BEFORE THE UNITED STATES

ATOMIC ENERGY COMMISSION

In the Matter of	)	
	)	
	)	
Consolidated Edison Company of	)	Docket No. 50-247
New York, Inc.	)	
(Indian Point Station, Unit No. 2)	)	

BEFORE THE ATOMIC SAFETY
AND LICENSING APPEAL BOARD

INTERVENOR HUDSON RIVER FISHERMEN'S ASSOCIATION'S BRIEF IN OPPOSITION TO APPLICANT'S EXCEPTIONS TO THE INITIAL DECISION AUTHORIZING FULL-TERM, FULL-POWER OPERATION

November 26, 1973

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INTERVENOR HUDSON RIVER FISHERMEN'S ASSOCIATION'S BRIEF IN OPPOSITION TO APPLICANT'S EXCEPTIONS TO THE INITIAL DECISION AUTHORIZING FULL-TERM, FULL-POWER OPERATION

This is an appeal by Con Edison from the decision of September 25, 1973 of the Atomic Safety and Licensing Board ("the Board") authorizing full term, full power operation of Indian Point 2 conditioned upon plant operation with a closed-cycle cooling system by May 1, 1978. The conditioned operating license was issued on September 28, 1973. This brief is submitted in opposition to Applicant's exceptions and supporting brief.

Of the many points raised by Applicant, there are two main points, both of which Applicant argues result from the Board's misinterpretation and misapplication of the National Environmental Policy Act of 1969 ("NEPA"). The first is an undue weight given to environmental considerations in the balancing process. The second is an unduly strict burden of proof placed on Applicant with regard to environmental damages or costs arising from the operation of Indian Point 2. Applicant has in its brief clustered many of its specific exceptions around its two main points.

In order to clarify the issues presented by this appeal, the Hudson River Fishermen's Association ("HRFA") will first deal generally with the arguments concerning NEPA. HRFA has also appealed certain of the Board's findings and conclusions. That appeal is presented in separate papers which will be referred to where appropriate in this brief to assist the Appeal Board in understanding HRFA's position.

STATEMENT OF FACTS

The record of the Board's consideration of the non-radiological consequences to the environment of plant operation is voluminous. It includes a two volume Final Environmental Statement, and thousands of pages of exhibits and testimony from

probing, thorough hearings before the Board which extended over a 10 month period. To put the legal arguments in context and assist the Appeals Board in analyzing, to the extent it deems it necessary, this extensive record, HRFA believes it important to summarize the non-radiological setting of the decision.

The Initial Decision of the Atomic Safety and Licensing Board must be viewed in the context of a considerable history involving the fisheries of the Hudson River, particularly the striped bass, and the development along the Hudson River of power plants designed to use river water for cooling purposes.

The reach of the Hudson River from Haverstraw Bay (approximately River Mile 30) to Coxsackie (approximately River Mile 125) is a rich spawning and nursery ground for anadromous and resident fishes. The striped bass is the best studied and most important game and commercial fish in the Hudson and for that reason analysis of the effects of power plant operation has emphasized the effects on striped bass.

The decade from 1970 to 1980 is witnessing an immense increase in the power-generating capacity along this crucial reach of the River: 1200 MW at Bowline Point; an additional 1858 MW at Indian Point; 2000 MW at Storm King; and 1200 MW at Roseton. All these plants with the exception of Storm King,

which is pumped storage, as well as the units which went into operation before 1970 (500 MW at Danskammer; 500 MW at Lovett, and 265 MW at Indian Point 1), are designed to operate with once-through cooling. Together, the plants will withdraw huge amounts of water from the estuary (approximately 12,000,000 gallons per minute) and return large quantities of heat to it.

The anadromous striped bass spawn upstream in the general region of Cornwall (River Mile 57), and their eggs and larvae slowly move downstream influenced by tidal and current movements. The striped bass eggs, larvae and many of the young juveniles cannot be screened out of the power plant cooling systems or the pumping system of Storm King. Thus, in the late spring and early summer, large percentages of these organisms will be removed from the River (entrained) and passed through the cooling or storage systems. At the nuclear and fossil fuel plants, the organisms will suffer mechanical damage, heat shocks of approximately 13 - 15° F, chemical damage and rapid pressure changes. At Storm King there will be a 2-mile trip up to the still reservoir and then a return passage to the River.

In addition to the entrainment problems, there is the problem of fish impingement on the cooling water intake screens of the plants. Most of the fish impinged are white perch, but large numbers of striped bass are also affected.

As far back as 1965 the serious impact of power plant operation on the Hudson River fishery was recognized. The Court in Scenic Hudson Preservation Conference v. F.P.C., 354 F.2d 608 (2d Cir. 1965), cert. denied, 384 US 941 (1966), instructed the FPC "to take the whole fisheries question into consideration before deciding whether the Storm King project is to be licensed". 1 ER at 1096.

Out of these instructions came the Hudson River Fisheries Investigation, 1965-1968, commonly known as the Carlson-McCann Report. Con Edison financed the preparation of the Carlson-McCann Report and has therefore been aware since 1965 of the importance of the issue of the effect on striped bass eggs, larvae and young juvenile striped bass of the withdrawal of substantial amounts of Hudson River water for use in electrical generating plants. The Report itself which contains data on the relative abundance of striped bass eggs, larvae and juveniles in the Hudson River between Coxsackie and Haverstraw provided the central source of data relied upon by all parties in estimating the effects of once-through cooling at Indian Point 2.

It is against this background that the Licensing Board's decision to require installation of a closed-cycle cooling system at Indian Point 2 must be viewed. The Board was

presented with HRFA and AEC Staff analyses of the research done on the River and the data provided therein on the life history, population dynamics, and coastal population of the striped bass which predicted that 30-50 percent of the annual production of striped bass in the Hudson River would be destroyed by the cooling system of Indian Points 1 and 2 alone. Both HRFA and the Staff recommended installation of a closed-cycle cooling system at Indian Point 2 to avert such an adverse impact. Although Con Edison predicted that the striped bass population would suffer negligible damage from plant operation, in its Proposed Findings of Fact even it conceded that a closed-cycle cooling system should be installed at Indian Point 2 by 1981 unless the results of its research efforts were to prove that the plant's impact on the striped bass fishery is not significant. Thus Con Edison recognized that damage to the fishery beyond a certain point is impermissible.

After hearing the extensive evidence on environmental impact, the Board concluded that, unless a closed-cycle cooling system is installed as soon as possible, there will be reductions in the striped bass population of the Hudson River amounting to at least 20 percent in the fifth year and 35 percent in the tenth year for operation of Indian Points 1 and 2, and 40 and 60 percent for operation of all plants now in

the River including Units 1 and 2. These findings on impact are particularly important in light of the Board's finding that as much as 80 percent of the recruits to the whole Middle Atlantic striped bass fishery may come from the Hudson River. In addition, the Licensing Board predicted that the impact on other fish species which use the vicinity of the plant as a spawning ground would be similar to that on striped bass.

The impacts of operation with once-through cooling are devastating. As Justice Holmes once said: "A river is more than an amenity, it is a treasure." New Jersey v. New York, 283 US 336, 342 (1931). There exists a feasible economic means of averting the adverse impacts. In requiring installation of a closed-cycle cooling system the Licensing Board was acting in fulfillment of its obligations under the National Environmental Policy Act of 1969.

POINT I

THE BOARD PROPERLY BALANCED UNDER NEPA THE ENVIRONMENTAL AND MONETARY COSTS OF OPERATION OF INDIAN POINT NO. 2 WITH ONCE-THROUGH COOLING AGAINST THE ENVIRONMENTAL AND MONETARY COSTS OF OPERATION WITH OTHER COOLING MODES AND, AMPLY SUPPORTED BY THE LAW AND FACTS, HAS ORDERED THE OPTIMALLY BENEFICIAL ACTION.

Applicant attacks the conclusion resulting from the Board's balancing of environmental and monetary costs of once-through and other cooling modes. It does so on the grounds that the balancing was illegal under NEPA because it resulted in the Board's conditioning the operating license on the construction and use of other than once-through cooling at a quantified, monetary cost greater than the quantified, monetary cost of the environmental effects.

Two separate issues are presented, although Applicant blends them together: first, did the Board properly balance under NEPA substantial and ultimately unquantifiable environmental values at stake in this proceeding; and second, does NEPA support an agency determination that economically feasible methods be adopted to prevent serious environmental degradation?

Applicant fundamentally mistakes the issues presented under NEPA to the Appeals Board by this appeal. It is not a question of whether NEPA requires "particular results in

particular problematic instances" or (to quote Applicant), whether NEPA creates "'substantive rights' to an environment free from adverse impact 'that are enforceable in the courts'."* Applicant's brief at 9-10. The question presented by this appeal is whether NEPA supports the analysis and conclusion of the Board. HRFA firmly believes it does.

As a result of this error, Applicant focuses on the decided cases from the wrong viewpoint. All decisions of the courts of appeal and most of the district courts concede that NEPA provides substantive law in §§101 and 102, even when deciding that the scope of review by a constitutional court is relatively narrow. But even those cases which mistakenly assert that there is no judicial review of agency decisions under NEPA clearly do not stand for the proposition that an agency decision-maker (in this case the Licensing Board or the Appeal Board) can avoid its statutory duty to follow and enforce the laws enacted by Congress, including §§101 and 102 of NEPA. The opinions of the Appeal Board clearly refute any such proposition. See, e.g., In the Matter of Arkansas Power & Light Co. (Arkansas Nuclear One, Unit 2)(ALAB-94), 2 Atomic Energy Law Rep., ¶11,702.

