looking to the page in the initial decision that you referred us to, and I appreciate

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the differences between the timing for the environmental report on the closed cycle cooling system and the Applicant's research program, but with regard to the Applicant's research program, the Licensing Board on page 101 said, "If the results from the completed reports are as favorable as the Applicant expects, it should have sufficient evidence before excavation starts to apply for permission to delay the construction until the program has been completed."

MR. KARMAN: That is certainly ---

CHAIRMAN PARLER: What I was asking you is whether you agreed with the Board's statement that under the circumstances, that is, the May 1, 1978 date, and the time that is required to complete all of the Applicant's r esearch programs, except for three items, that the Applicant would still have time if it believed the data that it obtained would support a request to file an amendment to its license which would change the May 1, 1978 data.

MR. KARMAN: My understanding, Mr. Chairman, is that the Applicant in its most hopeful and optimistic light could not expect to have data sufficient in 1975 to warrant this type of relief, because it is our position and the position of my colleague, the Intervenor for the Hudson River Fishermen's Association, that they will not have this by 1977.

I want to point out that I keep talking about a five-year research program by the Applicant, and now we are talking

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about 1974 now. The plant has commenced operation in the third quarter of 1973, and at the moment is not operating.

By the end of 1976, the Applicant will have had two years of study on the effects of the operation of Indian Point 2 on the biota of the Hudson River. It is not a five-year study. It may be a five-year study based on what is going now, but only two years based on the actual operation of that plant.

DR. QUARLES: Mr. Karman, I am having a little trouble understanding your interpretation of this one and two years extra time. Going back to this same reference page, page 100 and page 101, you say your interpretation is, if I understood you, that this is not an extra year or two tacked onto the end between the period between now and 1978.

MR. KARMAN: That is correct, sir.

DR. QUARLES: It is the year we are in.

MR. KARMAN: It is a year longer than the Staff recommended. That is what it is, beforehand.

DR. QUARLES: The Board has said that they agree that one or two years will not make a serious difference, but they then impose what is a rather rigid schedule for coming forward with the closed cycle system. I am not arguing whether the schedule is too tight enough.

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I do think it is a rather close schedule for completing the cooling towers. I can't see your statement that a year or two will not make any difference, and then impose a schedule so

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tight that you can't put the year in.

MR. KARMAN: I can only assume what the Board had in mind, but the Regulatory Staff had indicated that based on the commencment of operation of this plant earlier in 1973, that the once through cooling should be terminated by January 1, 1978. The Board did not go along with that. The Board felt the additional time, and possibly it felt we were too rigid in our schedule, although I thought that the Regulatory Staff was a lot more lenient than the State of New York, and the Hudson River Fishermen's Association in allowing the Applicant sufficient time to get the closed cycle system installed, but when the Board, rather than go from January 1, 1978, said they must be installed by December 1, 1978, the Board could very well have had in mind that this plant was not going to start until September, 1973 at the earliest.

So what it does is set it ahead a year, but only on the basis that the plant was not operating at the time the Regulatory Staff thought it would operate, in January. We were going to go from January 1, 1973, to January 1, 1978, which is five years.

The Licensing Board said "We will go from September, 1973 to December, but said we must stop by the way and have the towers installed. So we are in the 4-to-5 year range, no matter how we look at it.

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DR. QUARLES: Yes, but I don't see what the meaning

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of the year or two delay is if it isn't tacked onto it.

MR. KARMAN: That is only my interpretation of it. I cannot divine any further meaning to the Board on that. There was some discussion this morning about the biological monitoring program. The Regulatory Staff position is that the objective of the biological monitoring program is to evaluate the effects of operation of once through cooling on the Hudson River ecosystem, to determine the effects of the biota, and to devise means and methods of minimizing such adverse effects. This is indicated in Section 4.9 of the Environmental Tech Specs.

It is in reality an interim measure to minimize effects. The Regulatory Staff does not say that this environmental monitoring program will be able to obviate the necessity of installing closed cycle cooling systems. What it can do is possibly minimize the effects as they seem to be occurring in the river.

CHAIRMAN PARLER: Excuse me, Mr. Karman. Let's take a brief recess here.

(Recess)

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CHAIRMAN PARLER: The oral argument session is resumed.

Mr. Karman is excused because of circumstances beyond his control. The Board does have a number of questions to ask the Staff.