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*In fact, it is Applicant who is arguing that NEPA requires a specific result -- Applicant's result -- in the face of a contrary factual conclusion by the Licensing Board.

HRFA believes that on the facts demonstrated by the evidence and properly found by the Board, NEPA requires the result reached by the Board, in the sense that such result is the only one to which the facts and the law lead. In any case, the facts and the law clearly and amply support the Board's conclusion. The issue of whether, given the scope of review by a court of a final agency determination, a court would reverse a conclusion diametrically opposed to that of the Board in the case at bar is so far removed from the issues actually presented in this appeal that HRFA believes it is more helpful not to waste time and space in arguing the point.

A. The Board properly applied NEPA to the facts of this case.

Although it quantified costs and benefits to the fullest extent possible, the Board recognized and weighed the substantial unquantified, and in some cases essentially unquantifiable, environmental values to be protected by the operation of Indian Point 2 with closed-cycle cooling. These include the priceless value to present and future generations of the vitality of an entire striped bass fishery and the value of fish species not commercially or sports fished. The Board is not only justified in assessing and balancing these and other

unquantified values; it is required to do so.

The weighing of such unquantified values in the balance is not a mere procedural or "paper shuffling" duty. Such factors can tip the balance toward environmental protection in the appropriate case. HRFA submits that the unquantified environmental values weighed by the Board properly -- both as a matter of law under NEPA and as a matter of fact on the extensive record in these proceedings -- tipped the balance to the conclusion reached below.

Congress recognized in §101 of NEPA the importance of unqualified values and directed in that section and in §102 that they be accorded full weight in federal decision-making. In §102, Congress directed:

> " ... that to the fullest extent possible: ... all agencies of the Federal Government shall --
> ...
> (B) Identify and develop methods and procedures ... which will insure that presently unquantified environmental amenities and values may be given appropriate consideration in decisionmaking along with economic and technical considerations;"

Appendix D to 10 CFR Part 50 also directs that unquantified factors must be balanced.*

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*Subsection A.8 provides in relevant part:

> "The cost-benefit analysis will, to the fullest extent practicable, quantify the various factors considered. To the extent that such factors cannot be quantified, they will be discussed in qualitative terms."

The "finely tuned" balancing of Calvert Cliffs*clearly includes unquantified environmental values. This is also the rule announced by the Appeal Board in earlier decisions. In the Matter of Arkansas Power & Light Co. (Arkansas Nuclear One, Unit 2), supra, the Appeals Board said:

> "Thus, in striking its balance, the Licensing Board here was required to place on the scales every significant environmental impact which the record disclosed might be occasioned by the operation of the facility."

In the Matter of Consumers Power Co. (Midland Plant, Units 1 and 2) (Docket Nos. 50-329 and 50-330) 2 Atomic Energy Law Rep. ¶11,701.02, the Licensing Board, with the approval of the Appeal Board, seemed quite clearly to be weighing seriously in the balancing, unquantified environmental values.

Con Edison itself recognizes the requirement of weighing unquantified values. In its Proposed Findings of Fact, it proposed a license condition which would have required the installation of a closed-cycle cooling system by September, 1981, unless the company could in the meanwhile persuade the Commission that the system was unnecessary and that other protective measures would suffice. The proposal was made despite the fact that Con Edison had never presented a cost-benefit analysis which, in strictly monetary terms, would have

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*Calvert Cliffs' Coordinating Committee v. AEC, 449 F.2d 1109 (D.C. Cir. 1971).

justified the cost of the cooling system in terms of the benefits to the aquatic ecosystem. This proposal was a recognition by Con Edison of the truth of the statement made by one of the Staff witnesses:

> "... we feel that [the aquatic biota and the fishery] is priceless, not only to our generation, but to future generations to come; and we cannot put a price tag on it." Tr. 6988.

Nevertheless, Con Edison seems at other times to be arguing that allowing the weighing of unquantified values introduces spurious and uncontrollable variables in the decision-making process. This argument fails to credit the procedural strength and wisdom of the licensing process, including this Appeal Board. Moreover, if dollars and cents are used exclusively, the cost-benefit analysis will frequently obscure rather than illuminate fundamental policy issues and trade-offs and will be biased against those values -- the very ones NEPA is primarily aimed at protecting and interjecting forcefully into government decision-making -- that our market system is least able to ascribe dollars and cents values to.

A reading of the Board's opinion demonstrates its consideration and weighing of several substantial, unquantified environmental values and costs. First, while not quantifying

for lack of information, the Board recognized that the impact on other fish species would be similar to the impacts on striped bass and must be balanced. Initial Decision, pp. 69, 106.

Second, while not including in its monetary calculations a value for the adverse impact of the operation of once-through cooling on the Hudson River contribution to the New England fishery, the Board recognized that the impact "could be several million dollars per year." Initial Decision, p. 64.

Third, the Board considered without quantifying, the possibility that the installation of closed-cycle cooling might be necessary to insure compliance with New York State thermal water quality criteria and avoid possible fines which might be imposed under state law for fish killed by impingement. Initial Decision, pp. 105, 106, Ftn. 5.

Most important, the Board weighed in the balance the unquantifiable environmental value of the vitality of the Hudson River fishery. Initial Decision pp. 106, 107.

The Board properly gave this last value considerable weight. In its cost-benefit analysis and throughout this proceeding the Staff took the position that the striped bass fishery was "a priceless resource not only to the present generation but to future generations as well." Initial Decision, p. 65. HRFA submits that a fair reading of the Initial Decision

as a whole indicates Board approval of this position. Moreover, in accordance with Appendix D of 10 CFR Part 50, the cost-benefit analysis contained in the final environmental statement was approved and adopted by the Board as modified. See the Board's Summary of Findings and Conclusions pertaining to environmental subjects. Initial Decision, pp. 123, 124. Thus by operation of the regulations as well as in fact, the priceless value of the total fishery was an important element weighed in the balance by the Board.

NEPA is not a "paper tiger"; its requirements are not just "paper shuffling" procedural duties. Calvert Cliffs, supra. The serious weighing of unquantified values by definition means that in the appropriate factual situation those values will in fact influence the final decision, will in fact tip the balance toward a given result. In this proceeding the unquantified values weighed by the Board all weighed more heavily on the side of greater environmental protection, and the Board, considering the facts as it found them, struck the balance of requiring closed-cycle cooling by May 1, 1978. This process was fair, rational, and more than adequately supported by substantial evidence. As the discussion immediately below will show, the weight given to unquantified environmental values is entirely justified.

B. NEPA supports the adoption of economically feasible alternatives which alleviate substantial environmental damages.

Since NEPA requires that the balancing of costs and benefits result not in the adoption of the cheapest alternative but in the "optimally beneficial action", NEPA supports adoption of an economically feasible alternative having less environmental impact, to protect a substantial natural resource against serious damage. This rule not only supports the weight accorded to unquantified environmental values in the balancing process discussed above, it independently supports the adoption of closed-cycle cooling as the optimally beneficial action.

Applicant argues that, while §101 expresses the underlying legislative policy of NEPA, it does not create "substantive rights" to an environment free from adverse impact that are enforceable in the courts, nor does it mandate particular substantive results in particular problematic instances.

NEPA mandates that federal agencies act to protect the environment "to the fullest extent possible", and opt for the "optimally beneficial action" rather than the cheapest alternttive. Calvert Cliffs, supra, at 1129. A reasonable interpretation of this mandate is that where substantial adverse environmental effects will flow from a proposed action and

feasible means of averting that adverse impact exist, the agency must act to protect the environment. No less is required if the grand Congressional purposes underlying NEPA are to become a reality.

To the contrary, a number of cases have construed the Act as establishing a substantive policy which agencies are bound to implement. In EDF v. Corps of Engineers, 470 F.2d 289, 4 ERC 1721 (8th Cir. 1972), the Court in emphatically disagreeing with the District Court's holding that NEPA created only procedural duties stated the following:

> The language of NEPA, as well as its history, make it clear that the Act is more than an environmental full disclosure law. NEPA was intended to effect substantive changes in decision making. Section 101(b) of the Act states that agencies have an obligation 'to use all practical means, consistent with other essential considerations of national policy, to improve and coordinate Federal plans, functions, programs and resources' to preserve and enhance the environment. To this end, §101 sets out specific environmental goals to serve as a set of policies to guide agency action affecting the environment ... The purpose [of the procedural requirements of the Act] is to 'insure that the policies enunciated in Section 101 are implemented. ... Given an agency obligation to carry out the substantive requirements of the Act, we believe that Courts have an obligation to review substantive agency decisions on the merits'. (Citations omitted) 470 F.2d at 297-298, 4 ERC at 1725-6.

The Eighth Circuit subsequently reaffirmed its ruling on the substantive thrust of NEPA in Environmental Defense Fund v. Froehlke, 473 F.2d 346, 4 ERC 1829 (8th Cir. 1972).

A number of other circuit courts have held that NEPA establishes a substantive policy which agencies must implement in their decision-making. In Calvert Cliffs' Coordinating Comm. v. AEC, 449 F.2d 1109 (D.C. Cir. 1971), the Court stated that a reviewing court may reverse a substantive agency decision on its merits under §101 if it is shown that "the actual balance of costs and benefits that was struck was arbitrary or clearly gave insufficient weight to environmental values." (p. 1115) While the Court did say that NEPA may not mandate particular substantive results in particular problematic instances, it recognized that NEPA does establish a general mandate regarding substantive results.