These questions will be asked in writing and will be sent to Mr. Karman and copy provided the other parties. Mr. Karman will be requested to have the Staff reply to these questions within five days after the questions are received, and of course his reply should be sent to all of the parties.

MR. KARMAN: Mr. Chairman, possibly for the record it might look strange just to have me excused in the middle of an argument.

CHAIRMAN PARLER: I have already made an adequate statement, I think, because of circumstances beyond your control, and that is entirely adequate, I believe.

MR. KARMAN: All right.

CHAIRMAN PARLER: Now, Mr. Macbeth, in view of the number of questions that were asked you which interrupted your presentation, we agreed to give you some extra time after the Staff concluded its response.

Do you want to proceed now?

MR. MACBETH: Yes.

MR. TROSTEN: Mr. Chairman, before Mr. Macbeth

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completes his presentation, may I inquire whether the Board intends that after the Staff's answers are provided, the other parties would have an opportunity to comment?

This would be satisfactory, and it would be in lieu of taking time for rebuttal at the end of this period.

CHAIRMAN PARLER: The kind of comments that would be apprlpriate for your rebuttal, if you had the opportunity to make that rebuttal today.

MR. TROSTEN: That is what I mean, sir.

CHAIRMAN PARLER: Yes, that will be all right.

MR. TROSTEN: Fine.

CHAIRMAN PARLER: Mr.Trosten, any other rebuttal you might have for Mr. Macbeth or Mr. Corcoran, I hope you would do it this afternoon.

MR. TROSTEN: I am going to take the remaining twenty-odd minutes of my time to comment on those matters that Mr. Karman has already addressed himself to.

CHAIRMAN PARLER: Fine.

Would you proceed, Mr. Macbeth?

MR. MACBETH: Yes, I believe I have covered in my previous remark the points the Board included in the order, and I simply wanted to refer to the passage on pages 100 and 101 that has been discussed.

The Licensing Board corrected an errata, so that the top line should read "Operation of Unit 2

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without a closed cycle cooling system," rather than "with one," which I think makes considerably more sense to the entire passage.

Also, I think the point is that the Licensing Board is saying two things, that a delay of a year or two in the construction of the closed cycle cooling system will not have a serious permanent effect, but it goes on immediately to say in the following sentence with two points, one that there would be a serious adverse effect.

In other words, then, it comes back to the question of what we mean by permanent or irreversible, and not that there would not be another serious effect.

Of course, in addition, the research program in that period would not answer, would not provide sufficient reason to delay construction, in other words, answer any questions that the Hearing Board felt had to be answered.

I think the Hearing Board made it clear they think there is a sufficient record before the Board for a reasonable decision and on that basis there is no need to wait, and on top of that there will be a seriously adverse effect from another year or two of once-through operation.

Therefore, closed cycle cooling should be ordered on an expeditious basis. I think the timing that the Board has provided is more than adequage.

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The Fishermen's Association has put in a brief showing even by the evidence of the case that it could be done in a year less, and I think the total period of time provided in the initial decision is truly more than adequate to the needs.

Thank you, Mr.Chairman.

DR. BUCK: May I ask a couple of questions here that I am a little concerned about?

This is on an entirely different subject that we have not touched today that partially touches on the situation.

The thing that I am concerned with here is something that concerns Dr. Hart's testimony and his answer to Mr. Briggs. It starts on page 11,094 of the transcript, and Mr. Briggs went through in the first part of that page a rundown of what had appeared in the testimony concerning the number of viable fertilized eggs in the Hudson River and so on, and he runs down the fact that I believe this is directly from the Carson-McCann report, 1.3 billion viable fertilized eggs and that turns out to be 2.4 million of the juveniles after sixteen weeks, and finally down to 1.8 million juveniles at the end of the 34th week.

Now, Dr. Clark in backing up Mr. Goodyear's estimate of the number of fish that one would have to supply for the hatchery, has stated in the previous pages here

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that, in order to replace the fish in the Hudson, one would have to add 10 million or more fish to compensate for the losses and Dr. Briggs goes on to ask how it is that you have to have ten million fish in the hatcheries to replace 1.8 million, assuming they were put out around the 30th week or some such thing as that.

He goes on to point out that the reason he is asking the question, and the reason I am asking it at the moment is that it goes back to the question of impingement on the screens, and Mr.Briggs makes a remark, "This would make the impingement action on the screens much less than you had indicated in your previous testimony, is that right?"

And the witness said, "Yes, exactly. We are on the horns of a dilemma there."

My question to you there is, which part of Dr. Clark's testimony are we to believe, the amount of fish that he claims have to be put in from the hatchery, or the percentage of the fish that he claims are going to be damaged by the plant?

They obviously are on opposite ends of the pole, now.

MR. MACBETH: Yes, that is quite accurate. You have the problem with analysis as Clark presented it on his initial testimony of the entire effect of the plant, that the entrainment figures deduced from the Carl-McCann

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data are percentage figures of the total number of fish in the river.

It is done in percentage terms. The impingement figures are absolute figures from the plant, and they also, Carlson-McCann have numbers but they are relative numbers, so they are truly percentage numbers.

It is true, unless Carson-McCann are getting any fish, you can not take the absolute figures with the entrainment figures and that is an error in the testimony, and we took account of that in the final conclusions of law by saying the impingement numbers should be reduced.

The percentage numbers are correct and the larger number of fish needed for the river is correct, but you cannot treat the impingement numbers at the screens as--you cannot transmit them into the Carlson-McCann data without taking account of the fact that Carlson-McCann had--

DR. BUCK: My point is, then, that you must drastically reduce the number of fish that must be supplied by the hatchery.

MR. MACBETH: No, what must be reduced is the total impact of the plant which we did, and that is 27 percent.

DR. BUCK: From what?

MR. MACBETH: From 39.

DR. BUCK: This is a factor of many times more than ten here between the 20 million and the amount you

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actually have to supply in the hatchery, and just reducing this thing by a factor of a few percent does not explain this tremendous number of fish that you claim have to be supplied from a hatchery.

MR. MACBETH: I think what is involved is that, if you treat the Carlson-McCann numbers as having an efficiency, getting about 10 percent of the fish in the river and you apply that factor to reducing the impingement, that is how you arrive at the 27 percent. If you then go back to the hatchery problem, I believe that by then raising the hatchery numbers an order of magnitude from the absolute figures, you will come out in the right area.

DR. BUCK: I am sorry. They are just not that close together. I think Dr.Quarles is correct that these are very, very wide apart, as far as the comparison is concerned here.

DR. QUARLES: I think it should be understood on the record that we are agreed on this question.

DR. BUCK: The problem to us is then it seems as though Dr. Clark is trying to have his cake and eate it, too. He used a percentage on the Carlson-McMann to show the percentage of damage on the fish and then when he comes down to showing how many fish are going to be required to replace those, he goes to absolute numbers and

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gets an entirely different result.

This is enlarging both ends of the scale, now.

MR. MACBETH: Obviously one should not do that. Would it be all right if I make a further response?

DR. BUCK: Certainly, you have five days. We may have missed something in the evidence. I want to find out if we have but on the bald statement that we have here, that Dr.Clark says, "Well, we are on the horns of a dilemma," that, to me means we do not know whether to go with the answer we gave here or the other answer we gave.

MR. MACBETH: Yes, I certainly will respond to that.

Are there further questions from the Board I can respond to?

DR. BUCK: Would you hold while I look at my notes?

DR. QUARLES: I will ask you another one in the meantime.

In the last day or two, I have forgotten just where and I do not have my particular note on this, there was a discussion of how much brood stock would be necessary to supply the fish we are now talking about, and it develops in the testimony that the numbers of the females that would be required is based on the production of femals in the natural circumstances, that is, in the Hudson.

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Yet Dr.Stevens in his testimony, and it seemed to survive cross-examination, also indicated that his experience in the hatchery was that they could get about 20 percent of ghe eggs yielded, I think, which is quite different than the natural case.

So, if you could give us any additional information on what the number of adult females would be necessary to supply this whatever number you come up with on this other factor, Dr.Buck's question.

MR. MACBETH: Yes.

DR. QUARLES: What I want to know is how many five to fifteen-year old females it would be necessary to have to supply this production.

MR. MACBETH: I will try to answer that, if I can.

DR. BUCK: That is all I have.

CHAIRMAN PARLER: Thank you.

MR. TROSTEN: Mr. Chairman, could we have a five-to-ten minute recess?

CHAIRMAN PARLER: All right.

We will recess for five minutes.