In both Conservation Council v. Froehlke, 473 F.2d 664, 4 ERC 2039 (4th Cir. 1973) and Sierra Club v. Froehlke, ____F.2d____, 5 ERC 1921 (7th Cir. 1973) the substantive as well as the procedural duties which NEPA imposes were recognized and federal agency decision-making under NEPA was held to be subject to judicial scrutiny to see if these substantive requirements had been fulfilled.

The Court's interpretation of NEPA is in accord with decisions of the Atomic Energy Commission. In the Licensing

Board's initial decision In the Matter of Arkansas Power & Light Co. (Arkansas Nuclear One, Unit 2) (Docket No. 50-368), 2 Atomic Energy Law Reports, ¶11, 702, relying on Calvert Cliffs' Coordinating Committee v. AEC, supra, the Board stated:

> NEPA requires the Atomic Energy Commission to consider and assess the economic benefits of a proposed action in relation to environmental costs. Moreover, in weighing the costs as against the benefits, the Commission must consider alternatives that would produce the least environmental damage.
>
> * * *
>
> A primary objective of NEPA is to forestall or, at least, limit environmental damage where appropriate or feasible.

The decision of the Appeal Board (ALAB-94) modifying in part the Licensing Board decision, did not modify or disapprove the quoted analysis.

The purpose of NEPA is to effect a qualitative change in agency decision-making. As revealed in the above cases, the test of compliance with the Act is not only whether the agency's decision is reached after a balancing of environmental factors including those unquantified, but also whether the decision reached by the agency fulfills the substantive policy of the Act. The language of Section 101 is thus not mere preamble. It requires that agencies act to:

> (1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
> (2) assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings;
> (3) attain the widest range of beneficial uses of the environment without degradation, risk to

> health or safety, or other undesirable and unintended consequences;
> (4) preserve important historic, cultural and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity and variety of individual choice;
> (5) achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and
> (6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

When read in conjunction with the Act's other provisions, particular the requirement of §102(1) that all other federal policies and laws must be interpreted and administered "to the fullest extent possible" in conformity with NEPA's policy, the six goals intend to alter the way in which benefits and costs are to be weighed.*

The Licensing Board, in holding that environmental values must take precedence over purely economic values where a precious natural resource is seriously endangered and economic means having less adverse environmental impact exist, was

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* Section 102(2)(D) also support this interpretation. In the case at bar, the use of the Hudson River water as a fish hatchery and nursery is in conflict with its use (along with other generating plants in the critical area) in once-through cooling. This conflict over the use of this natural resource can be resolved by the installation of cooling towers at a feasible and reasonable cost.

implementing the substantive mandate of the Act.* The Board was acting as trustee of the environment for succeeding generations, it was averting degradation of the environment, it was preserving a crucial natural resource and maintaining an environment which supports diversity. The Board's decision can not be looked upon as irrational or untenable because it is not the cheapest alternative based on a cost-benefit analysis involving only quantifiable values. The Act does not require that a decision be based on the results of such an analysis. In fact, as revealed in the above discussion, it mandates otherwise.

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*This approach is also in accord with the President's recent energy message which encourages the internalization of costs in pricing energy. It is Con Edison customers who benefit from the electricity and under the Board's determination it is those same customers who will pay the price of protecting the fishery. If appropriate protective devices are not required, it is commercial and sports fishermen who will bear the cost of injury to fish.

EXCEPTION 1

> "The ruling that estimates of impact upon the striped bass fishery based upon present modeling techniques and existing data are an adequate basis for making a decision now to require installation of a closed-cycle cooling system for Indian Point 2 notwithstanding the Licensing Board's recognition that:
>
> > '... it is almost impossible to describe the complexities of estuarine behavior by mathematical formulas susceptible to programming for computer computation. The fact of the matter is that even though the computer models which can be built appear very complicated, they involve such great simplifications as to make their applicability to the real situation suspect.'
>
> (Pages 29,30, 36-37, 51)"

To support its argument that the Board failed to base its determination in a rational and accurate balancing analysis, the Applicant points to the Board's reliance on experimental and mathematical models, in lieu of empirical data. The Applicant states that the Licensing Board utilized such models even though it found them to be "suspect" tools. Applicant's Brief, p. 17. The Applicant points to the Board's statement on the modeling of thermal effects. Initial Decision, pp. 29-30. The Applicant takes the Board's statement that the great simplifications involved in the thermal modeling make the

applicability to real situations suspect, and seeks to make it appear as though the Board was making a generic criticism applicable to all the models used in the Board's analyses. Applicant's Brief, p. 17, ftn. 47)

There is no basis for Applicant's argument. The entrainment models used by the Board in examining the impact of operation of Indian Point 2 with once-through cooling were not criticized by the Board as being suspect tools. In addition, the reasons the Board gave for finding the modeling of thermal discharges suspect are not applicable to the entrainment models. In thermal modeling, the complexities of estuarine behavior make it extremely difficult to use mathematical formulas to accurately reflect the real situation. Initial Decision, p. 29; Simon-Tov on Hudson River Power Plants, February 12, 1973 at 1-4, follow. Tr. 10,021; Tr. 6914-6916. Since the field information necessary to verify the thermal models rarely exists, reliance on such models for determining the effects of thermal discharges was considered unwise by the Board. Initial Decision, p. 30. As a result, the Board refused to rule on the basis of the thermal modeling. Ibid.

The entrainment models developed by the parties and relied upon by the Board in reaching its decision differ

significantly from the thermal models in terms of the phenomena described. The entrainment models deal with plant withdrawal of water from the River and the behavior of biological organisms in the River. The thermal models deal with the discharge of water from the power plant with an emphasis on an analysis of the qualities of that water involving comparatively fine and exact measurements. Most importantly, as the Board has pointed out, significant data exist to verify the accuracy of the entrainment modeling. Initial Decision, pp. 38-39.

It is entirely appropriate for the Board to rely on modeling techniques where inadequate empirical data exist. Indeed Applicant based much of its testimony on safety and radiological issues on modeling and the Board accepted it. No one, especially Applicant, is attacking the use of modeling in that instance. Where scientific uncertainty exists, a decision may be reached on the basis of the best evidence available. In re Wisconsin Electric Power Co. (Point Beach 2), ALAB-137, RAI-73-7491. City of New York v. U.S., 344 F.Supp 929 (E.D.N.Y. 1972); SIPI v. AEC, _____F.2d_____, 5 ERC 1418 (D.C. Cir. 1973); NRDC v. Morton, 458 F. 2d 827 (D.C.Cir. 1972). These cases hold that under NEPA it is appropriate to predict

environmental consequences even where uncertainty exists, so long as the agency has made a careful examination of environmental consequences and information sufficient to support a reasoned choice exists.

The responsibility for any lack of empirical data rests with Con Edison. It is the Applicant that has the burden of coming forward with the evidence to support and justify issuance of a license. 10 C.F.R. §2.732. It would be most ironic if an Applicant's failure to supply empirical data on environmental impacts prevented the Licensing Board from making a ruling in behalf of environmental protection. Such a rule would mean that an Applicant would benefit from its own ineptitude and would have no incentive to carry out a vigorous research program in order to present data on environmental impacts to a Board.

In the instant case, Con Edison has had ample opportunity to obtain empirical data. It has known of the problem of the adverse impact of power plant operation on the Hudson River fishery since 1965 and has sponsored research on the problem over the past eight years. Indeed, as pointed out above, significant data have been obtained from these studies and used to verify the accuracy of the fish entrainment models.

EXCEPTIONS 2 AND 4

"The ruling that the potential adverse environmental impact of the once-through cooling system for Indian Point 2 justifies construction of a closed-cycle system even though the economic costs of such a system are greater than the Licensing Board's maximum predicted economic loss to the fishery and the environmental costs of the latter system have not yet been determined. (Pages 77-79, 83, 106-180)"

* * *

"The conclusion that the National Environmental Policy Act of 1969 ("NEPA") requires that the Hudson River fishery be protected from 'serious damage' by installation of a closed-cycle cooling system for Indian Point 2 notwithstanding the estimated balance of monetary benefits and costs of a closed-cycle cooling system, reflected in the following portions of the decision:

(a) 'On the basis of estimates of monetary values alone, the Board finds that the benefits, to the extent they can be quantified, to be derived from installation of a closed-cycle cooling system on Unit No. 2 are unlikely to approach the cost. This must certainly be true over the next ten years. This, however, is not the only consideration ... The law requires that a natural resource like the Hudson River fishery be protected from serious damage if economic means having less adverse environmental impact are available to provide such protection.' (Pages 106-107)

(b) 'In a previous section, the Board concluded that the Hudson River supplies between 20 percent and 80 percent of the recruits to the Middle Atlantic striped bass fishery.

> If the total value of the fishery is $20 million per year, the Hudson River contribution is between $4 million and §16 million per year. Based on the Applicant's 'best estimate' that the reduction in recruitment from the Hudson River would be 5 percent, the impact of once-through cooling of Unit Nos. 1 and 2 would be only $200,000 to $800,000 per year in the tenth year after operations have commenced. On the basis of Applicant's most conservative estimate (adopted by the Board as being a reasonable exception), the reduction in recruitment would be 35 percent and the cost would be $1.4 million to $5.6 million per year in the tenth year. (Page 67)"

These two exceptions relate to Applicant's argument that the Licensing Board misinterpreted and misapplied NEPA in regard to both its substantive and procedural mandates. Applicant's Brief, pp. 6-13; 18-19. The above discussion on the correctness of the Board's application of NEPA answers the key points raised in these two exceptions. As was pointed out, NEPA does not require that agency decisions be made on the basis of purely monetized costs or that a strictly financial cost-benefit analysis is to dominate and dictate agency decisions. As was stated in Calvert Cliffs, supra, under whose mandate this proceeding is being conducted, the end result which is sought is not the cheapest way of doing things, but the "optimally beneficial action." (p. 1123).

The cases discussed above clearly show that, in enacting NEPA, Congress sought to reorder priorities by giving environmental issues proper consideration.

The Board not only correctly construed the substantive policies of NEPA, but utilized a systematic and thorough analysis in applying that policy. On the basis of voluminous evidentiary record, including a two volume Final Environmental Statement, scores of statements of prepared testimony and over 6,000 pages of transcript on environmental issues, the Board reached its conclusions regarding the environmental costs and benefits of plant operation with both a once-through and closed-cycle cooling system. From the testimony, the Licensing Board concluded that the Indian Point 2 plant operating with a once-through cooling system would seriously damage and destroy the important striped bass fishery of the Hudson and that portion of the coastal waters which the Hudson supports. Final knowledge concerning environmental impact need not be had before a decision is reached. The Board had the authority under NEPA to draw conclusions as to environmental impact on the basis of the best available evidence. City of New York v. U.S., supra; In re Wisconsin Electric Power Co. (Point Beach 2), supra; Sierra Club v. Froehlke, supra. As the Court in Sierra Club v. Froehlke stated:

> NEPA does not require that every conceivable study be performed and that each problem be documented from every angle to explore its every potential for good or ill. Rather what is required is that officials and agencies take a 'hard look' at environmental consequences. 345 F.Supp at 444.

In NRDC v. Morton, supra, at p. 836, the Court held that what is required is information sufficient to permit a reasoned choice of alternatives as far as environmental aspects are concerned. The Board's decision meets the requirements of NEPA. Indeed as the Board stated, conciderable knowledge concerning the striped bass fishery exists. Initial Decision at 38. Con Edison's research and the further analysis of the other experts in the proceeding provided information sufficient for the Board to take action now to protect the Hudson environment, particularly its fishery.

The Applicant attacks the Board's "perfunctory consideration of the environmental impact of a closed-cycle cooling system" claiming that the impact of such a system is not known at this time and that the Board failed to adequately evaluate the effect of a closed-cycle cooling system on the environment in this regard. Applicant's Brief, p. 18. As discussed above, NEPA does not require absolute certainty regarding the adverse environmental impact of alternatives to a proposed action

before a decision may be made. In addition, there is much evidence in the record to support the Board's finding that the adverse environmental impacts for operation with a closed-cycle cooling system are likely to be much less than those for operation with once-through cooling. (See discussion of the predicted environmental effects of closed-cycle cooling system in HRFA response to exception 13). Applicant's Exhibit 3-A, Environmental Reporter Supplement No. 3; Burns & Roe Report on Alternate Cooling Systems, HRFA Exhibit V, follow. Tr. 10,543; Tr. 7562; 1 FES Chapter XI; Aynsley on Alternatives, October 30, 1972, following Tr. 6276.

In conclusion, the Applicant's argument that the Board engaged in irrational decision-making is not supported by the record. The Board carried out a thorough and systematic cost-benefit analysis in accordance with the mandate of NEPA and the AEC's own regulations. On the basis of this analysis, the Board applied the great substantive policies of the Act which mandate action for the protection of the environment. This action is fully supported by the record and is based on an accurate interpretation of the mandate of the National Environmental Policy Act.

EXCEPTION 3

> "The ruling that operation of Indian Point 2 with once-through cooling may not continue beyond May 1, 1978 although the Board has not found that operation of the plant for the additional period from May 1, 1978 through September 1, 1981 will have an irreversible impact upon the mid-Atlantic fishery and indeed has specifically agreed 'that there is unlikely to be a serious permanent effect on the fishery by a delay of a year or two in starting construction ...'. (Pages 100-101)"

The Applicant has misconstrued the law. Neither NEPA nor any of the cases interpreting the Act require that protection of the environment may only be ordered if the proposed action will have an irreversible impact. The case law interpreting NEPA squarely recognizes that every significant environmental impact which might be occasioned by a proposed action must be considered in the NEPA review. In the Matter of Arkansas Power & Light Co. (Arkansas Nuclear One, Unit 2), supra, and in Calvert Cliffs' Coordinating Committee v. AEC, supra, the judicial ruling under which a NEPA review was required in this proceeding, the Court of Appeals held that:

> The sweep of NEPA is extraordinarily broad, compelling consideration of any and all types of environmental impact of federal action. At 1122 (emphasis supplied).

In the discussion of balancing the various factors which are to be weighed so as to reach the "optimally beneficial action" there is no suggestion that only reversible commitments of resources or irreversible impacts are to be considered.

In addition, Con Edison is here playing a semantic game with the meaning of "irreversible" and the Licensing Board's use of "serious permanent effect." Con Edison apparently takes irreversible to mean something which could never be returned to its original state. Thus an irreversible effect on the fishery is one which reduces the fishery for all time but not one which damages it for five, ten or twenty years. Of course, damage which cannot be repaired in less than five, ten, or twenty years is irreversible and permanent during that period and must be given full consideration.

The illogic of Con Edison's interpretation can most easily be illuminated by applying Con Edison's notion of irreversible to justify suspension of plant operation until installation of a closed-cycle cooling system. Since the cost to consumers of power losses is not permanent through all time, suspension of plant operation will not cause irreversible harm. This argument is as unimpressive when applied to the effects on the fishery as it is when applied to the effect on consumers.

There can be no question that the Licensing Board met the requirements of the National Environmental Policy Act and its controlling judicial interpretation in refusing to delay the requirement of a closed-cycle cooling system to September 1, 1981. Having reached the conclusion on which Con Edison's exception relies, the Licensing Board immediately went on to state:

> However, the Board also agrees with the Staff, HRFA, and the State of New York that operation of Unit No. 2 without a closed-cycle cooling system can have a seriously adverse effect on the fishery, and the Applicant's research program is unlikely to resolve the important question in that extra year or two. Initial Decision at 100-101.

Thus, in rejecting the Applicant's request for a longer period of time in which to operate the plant with once-through cooling and in which to conduct its research program, the Board weighed the risks of permanent damage to the fishery, the seriously adverse effects of short term operation and the inadequacies of the research program and concluded that operation until September 1981 with a once-through cooling system was not justified. This is precisely the type of weighing and balancing of all environmental impacts which the Act and Calvert Cliffs call for.

In addition, although the Board indicated that emergency measures could be taken to avert certain adverse environmental

effects during operation with once-through cooling, the Board's finding related only to measures which could be taken to avoid a drastic impingement problem at Indian Point 2. Initial Decision, p. 58. With regard to all other adverse impacts, the Board specifically found that there are no measure which are presently known to be effective in mitigating these impacts resulting from operation with once-through cooling. Initial Decision, p. 85.

POINT II

THE LICENSING BOARD HAS USED AN APPROPRIATE STANDARD IN REVIEWING THE EVIDENCE BEFORE IT.

Throughout its discussion, Con Edison fails to mention that the basic standard by which the Licensing Board must judge the evidentiary contentions of the Applicant rests on the Commission's rule that an applicant in an operating license proceeding has the burden of proof. 10 C.F.R. Section 2.732. The Board must thus consider whether the applicant has met its burden, and whether the preponderance of the evidence demonstrates the truth of the contention which the applicant has put forward.

Con Edison attempted to confuse this issue by relating it to the issues of the interpretation of NEPA as well by lifting occasional phrases out of context. Both approaches are incorrect and should be rejected by the Appeal Board.

As the detailed responses of this brief will show at greater length, the Licensing Board has used the proper standard in reviewing the evidence on the environmental issues, and there is no basis in the record for the Appeal Board to alter the conclusions which the Licensing Board reached on those issues.

EXCEPTION 5 AND 6

"The Licensing Board's ruling as to the standards by which it judges the evidence concerning potential adverse effects of the once-through cooling system, reflected in:

(a) The finding on page 48 that 'calculations with the combined f factors equal to 1 [is] appropriately conservative,' notwithstanding the Licensing Board's recognition that '[t]he Applicant has some justification for its best estimate of the combined f factors.'

(b) The finding that the effects of compensation will not effectively mitigate the impact of plant operations, as reflected in the following portions of the decision:

(1) 'The Board agrees that it is desirable to take compensation into account but does not find convincing evidence that the effects at the present level of population are likely to be as effective in reducing the plant impact as Applicant's calculations indicate.' (Page 50)(emphasis added)

(2) 'None of the present evidence demonstrates that compensation will be effective in preventing drastic reductions in the fish populations.' (Page 100)(emphasis added)

(c) The conclusion that it is 'only prudent to assume that the impact of operation of the plants as they are presently designed will be at least as great as shown by the 'Applicant's conservative calculations.' (Page 51)(emphasis added)"

* * *

"The conclusion (not supported by Applicant's testimony) that 'Applicant's conservative calculations' show certain reductions in the striped bass population due to operation of Indian Point 1 and 2, reflected in the finding that:

'...the Board concludes that the impact of one year of plant operation is unlikely to be as great as is predicted by the Staff and HRFA.