(Recess)

CHAIRMAN PARLER: We will resume the oral argument session.

Mr.Trosten, proceed with your rebuttal.

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REBUTTAL ARGUMENT OF LEONARD A TROSTEN

ON BEHALF OF THE APPLICANT.

MR. TROSTEN: First of all, I want to lay to rest a point which seems to have crept into the argument here. It has been stated that, as a result of this research, that Con-Edison is going to argue that there is no problem and ask for more time or what-have-you.

This is absolutely contrary to the position the Company has taken. The Company has suggested to the Board that the operation of the facility will be promptly defined--once-through cooling system shall be permitted until September 1, 1981, unless otherwise authorized by an amendment to our license, operation shall be permitted after September 1, 1981 on, if a closed cycle cooling system has been installed as of that date.

We have assumed the burden of showing the Staff that operation behond then should be permitted. We have assumed this burden. So the argument that we are going to ask for a delay is completely off base.

Another point has been made here that Con-Edison is not going to accept the results of the research program. I submit to the members of the Board that this is absolutely nonsense. It is not Con-Edison that is not accepting the research.

It was on the basis of research that Con-Edison

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proceeded. It is the Intervenors who are not accepting the results of this research, not Con-Edison. It is the Intervenors who are not accepting the results of tagging studies that have been done in the Midatlántic. They are the ones claiming through some new analysis that the researchers who did the tagging studies are wrong. They are the ones who are saying that the research done in the past should not be accepted.

I might add in connection with the tagging studies themselves that Con-Edison introduced those tagging studies simply to show that they tended to confirm the opinion of the experts, that they did not refute the opinions of the experts as Dr. Goodyear said they did.

That was the use made by Con-Edison of the tagging studies.

Now, I would like to turn to a matter that Dr. Quarles raised with me, and it concerns the extent of the damage which is acceptable and for how long a period of time it is acceptable.

First of all, let us talk about this fifteen percent number and let us be absolutely clear that we are talking about the same thing. Fifteen percent means 15 percent of each year class during a period of a few years. We are not talking about fifteen percent of a total population. The striped bass lives for 13 years. It spawns for

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perhaps ten of those thirteen years, in any event from 8 to 10 of those 13 years it spawns.

We are not talking about a 15 percent reduction of a total population. We are talking about a 15 percent reduction of several year classes during a period ending at the very end of September 1, 1981.

Now, it is our position that there is not going to be as best we can determine, a fifteen year reduction of each year class for those years starting in 1973 and ending at the latest in 1981.

But our position is that even if there were such a reduction, fifteen percent in each of those year classes, that such a temporary reduction in the year class strength of a few of these year classes would be acceptable because it is temporary and because the damage to those year classes could be reversed, not only to those year classes to the population, but to the population as a whole.

Let me make this point a little clearer if I may. First of all, the statement that was made by Mr. Macbeth that you could not reverse the damage to that year class is not so. You could reverse the damage to that year class in two ways.

No. 1 would be by stocking.

No. 2 would be by changing the fishing regulations to allow that year class as it entered the fishery to be

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R13 exempt from fishing pressure for an extra year or two, and if Dr. Goodyear is correct that it is really the fishing pressure on the striped bass fishery that is controlling the fishery, then exempting that year class from fishing pressure would mitigate and tend to reduce the impact, if any, that had been caused by the power plant.

DR. QUARLES: If you are going to move on, let us be sure I understand your fifteen percent this time. You are saying that the first year fifteen percent of zero year class will be removed.

MR. TROSTEN: That is what the Board said, yes, sir.

DR. QUARLES: O.K. Then the next year 15 percent of that zero year class.

MR. TROSTEN: Yes,sir.

DR. QUARLES: But the upper ones will not be affected, at least to this extent.

MR. TROSTEN: Yes, precisely, sir.

The effect on the plant is of the less than one-year old fish. When the plant starts up, it is not having an impact on all the older fish in the population.

DR. QUARLES: Then, if I had no impact on the older fish, you would have a population decrease of 15 percent.

MR. TROSTEN: If you assumed, Dr.Quarles, that

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there is no compensatory mechanism.

DR. QUARLES: I am assuming all these simplifying things. I am trying to get the 15 percent we are talking about here, clear.

MR. TROSTEN: If I assume no changes in all the adult year classes, the fifteen percent over a period of thirteen years, if my arithmetic is correct, and I will check it if it is wrong, over a period of thirteen years you would eventually reduce the whole population by fifteen percent but that is such a grossly over-simplified thing--

DR. QUARLES: I realize that. I wanted to understand the fifteen percent. I have it now.

MR. TROSTEN: I believe that is correct.

DR. QUARLES: Thank you.

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MR. TROSTEN: Now, I would like to say something else about what is acceptable loss. Various people express various ideas about what is acceptable, and it poses a philosophical question and a cost-benefit question. I would like to say that Con Edison's judgment about what is acceptable is not the only thing that will be brought into play here. All the data from the program are going to be made available to every federal and state agency that has an interest in this.

If there is any federal or state agency that concludes that a certain percentage is not acceptable on a cost-benefit balance or some other balance, there are means where the position of that agency can be brought to bear, so this is not a decision that is being made in the abstract by Con Edison.

The data being gathered in the program, the implication has been made by several remarks here that so long as somebody is on the river in a boat conducting a study that that is research that that should be accomplishing what we want. That obviously is not the case.

You design a research program to accomplish a specific result, and unless you know what you are trying to accomplish, you are not collecting the data for that purpose. We have a research program starting in 1969 that for the first time was designed to determine the impact of steam power plants, particularly the Indian Point plants, specifically on the striped bass population.

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This is the sort of research that gets the results that are worthwhile in terms of the particular problem at hand. That is not general research that is directed at some other problem, and I think this is an extremely important point to bear in mind. As far as the various agencies that are examining this matter, in the Department of Environmental Conservation and the AEC, I would like to make it clear that the Hudson River Policy Committee is composed of representatives of the Department of Interior, and state department of New York, Connecticut and New Jersey.

The Department of Interior has a resident representative who is a staff member of the Hudson River Policy Committee at Indian Point. Further, I would like to say that the Hudson River Policy Committee reviews the applicants' research program. They have a definite input into applicant's research program and the applicant has never suggested a suggestion for a change in the program which has been propounded by the Hudson River Policy Committee.

DR. BUCK: How often does this Committee meet or does it hold its meetings, shall we say, and who chairs it, and calls the meetings, and so on and so forth?

MR. TROSTEN: It meets a few times a year, I would say, the policy committee. The technical committee meets more often. There is a technical committee, a working technical committee that operates under the surveillance of the policy

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committee. This is a staff-type committee.

The Chairman of the Hudson River Policy Committee traditionally has been a senior staff member of the Department of Environmental Conservation of the state of New York, and I believe that is the case today.

DR. BUCK: Thank you.

CHAIRMAN PARLER: Is there any representation on that Committee of organizations such as the Hudson River Fishermen's Association?

MR. TROSTEN: There is no representative on that Committee of HRFA, but they are welcome to attend meetings of the Committee. We have -- I think the record will demonstrate -- extended invitations to the HRFA to participate fully in the deliberations of all the applicant's advisory groups. The HRFA has asked for and has received information from the Hudson River Policy Committee.

I hope that answers your question.

CHAIRMAN PARLER: Yes.

MR. TROSTEN: With regard to the research program again, and Dr. Goodyear's opinions on it, I assume, Dr. Buck, that you recognize that the remarks I was making this morning about the research program were directed to that aspect of the quotation you were reading to me which dealt with why he felt the program might not produce the results.

The quotation also said it may produce the results.

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DR. BUCK: Yes, I understand. Part of the quotation, I think, was dealing with results which were essentially meaningless, or some such thing as this. I assumed you were talking about why they wouldn't.

MR. TROSTEN: Thank you, sir.

Now, I would like to turn for a moment to the compensation question again. Again, there has been a tendency in the remarks made today to indicate that first of all, we have to identify a specific compensatory mechanism and also that it is vitally important that compensation occur during that particular year.

The record shows that compensation could occur in some other elements of the striped bass population. The total population that I was describing to Dr. Quarles, that is, it need not specifically occur in that year, although it is most likely to occur in that year.

Furthermore, it is not necessary to identify a specific mechanism to test provided you see the results of compensatory mechanisms. That is the key thing. We are not here to test whether or not a particular theory is applicable. What we are here to do is, what we are trying to do, is test the actual results.

I would like to turn for a moment to several of the remarks of Mr. Corcoran.