> However, Applicant's conservative calculations show reductions in striped bass population of 20 percent in the fifth year and 35 percent in the tenth year for operation of the Indian Point Unit Nos. 1 and 2, and 40 and 60 percent for operation of all plants now on the river, including Unit Nos. 1 and 2.' (Page 51)"

In these exceptions, Applicant challenges the standards by which the Board judged the evidence dealing with the damages which will be inflicted on the striped bass fishery by the operation of the once-through cooling system. The exceptions which contest the standards by which the evidence is measured relate to rulings on three evidentiary matters: "f" factors, compensation, and the impact on the fishery of once-through cooling. The basic standard by which the Licensing Board must judge these evidentiary contentions of Con Edison's rests on the Commission's rule that an applicant in an operating license proceeding has the burden of proof. 10 C.F.R. Section 2.732. The Board must thus consider whether the applicant has met its burden, and whether the preponderance of the evidence demonstrates the truth of the contention which the applicant has put forward.

Through the introduction of the "f" factors into its calculations of plant impact, Con Edison attempted to show that the number of entrained striped bass which would pass through the plant's cooling system and be killed would be less per unit of water withdrawn that the average number present per unit of water in the cross-section of the Hudson in front of the Indian Point plant. By introducing the notion of compensation into its calculations, Con Edison tried to show that the percentage decline in the adult population of striped bass spawned in the Hudson would be less than the percentage of Hudson striped bass population killed by the operating of

Indian Point 2 during the early stages of life. On total impact, Con Edison, of course, attempted to show that the damage to the striped bass fishery was less than its conservative calculations.

All three of the issues which Con Edison contests here were hotly contested by Con Edison, HRFA and the Staff during the evidentiary proceeding. There is no indication in the opinion of the Board that it reached the conclusion that the Applicant had discharged its burden of proof, that the preponderance of the evidence favored the Applicant's position and that the Board nevertheless ruled against the Applicant's contention.

Three of the "f" factors, f_1, f_2 and f_c were in dispute. f_1 was defined as the ratio of average concentration of organisms in the cross section of the river in front of the plant to the concentration in the vicinity of the plant's intake; f_2 was the ratio of actual intake concentration to the concentration in the vicinity of the intake; f_c was the fraction of organisms killed by entrainment. Lawler on Entrainment, October 30, 1972 at 30,33, 49-65, following Tr. 6256. Obviously both f_1 and f_2 can be less than, equal to, or greater than 1. All the parties agreed that if data were available to give particular values to f_1, f_2 and f_c, it would be proper to use them in calculating the plant's effect. Tr. 6512, 6591, 8855, 8860. Con Edison contended that values other than unity could be assigned to the "f" factors

on the basis of present data, while HRFA and the Staff contended that the data was inadequate to indicate a value other than unity. HRFA and the Staff rebutting Con Edison's contention by showing both the inadequacies of Con Edison's methodology in determing the values for f_1, f_2 and f_c; the statistical invalidity of the values Con Edison assigned to those factors; the inadequacy of the data relevant to Indian Point in which Con Edison relied and the results of experiments at other sites which tended to rebut Con Edison's contention.

Thus Con Edison's contention for the value of f_1 was countered by Staff evidence showing that the withdrawal by the plant had been assigned by Con Edison to the wrong portion of the River and by evidence and cross-examination by the HRFA and the Staff showing Con Edison's estimates of the variation in concentration had no statistical significance. Goodyear on Susceptibility, February 22, 1973, Figure 3, following Tr. 9892 ; 1 FES III-14; Tr. 7081-83; Griemsmann on Distribution, February 19, 1973, following Tr. 9859, Griemsmann, April 6, 1973, following Tr. 10,349. Expert witnesses for HRFA and the Staff testified that in these circumstances, the most reasonable approach is to assume that the plant will withdraw organisms at the concentration of the cross-sectional average and thus f_1 should be set at unity. Goodyear on Susceptibility, February 22, 1973, following Tr. 9892 . Clark, Effects of Indian Point, October 30, 1972, following Tr 6276.

Con Edison itself admitted that the data on which f_2 was based was inadequate to perform any valid analysis. Lawler on

Entrainment, October 30, 1972 at 30, following Tr. 6256; Tr. 7370. HRFA and the Staff did not dispute that conclusion and further produced cross-examination and evidence showing that the data collection techniques for the determination of Con Edison's f_2 value were too flawed to be given credence and that the data showed no statisfically valid differences in concentrations. Tr. 7103-04, 7370, 7098-99, 7114-16, 7358-62; Goodyear on f_2 Factor, February 22, 1973, following Tr. 9892. Again it was the conclusion of HRFA and Staff expert witnesses that there was no basis for assuming differences between the concentrations in the intake and in the vicinity of the plant and thus f_2 should be treated as unity. Goodyear on Susceptibility, February 22, 1973, following Tr. 9892 ; Clark on Effects of Indian Point, October 30, 1972, following Tr. 6276.

Con Edison contended that less than all the entrained striped bass were killed on passage through the plant's cooling system on the basis of field test and laboratory experiments. HRFA and the Staff's expert witnesses did their own analysis of the field data from Indian Point 1, examining the conditions which would exist when the plant was fully operational, and pointed out the inadequacies of the laboratory tests which did not measure all of the stresses involved in plant operation, and gave opinions based on data from other operating plants, particularly the experiments undertaken at the Connecticut Yankee nuclear plant. Griemsmann on Distribution, February 19, 1973 at 3-4, following Tr. 9859; Clark Redirect, February 12, 1973 at 1-5, following Tr. 9858; Goodyear on Biological Effects, February 22, 1973; 1 FES A-V-16 to 18; Clark on Effects of Indian Point, October 30, 197

at 47-49, following Tr. 6276. This evidence showed that all, or close to all, the organisms would be killed on passage through the plant and that for every practical purpose complete mortality should be assumed and f_c set equal to unity.

On the issue of compensation, all the parties agreed that compensation is frequently present in animal populations. But the real issue before the Licensing Board was whether at present population levels any compensatory mechanism is operating in the crucial periods of the first year of life of Hudson-spawned striped bass. Con Edison contended that such a mechanism must be operating as a matter of general biology, but it could produce no evidence that such a mechanism was in fact operating. McFadden on Impact, October 30, 1972, at 10, following Tr. 6254.

Q (by attorney for HRFA):

You say here on page 10 of your testimony of October 30:

> "No empirical observations on operation of compensatory processes during different life history stages for striped bass in the Hudson River *per se* are known by me to exist."

And in your discussion of compensatory processes, I found no references to striped bass in the Hudson River.

Am I correct in assuming that your testimony does not rely on any data collected on striped bass in the Hudson River.

A (by Con Edison witness McFadden):

With respect to compensatory processes, that's correct. Tr. 7441-42.

Expert witnesses for both HRFA and the Staff examined various aspects of the biology of Hudson-spawned striped bass - growth rates, lack of crowding,trends in the size of the population -

and concluded that the evidence indicated that there were no compensatory mechanisms operating in the crucial periods of the first year of life of the Hudson striped bass at the present levels of the population. Clark on Effects of Indian Point, October 30, 1972 at 49-56, following Tr. 6276; Goodyear on Rate of Growth, February 22, 1973, following Tr. 9892; Tr. 11,278; 1 FES V-56, V-61. It was shown by reference to the Pacific sardine and the striped bass in the Sacramento San-Joaquin system that the absence of effective compensatory mechanisms in a major sport or commercial fishery is well documented. Clark on Indian Point, October 30, 1972 at 52-54, following Tr. 6276; Goodyear on Compensation, February 22, 1973 at pp.4-8, following Tr. 9892.

Thus on both the issues of the "f" factors and compensation, the record contains ample evidence refuting the position for which Con Edison contended and showing that Con Edison did not discharge its burden of proof or prevail on a preponderance of the evidence. Instead, the record fully supports the position taken by HRFA and the Staff that "f" factors should be set at unity and that compensation in the system should not be assumed. Con Edison may quibble on the exact words in which the Licensing Board expressed its opinion, but there is no doubt that the Licensing Board used the appropriate standard in judging the evidence.

To say that Con Edison has "some justification for its best estimates of the combined f factors" is not to say that its estimate is carried by a preponderance of the evidence. It is closer to saying that Con Edison's contentions are not frivolous. The Board goes on to say: "Because of the large uncertainties in the data, however, the Board considers the calculations with the combined f factors equal to 1 to be appropriately conservative." This statement says no more than that the evidence will not support the values for the f factors proposed by Con Edison, the Applicant has not discharged its burden of proof, and therefore the Licensing Board adopts the reasonable, nonspeculative position that the f factors should be set at unity rather than less or greater than one. The evidence fully supports that conclusion. The truly most conservative position would set f_1 and f_2 at values greater than one. The Licensing Board did not take the most conservative course, but rather the most reasonable one.

On the issues of compensation, Con Edison dislikes the use of the words "convincing" and "demonstrates" in relation to the evidence on compensation. It should be obvious that a showing by a preponderance of the evidence would be convincing and demonstrative. The Board is using the proper standard here. It is not proposing proof beyond a reasonable doubt or any heavier burden. The Board makes the point pungently later in its opinion: "None of the present evidence demonstrates that compensation will be effective in preventing drastic reductions in the fish populations." Initial Decision at 100. Con Edison simply

failed to carry its points by the appropriate legal standard.