Our response to the New York state brief, I think, is

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dispositive of the question of the need to consider the potential findings. The matter is in litigation in the courts of the state of New York. The second highest court in New York state has determined that the lower court was wrong in granting summary judgment, that Con Edison is entitled to a trial on the fundamental issues in this matter.

It is obviously a matter that can go on in litigation for some time and it would be completely incorrect to take into account in this proceeding the results of this potential litigation in the state. I would further like to say if one were to adopt the theory of the Board as to what is a transfer within the economy that if a fine actually were paid, it would constitute as much a benefit as it would a cost, and hence this is a completely irrelevant argument.

Mr. Corcoran has implied or said that permits are not needed. I would like to frankly have a citation from Mr. Corcoran, or perhaps a legal opinion from the attorney general's office that we do ont indeed need a permit from the Department of Environmental Conservation.

Our opinion is that we do need such a permit. Mr. Corcoran, I believe, is not speaking for the Department of Environmental Conservation in this respect. If he is, I would like to be advised of this. We will certainly do the best we can do to supply the best environmental report we can to the Department of Environmental Conservation, which will review it

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and has to review it. We will do this whether the data are there or not, and will do the very best that we can do.

The Department of Environmental Conservation has not reviewed any environmental report on closed cycle cooling at Indian Point 2, and until they do, they will not give us their approval.

There has been an indication given that we could bring in fresh water from above Chelsea to supply makeup for the cooling water, or towers. The evidence of record here that indicates that the cost would be horrendous to do this, and that there are severe problems associated with doing it, apart from the cost, problems of reliability.

I would like to point out that there is no cooling tower in operation or under construction today that uses saline water in an area that has vegetation of the type that grows at Indian Point. We are dealing with a valley which has special meteorological conditions.

The record shows that the Appalachian conditions are not the same as the conditions at Indian Point, and we will supply a transcript reference for the Board.

Turning to the Mid Atlantic fishery, Mr. Corcoran misstated our position when he said that we were saying that a 10 percent kill would be acceptable. The 10 percent number that we used related to our estimate of the contribution of the Hudson to the Mid Atlantic, and we were simply stating in our brief

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that if the Board had found that the Hudson River only contributed 10 percent to the Mid Atlantic, which was one of our contingents, then the cost-benefit analysis would have been flawed, because they were thinking in terms of 20 to 80 percent contribution, and it was in that context we used the 10 percent number.

Concerning the Burns and Rowe report, I would like to make it clear that the Burns and Rowe study was a several month study that was done without collection of one single piece of data. It was an examination of what was there and the preparation of a preliminary scoping study for our use in preparing the cost-benefit analysis newly required at that time by the AEC's regulations.

There was no evidence that Burns and Rowe ever looked at conditions in the Indian Point area, and in fact, they did not. I would further like to keep the Board straight on one point. So-called Exhibit 3-C, which was the Applicant's cost-benefit analysis submitted to the AEC in response to this requirement is not in evidence in this proceeding.

We never submitted it in evidence, and it is not in evidence. We never offered it in support of any contention that it showed there was an adequate basis for choosing a closed cycle cooling. We simply submitted it to the Atomic Energy Commission because the AEC's regulations require us to do that. We never asserted that this supported an environmental analysis

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of closed cycle cooling, and it is not in evidence in this proceeding.

The Staff has not done environmental studies. It is quite clear from the record that the Staff has not examined the environmental area around Indian Point. They required us to perform an environmental study, so there is no environmental analysis in this case with regard to cooling towers at Indian Point.

Mr. Macbeth mentioned that the Scenic Hudson Preservation Conference had written a letter to the AEC which appears in Volume 2 of the Final Environmental Statement, saying they did not oppose cooling towers.

The letter is not in evidence. The Scenic Hudson Preservation Conference is not an organization that has concerned itself with the aesthetic appearance of the area around Indian Point. They have concerned themselves with an area around the Cornwall site, far up the River.

If one wants to look at non-record evidence, one could look at the letter written by the mayor of Buchanan -- non-evidentiary material, rater -- with respect to the problem of getting a zoning variance for the cooling tower.

Now, turning back for just a moment to the matter of compensation, there have been several statements made that the record shows that there is no compensation in the West Coast striped bass population. This is not the case, and we

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will supply transcript references.