Con Edison also takes exception to the general conclusion on the effects of the once-through cooling system on the striped bass fishery when the Board stated that it is "only prudent to assume that the impact of operation of the plants as they are presently designed will be at least" as great as shown by Con Edison's conservative calculations. The Applicant attacks the utilization of this assumption as being irrational and unreliable. (Applicant's Brief, p.24.) If there is a legal failing in the standard used by the Licensing Board here, it must surely be that the standard by which Con Edison's evidence was judged was too lenient rather than too stringent. The Licensing Board identified three areas of controversy as important to determining the magnitude of the effects of once-through cooling on the striped bass fishery: hydraulics, f factors and compensation. Initial Decision at 42-51. The Board indicated that the evidence favored the position of HRFA and the Staff over that of Con Edison on f factors and compensation. The question of hydraulics was not clearly resolved. Ibid.

The following results were obtained:

	Percentage Reduction					
	Year 1		Year 5		Year 10	
	First Yr. Class	Total Adult	First Yr. Class	Total Adult	First Year Class	Total Adult
Indian Point 1 & 2 only operating:						
without impingement included	13.85	9.71	19.23	17.59	33.06	31.83
with impingement included	15.41	10.81	22.08	20.08	38.73	37.29
Indian Point 1 & 2, Bowline & Roseton operating:						
without impingement included	28.61	20.06	37.67	34.96	58.82	57.15
with impingement included	30.64	21.49	41.78	38.37	67.16	65.34

If the hydraulics of the Staff model had been employed, much higher figures would have been produced since the Staff's estimate of the percentage reduction of the first year class in the first of operation were higher than those of Con Edison. 1 FES V-48; Goodyear on Other Plants, February 8, 1973, follow. Tr. 10,021. Thus, the Board gave Con Edison the benefit of the doubt on the hydraulics issue.

It thus becomes clear that the Board's conclusion rests on findings against Con Edison on two crucial matters, but on no findings for or against the company on the third crucial issue of hydraulics. Without deciding the issue of hydraulics, the reduction figures were established and the Licensing Board evidently considered that it was unnecessary to go further, since there was no evidence on hydraulics which would reduce the amount of damage predicted. Having reached the conclusions

which it did on f factors, compensation and hydraulics, the conclusions of the Licensing Board were in its own words "a reasonable expectation," (Initial Decision at 67), and were fully supported by the evidence. If anything, the Licensing Board's conclusions underestimate the impact of the plant in favor of Con Edison's position. They are by no means the most conservative estimates presented to the Board, but rather reasonable judgments based on an extensive record. There is no basis here for an argument by Con Edison that the Licensing Board applied too stringent an evidentiary standard against the Applicant.

EXCEPTION 20

> "The ruling that it is necessary for the Licensing Board to determine that Applicant's research program will be able to 'conclusively demonstrate' by 1977 that the operation of Indian Point 1 and 2 will not have an unacceptable long-term adverse impact on the fisheries supported by the Hudson River, in order to permit once-through operation to continue until September 1, 1981, (Pages 98-100)."

By its framing of this exception, Con Edison has utterly misstated the conclusions that the Licensing Board reached on both the necessity and adequacy of Con Edison's research program.

The Licensing Board gives a forceful conclusion on the evidence which Con Edison has put in on the proposed research program.

> The Applicant has not . . . provided reliable probative and substantial evidence to constitute a convincing case that its research program will resolve the question of the impact of entrainment at Unit Nos. 1 and 2 on the fisheries. Initial Decision at 108.

It is hard to imagine a clearer statement of Con Edison's failure to discharge its burden of proof and to prevail on a preponderance of the evidence as to the value of its research program in settling what it alleges are massive uncertainties in the present record. It is also patently clear from this statement that the Licensing Board has used a fully acceptable legal standard in judging Con Edison's evidence.

Equally importantly, it is evident that the Licensing Board essentially agrees with HRFA's conclusion that there is presently enough evidence to decide the issue of whether or not a closed cycle cooling system is necessary at Indian Point 2 to protect the fishery and thus no need to have a research program. Immediately before stating that it essentially agrees with the Intervenors on the research program, Initial Decision,p.99, the Licensing Board summarized HRFA's position in this manner:

> HRFA asserts that data on hand give sufficient evidence of the serious impact that once-through cooling of Unit No. 2 could have on the Hudson River and related fisheries. HRFA does not oppose the imposition of a condition on the license requiring the Applicant to conduct research, but this requirement should in no way be accepted as an alternative for installation of an alternative cooling system at a date no later than that suggested by the Staff and preferably much earlier. The State of New York fully supports this position. Initial Decision at 98.

The blunt fact is that the Board both concluded that in light of present record there was no need to conduct further research before requiring the installation of a closed-cycle cooling system at Indian Point and also that it concluded that Con Edison had not succeeded in discharging its burden of proof and showing by a preponderance of the evidence that its research program would resolve the important questions which the company alleged to be undecided and open.

Con Edison appears to believe that there must be definitive answers to every question before any action for the protection

of the environment is taken. As the Appeal Board in In re Wisconsin Electric Power Co. (Point Beach 2), supra at 506, has pointed out, there is no such requirement in NEPA or the Commission's regulations. See, City of New York v. U.S., supra at 939. Moreover, when one takes into account the fact that Con Edison has been engaged in supporting and conducting research on the Hudson River striped bass for eight years, the cry for yet more research rings hollow. This is particularly so when, instead of refraining from using Hudson River water for its plants until the results of the research program are in, Con Edison has engaged in a massive construction on the Hudson River adding thousands of megawatts of steam electric capacity with once through cooling to the crucial reach of the River between Newburgh Bay and Haverstraw Bay over the period from 1965 to 1974.

EXCEPTION 22

> "The finding that '[i]f stocking is to be used to mitigate the effects of once-through cooling, it is incumbent on the Applicant to show that the benefits of maintaining the populations of [species other than striped bass] fall short of compensating for the costs.' (Page 90)"

This exception turns on the question of burden of proof. The Licensing Board found that the species of fish in the Hudson other than the striped bass had a value which could not be quantified and that the operating of Indian Point with a once-through cooling system was likely to have effects on some of the species similar to those it will have on striped bass. Initial Decision at 65-66; 68-69. In addition, the Licensing Board found that the fish might be important to the ecosystem which would add to the value and importance of fish beyond their immediate value in the sports and commercial fishery. No party presented evidence suggesting that hatchery technology was available for rearing other Hudson River species and HRFA's witness stated that there were no proven techniques for artificial propagation of most of these species. Clark on Hatcheries, April 23, 1973 at 3, follow. Tr. 11,047.

On that state of the record, Con Edison proposed the following finding of fact:

> On the basis of the evidence in this record, there has been no showing by any party that the benefit

> of replacing by artificial propagation, other species which may be affected by the plant, such as white perch or tomcod, are equal to the costs of constructing and operating such a hatchery. Con Edison, Proposed Findings of Fact, N25 at 210-11.

The Licensing Board quite properly refused to accept this method of judging the evidence:

> The Board rejects the Applicant's position that replacing other species which may be affected by the plant is unnecessary because there has been no showing that the benefits are equal to the costs of constructing and operating such a hatchery. If stocking is to be used to mitigate the effects of once-through cooling, it is incumbent on the Applicant to show that the benefits of maintaining the populations of other species fall short of compensating for the costs. Initial Decision at 90.

It is Con Edison which has the burden of proof and, on the basis of the Licensing Board's other conclusions, it is Con Edison who is requesting a license to operate Indian Point with a once-through cooling system which will damage Hudson River fish other than the striped bass. Con Edison makes no proposal for stocking species other than striped bass. In these circumstances, it is the task of Con Edison to show that the costs of artificial propagation fall short of compensating for the lost benefits. Con Edison and not the other parties must offer the evidence to support the Applicant's proposal. Con Edison has simply failed to offer any evidence to discharge its burden of proof, and there is no basis for shifting that burden to any other party.

POINT III

SPECIFIC FACTORS UPON WHICH THE LICENSING BOARD RELIED ARE SUPPORTED BY THE RECORD.

In reviewing the factual findings of the Licensing Board to which Con Edison has excepted, HRFA proposes that the Appeal Board adopt the following standard: were the findings made by the Licensing Board supported by reliable, probative and substantial evidence. HRFA recognizes that the Appeal Board is not required by law or regulation to adopt such a standard. 10 C.F.R. Sections 2.785 and 2.770; 5 U.S.C. Section 557(b). The use of such a standard, however, is within the Appeal Board's power and is entirely appropriate to its function as a reviewing body. In re Arkansas Power & Light Co. (Arkansas Nuclear One Unit 2), supra; In re Wisconsin Electric Power Co. (Point Beach 2), ALAB-78 (Nov. 10, 1972), 1 CCH Atomic Energy Law Rep. Para. 11, 2760.03. As the Appeal Board in Point Beach 2 stated in response to a request that it conduct a de novo evaluation of the record:

> Obviously, an essential element of such review in a particular case is an inquiry into whether each of the essential findings of the Licensing Board is supported by reliable, probative and substantial evidence of record. But it scarcely follows that, even though we may be clothed with legal authority to do so, it is appropriate for us as a reviewing tribunal to substitute our judgment on purely factual matters for that of the Licensing Board. [footnotes omitted.] Specifically, while it is our duty to reject or

> modify factual determinations which we conclude are not well founded and rational, we see no justification for setting aside licensing board findings simply because, had we been the trier or fact, we might have found differently.

It would be particularly appropriate for the Appeal Board to utilize the standard of review applied in Arkansas Nuclear One Unit 2 and Point Beach 2 in the instant case. The Licensing Board necessarily gained great expertise in the many complex factual issues presented. It presided over lengthy hearings and heard thousands of pages of testimony. The Licensing Board's findings should be lent great credence and reversed only where unsupported by reliable, probative and substantial evidence.

EXCEPTION 6

> "The conclusion (not supported by Applicant's testimony) that 'Applicant's conservative calculations' show certain reductions in the striped bass population due to operation of Indian Point 1 and 2, reflected in the finding that:
>
> > '...the Board concludes that the impact of one year of plant operation is unlikely to be as great as is predicted by the Staff and HRFA. However, Applicant's conservative calculations show reductions in striped bass population of 20 percent in the fifth year and 35 percent in the tenth year for operating of the Indian Point Unit Nos. 1 and 2, and 40 and 60 percent for operation of all plants now on the river, including Unit Nos. 1 and 2.' (Page 51)"

Con Edison objects that these are not its conservative estimates. The language could be changed to read: "the conservative calculations made with Applicant's model." This would not be an alternation of substance. The Licensing Board has decided that the evidence supports HRFA and the Staff on the "f" factors and compensation; thus using calculations from Applicant's hydraulic model with the appropriate values for f factors and compensation is entirely proper. As in Exception 5, once the Licensing Board's rulings on f factors and compensation are sustained, the use of the Applicant's hydraulic model is favorable to Con Edison. The evidence, as analyzed in 5 above, fully supports this conclusion.

EXCEPTION 7

> "The finding that the Hudson River may supply as much as 80 percent of the recruits to the Middle Atlantic fishery and that 20 percent is the lower end of the range of possibilities. (Page 63)"

Con Edison appears to make two arguments on this exception. By ripping words out of context, it contends that the Licensing Board used a Hudson River contribution of 80% in its cost-benefit analysis. This contention is utterly unsupported by any reading of the Initial Decision and is dealt with in the response to Exception 9. Con Edison's second argument is that the 20-80% range of contribution adopted by the Licensing Board is unwarranted. This is refuted by an analysis of the record. Persuasive evidence supports the Licensing Board's conclusion that the Hudson supplies between 20 and 80% of the Middle Atlantic (Delaware, New Jersey, and New York) striped bass fishery. There was considerable controversy on this issue in the proceeding, with Con Edison contending that the percentage supplied by the Hudson was low, one witness placing it at 5% or less (Tr. 7631-32) and another gave a range of 5% to 40% (Tr. 9623-24). Expert witnesses for both HRFA and the Staff estimated the Hudson contribution to the mid-Atlantic fishery at 80%. Tr. 8560-65; 1 FES XII-29 to 38; Goodyear on Origin of Striped Bass, March 1, 1973, following Tr. 9892.

The bases of the witnesses' positions were given at some length. Con Edison's testimony was based on past analyses of tagging studies and an argument attempting to show by the use of various hypotheses that the notion of a major contribution from Chesapeake Bay could not be rejected. Raney on Striped Bass, October 30, 1972, following Tr. 6254; Raney on Striped Bass, February 5, 1973, following Tr. 9405; Lawler on Contribution of the Hudson, February 5, 1973, following Tr. 9405; Lawler on Contribution of Chesapeake, April 20, 1973, following Tr. 11,044. The first Con Edison witness was unable to provide a coherent and persuasive analysis of what the tagging studies showed and emphasized his personal experience and the conclusions by other investigators on which the witness relied. Raney on Striped Bass, October 30, 1972, following Tr. 6354; Tr. 7620-32, 7652-64. It was altogether proper for the Licensing Board to reject this testimony. The second Con Edison witness had no personal experience in the analysis of fisheries (Tr. 9591-9603) and twice repeated that he did not intend his testimony "to be proof of what is actually happening; it is intended solely to illustrate that the Chesapeake Bay hypothesis cannot be rejected at the present time." Lawler on Contribution of Chesapeake Bay, April 20, 1973 at 1

quoting Lawler on Cumulative Effects, March 30, 1973 at D-8, following Tr. 11,044. He nevertheless presented a range of figures significantly overlapping the range which the Licensing Board concluded was supported by the evidence.

The position taken by the expert witnesses for HRFA and the Staff was based on a number of items. First, tagging returns and seining experiments were analyzed, going beyond the opinions of those reporting the tagging experiments to the data itself, with the basis for differences of opinion with earlier investigations set forth. Goodyear on Origin of Striped Bass Stock, March 1, 1973, following Tr. 9892; Tr. 8560-65, 8696-97. The relative geography of Chesapeake Bay and the Hudson-Long Island area was analyzed as was the insignificant contribution made by the Delaware due to the gross pollution in the Philadelphia area. 1 FES XII-36; Clark Redirect, February 12, 1973 at 12-15, following Tr. 9858; Goodyear on Origin of Striped Bass, March 1, 1973 at 2-12, following Tr. 9892. Regression analyses were also performed testing the relationship between mid-Atlantic catches and landings in the Hudson and the Chesapeake which act as an index to spawning activity in those estuaries, the Staff concluding that the regression analysis did not refute the notion of a large Hudson River contribution but that the correlation

between the Chesapeake and the Middle Atlantic was spurious. 1 FES XII-36 to 38; Tr. 9910-12; Tr. 9196. The examination of all of this data led the expert witnesses of HRFA and the Staff to conclude that the Hudson contributed approximately 80% of the mid-Atlantic striped bass fishery.

On this matter, the Licensing Board essentially had to make a choice between various expert opinions. Their conclusion was a broad one, which embraced half of the range proposed by one Con Edison witness. The Commission's Appeals Boards have made it clear that the decision of the Licensing Board on expert testimony will not be lightly upset and there is no basis for upsetting the Board's ruling on this issue:

> In its evaluation of the testimony of the various expert witnesses, the Board was appropriately exercising the very function that a licensing board is most uniquely equipped to perform. In re Wisconsin Electric Power Co. (Point Beach 2) ALAB-137, RAI-73-7 491, 500.

There is no basis for the Appeal Board to modify the conclusion reached by the Licensing Board which is fully supported by the evidence in the record.

EXCEPTION 8

> "The finding that the '[u]se of Hudson River water for once-through cooling of power plants in the striped bass spawning and nursery must be considered as the possible cause if a continuing decline should occur in the Middle Atlantic striped bass fishery.' (Page 63) (emphasis Added)."

This ruling follows naturally from two of the Licensing Board's earlier conclusions that it is prudent to assume that the steam electric plants presently operating on the Hudson will reduce the Hudson striped bass population by at least 40% in 5 years and 60% in 10 years (Initial Decision at 51) and that the Hudson supports between 20 and 80% of the mid-Atlantic striped bass fishery (Initial Decision at 63). Thus, the impact of the Hudson River steam electric power plants after 5 years of operation would, with once-through cooling, range from 8-32% after 5 years and from 12-48% after 10 years. These simple numbers make it evident that the operation of the plants would have to be considered as the possible cause of declines in the mid-Atlantic striped bass fishery. The Board is not even ruling that the impact from the plants is the probable cause- which would be a perfectly logical finding- but only that such an effect is possible. The Licensing Board does not rule out other possibilities such as disease or environmental perturbations. It merely states that the effects of the plants' operation is the possible cause.

EXCEPTION 9

> "The finding that '$16 million per year [is] the value of the maximum long-term impact on the striped bass fishery of operation of Unit Nos. 1 and 2 (and of all other plants on the Hudson River) with once-through cooling systems.' (Page 106)"

The Licensing Board reached the determination that "$16 million per year [is] the value of the maximum long-term impact on the striped bass fishery of operation of Unit Nos. 1 and 2 (and all other plants on the Hudson River) with once-through cooling systems" by a series of steps. First, a reasonable value for the mid-Atlantic striped bass fishery was established as $20 million (Initial Decision at 66). Second, the previously established range of the Hudson contribution to the mid-Atlantic striped bass fishery of 20-80%, reviewed under Con Edison Exception 7, was applied to this $20 million value (Initial Decision at 67). Simple mathematics gives $16 million as 80% of $20 million. From this, it is a simple logical deduction to see that the maximum long-term impact from Indian Point or any other plant or set of plants will be $16 million. It is perfectly obvious that the Licensing Board is not ruling that $16 million <u>will</u> be the monetary impact from Indian Point 1 & 2 with or without the other

plants, but simply setting out what it considers to be the maximum value that could be taken by the plants.

The $16 million figure is in fact an underestimate since it ignores values which the Licensing Board recognizes exist, but on which it put no specific numerical value. First, the Licensing Board recognized that the Hudson contributes not only to the mid-Atlantic fishery but also to the New England fishery and that this contribution may have very substantial monetary value:

> Testimony by HRFA indicated that striped bass from the Middle Atlantic region supply the coastal fishery as far north as Maine and the other parties agreed. Initial Decision at 60.

Having discussed the HRFA testimony and the adjustments to it which the Licensing Board felt were justified and which gave a value to the Middle Atlantic fishery of near $20 million, the Licensing Board went on to say:

> These figures do not include the impact on the Middle Atlantic contribution to the New England fishery, which could be several million dollars per year. Initial Decision at 64.