I have just one final remark to make with regard to what Mr. Karman has said. It is quite clear that this Board has not found that there would be an irreversible impact during the extra year or so that we would have to complete the research program.

I submit that if the Board will look back at the record that you can see that the period that they were talking about there was the extra period for the research program, not the period for considering studies on closed cycle cooling.

I think Mr. Karman has mistaken what the situation is in the Board's opinion. The Board has found specifically that there will be actions that can be taken to mitigate the effects of once-through cooling during the period prior to 1978, and I specifically call the Board's attention to that.

Thank you, Mr. Chairman. I have concluded.

CHAIRMAN PARLER: Thank you.

Do you have any questions?

DR. BUCK: No, I don't.

CHAIRMAN PARLER: Do you have any questions?

DR. QUARLES: No.

MR. MACBETH: Could I reply to two or three factual points that Mr. Trosten just raised?

CHAIRMAN PARLER: Go ahead.

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REBUTTAL ARGUMENT OF ANGUS MACBETH, ON BEHALF OF HUDSON RIVER FISHERMEN'S ASSOCIATION.

MR. MACBETH: The first is Dr. Quarles' question about the 15 percent, and the chart on Page 44 of the initial decision shows the effects, and after five years, the percentage goes up, because then the fish that were reduced by 15 percent are coming back to spawn.

So at the end of 10 years, you would have an effect of reduction of 35 percent. That is both of the first year class and of the total adult population. So over time, the number goes up from 15 as the year class that was reduced comes back to spawn. That was one point I wanted to make.

The second was the Hudson River Policy Committee. The Hudson River Fishermen's Association asked to have an environmental representative on the Policy Committee some years ago, and the Policy Committee refused to do that, and I can provide the minutes of the Policy Committee if that would be useful.

Further, I wrote the Policy Committee on behalf of the Fisherman's Association in the middle of last year, asking to be invited and informed of future meetings of the Policy Committee and received no resopnse from them.

So while Con Edison has frequently, now, tried, I think quite honestly, to have the fishermen appraised of what they are doing, that hasn't been true with every other group, and the Policy Committee in particular.

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The third question is whether Volume 2 of the Final Environmental Statement is in evidence, and it was admitted in evidence at page 6271 --

CHAIRMAN PARLER: That wasn't the point, not Volume 2 of the Final Environmental Statement. I thought it was the Applicant's Exhibit 3-C.

MR. MACBETH: He made two points. One was Exhibit 3-C and the other was the Scenic Hudson letter.

CHAIRMAN PARLER: Do you have other points?

MR. MACBETH: That is it.

MR. TROSTEN: It is a matter of clarifying the record here, Mr. Chairman. Supplement 2 of the Final Environmental Statement, or Volume 2, is not in evidence. This can be established very clearly.

The Supplement 3 to the Final, or the environmental report of the Applicant also is not in evidence. There is an Exhibit 3-C which is in evidence, but supplement 3 of the Applicant's environmental report is not in evidence in this proceeding.

MR. MACBETH: I thought it was. If it isn't, I don't find immediate reference to it, and I won't dispute that now. But I thought the whole environmental report was in evidence, not just the first two supplements.

But certainly the basic burden of the report is in evidence. That is Exhibit V.

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CHAIRMAN PARLER: The record should clarify the situation as to what is in evidence and what isn't, hopefully.

On behalf of the Board, I would like to thank counsel for participating in this argument and attempting to assure ourselves that we don't overlook any material part of the evidence that is relevant to the positions that the respective parties are urging us to take in our decision.

That is the purpose of the oral argument, the purpose of our questioning, also, and also the purpose of our asking you to provide us, if you will, with the citations that are relevant to the questions, some of the questions that were asked.

Earlier in this argument, in connection with the supplying of the citations, I stated that the time should be five days from today. Since that time, it has become apparent that the Board has to prepare questions and send them to the Regulatory Staff for response, so the time for the parties to supply their citations will be the same as the time that we give the Regulatory Staff to supply the answers to the question, and we will ask the regulatory staff.

Of course, you will not know exactly what that time is until you receive the questions. Whatever the time will be, it will be at least five days after you actually receive the document.

Do you have anything else?

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Also, on behalf of the Board, I would like to thank Mr. Corcoran and Mr. Macbeth for travelling down here from New York to participate in the argument.

This session is concluded.

12 (Whereupon, at 3:50 p.m., the session was concluded.)

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