No exception has been taken to these findings and they are supported by the record. Clark, Redirect, February 12, 1973 at 17, following Tr. 9858; Tr. 9862-63, 9030.

Second, this value does not include the likely increases in the value of the present fishery over time.

It is common knowledge that food prices are increasing at astronomical rates. Thus both the sports and commercial value of the fishery is likely to increase. There was testimony in this proceeding to that effect and the Licensing Board recognized this:

> In the absence of major disturbing forces, the value of the fishery, like the value of other natural resources, can be expected to increase with time. Initial Decision at 66.

Despite the fact that the Licensing Board allowed escalation costs in its estimation of the costs of the closed-cycle cooling system (Initial Decision at 79), no such escalation or increasing value was credited to the value of the fishery. Thus the value assigned by the Licensing Board to the fishery clearly tends to underestimate its value relative to the cost of the closed cycle cooling system.

Third, the Licensing Board did not address itself to the likelihood that the Hudson spawned striped bass fishery is itself growing in size and the value of the fishery will further increase as the size of the population increases. No party could confidently predict the maximum size of the Hudson spawned striped bass fishery, but both Con Edison and the Staff introduced evidence showing substantial growth in population size over the past forty

years, so that the possibility of further growth clearly exists, particularly in light of the extensive efforts of the State of New York to reduce pollution in the Hudson. Lawler on Sensitivity of Model, February 5, 1973 at 9-11, following Tr. 9405; Goodyear on Striped Bass Population, April 9, 1973 at 9-13, following Tr. 10,826; see 1 FES XII-36 to 37; Tr. 9863.

Fourth, the Licensing Board did not include in the costs of operating with once-through cooling the possible liability of Con Edison under the law of the State of New York, which prohibits the taking of fish by the drawing off of water and sets a civil penalty of $10 per fish for every fish so taken. These costs are discussed fully in the brief of the Attorney General of New York and need not be repeated here, but there can be no question that they represent the probability of further very significant costs due to the taking of fish through the use of the once-through cooling system.

Fifth, there are the unquantified esthetic and other values of the fishery which were recognized by every party and which cannot be put in strictly monetary terms. These are discussed more fully in HRFA's brief in support of its exceptions to the Initial Decision and are fully supported by the evidence in the record. Clark, Redirect, February 12, 1973 at 17-18, following Tr. 9858; Tr. 9418, 9440-42, 6988.

In these circumstances, there can be no doubt that, while the $16 million figure discussed by the Licensing Board represents a simple mathematical deduction from the Licensing Board's earlier conclusions, it actually underestimates the maximum long-term value of the Hudson striped bass fishery by ignoring both values which the Board recognized but did not give numerical monetary values to and values which the Licensing Board simply did not utilize in its analysis.

EXCEPTION 10

> "The finding that '[a]t the end of five years the maximum impact for striped bass would be a maximum of $3 million per year" (Page 106), and that the monetary cost of reduction in recruitment to the Midd Atlantic striped bass population would be $1.4 million to $5.6 million per year in the tenth year.' (Page 67)"

This exception is essentially a refinement of earlier exceptions and rests on the same basic conclusions by the Licensing Board as to the value of the Mid-Atlantic fishery and the Hudson contribution to the Middle-Atlantic fishery set out in the response to Exception 9 with the further addition of conclusions on the impact of Indian Point on the fishery which are disputed in Exceptions 5 and 6. It would be repetitive to reargue the basis for HRFA's opposition to those exceptions.

The Licensing Board concluded that $20 million was a reasonable value for the Middle Atlantic striped bass fishery and that the Hudson contributed 20-80% of that fishery. It further concluded that it was a reasonable expectation that Indian Point 1 & 2 would reduce the Hudson striped bass fishery by 20% after 5 years of operation with once-through cooling. Simple mathematics thus give value of $1.4-5.6 million for the reduction in value of the Middle Atlantic striped bass population after ten years. The maximum reductions after five years works out at $3.2 million and after ten years at $5.6 million. Thus the Licensing Board rounded figures flow as a natural result of its earlier conclusions and are equally well supported in the record.

EXCEPTION 11

> "The finding that 'one must expect' that there will be a serious adverse impact on other species of fish using the Hudson River in the vicinity of Indian Point as a spawning and nursery ground due to the operatong of the once-through cooling system, reflected in the finding that 'one must expect that the impact of once-through cooling on the populations of those fishes will be similar to the impact on the population of striped bass.' (Pages 69,101)"

In making its exception to the Licensing Board's ruling on the effect on other fish species with the once-through cooling system, Con Edison grossly misrepresents the finding of the Licensing Board by failing to spell out the full qualifications of the Licensing Board's statement "To the extent that the other species use the river in the vicinity of Indian Point as a spawning and nursery ground, one must expect that the impact of once-through cooling on the populations of those fishes will be similar to the impact on the population of striped bass." Initial Decision at 69.

The major thrust of the environmental controversy in this proceeding has been the effect of Indian Point's predatory once-through cooling system on the striped bass which spawn and have their nursery habitat in the Hudson with large percentages in the Indian Point vicinity. The Licensing Board has found that the operation of the once-through cooling system will have a major impact on the striped bass through entrainment and impingement. The Board has simply ruled that insofar as other fish have similar early life stages, similar effects must be expected.

This conclusion by the Licensing Board is supported by the evidence in the record provided by the expert witnesses for HRFA and the Staff. The opinions of these experts was based on the data on the entrainment of both white perch and striped bass at Indian Point (the two species are closely related biologically and were not separated in the Con Edison analysis of its entrainment data), a critical review of the scientific literature on entrainment and indications of decline in the white perch population in the Hudson. Clark on Indian Point, October 30, 1972 at 56&57, following Tr. 6276 ; Clark on Certain Effects, July 14, 1972 at 3-4, following Tr. 6276; Clark, Redirect at 2-5 following Tr. 9858 ; 1 FES A-V-12 to 18; 1 FES V-61; Goodyear on Trends, February 22, 1973.

In addition, all parties argued that effects on other species would be indicated by the effect on striped bass. Thus both HRFA and the Staff contended that serious impacts on other species could be predicted and Con Edison stated:

> The Applicant has taken the position that the impact on striped bass will not be substantial or irreversible during an 8-year period beginning in 1973. This position can reasonably be extended to other fish species. Proposed Findings of Fact H4 at 141.

Thus the conclusion of the Licensing Board is further supported by its position on the impact of the once-through cooling system on striped bass and its extension of the effects on striped bass to other species which all the parties recognized as a reasonable assumption.

Consideration of the impact of plant operation on other fish species besides the striped bass was proper for the Board in its weighing of the costs and benefits, particularly in light of the Board's finding (which was not excepted to by the Applicant) that such species may be important to the ecosystem even though such species are less important than the striped bass to the commercial and sports fishery. (Initial Decision at 69.) As has already been pointed out many times, an environmental effect need not be conclusively established to be taken into account.

The Applicant's argument that the Board's decision to require a closed cycle cooling system by May 1, 1978 rests on this adverse impact which may occur is patently absurd. Applicant's Brief, pp.37-38. Throughout the Initial Decision, the major emphasis is on striped bass. In fact, in the final decision of the monetary cost-benefit analysis, the Licensing Board explicitly excluded the value of species other than the striped bass. Initial Decision, p.106. There is no indication that the effect on other species was weighed beyond the careful and limited way in which the Licensing Board stated its finding.

EXCEPTION 13

> "The finding that the '...data already available or currently being obtained are sufficient for the Applicant to submit a satisfactory environmental report to the Staff by March 1, 1974.' (Page 83)
>
> (a) The finding that twelve months is not needed for environmental studies for cooling towers. (Page 114, item M27)
>
> (b) The finding that an additional three months is not required for report preparation. (Page 115, item M28)
>
> (c) The finding that the cooling tower studies commenced on May 1, 1973, reflected in the following statement on page 82:
>
> > 'This schedule also reflects a slippage from February 1973 to May 1973 in the beginning of the environmental studies by the Applicant.'"

The Licensing Board's conclusion that the Applicant can submit a satisfactory environmental report to the Staff by March 1, 1974 is amply supported by the record. The Staff presented testimony to the effect that the data necessary for preparation of the report on alternative cooling systems, their cost and environmental impacts, were already available. Tr. 6960-6976. As a result, in its Proposed Findings of Fact, the Staff set July 1, 1973 as the date for submission of the report. Staff Proposed Findings of Fact, June 11, 1973, p.64 (M9). HRFA reached the same conclusion. HRFA Proposed Findings of Fact, June 11, 1973, p.61.

Indian Point Unit #1 has been operating over the last 10 years and the Applicant has carried out meteorological

studies at that site which can be used in determining the environmental impact of alternate closed-cycle systems. Tr. 6975-6976; 9710. Information on other environmental impacts of a closed-cycle cooling system has been accumulated for the Applicant, (Burns & Roe Report, June 28, 1972, HRFA Exhibit V, follow. Tr. 10,543) and since the issuance of that report, new information has been developed regarding environmental impacts. Tr. 6961-6965. No evidence to date has shown that there will be significant adverse effects from fogging, icing or saline drift or a significant impact from noise. Applicant's Exhibit 3-A, Environmental Report Supplement No.3; Burns & Roe Report, HRFA Exhibit V, follow. Tr. 10,543; Tr. 7561-7562; 1 FES Chapter XI, follow. Tr. 6271; Aynsley on Alternatives, Oct. 30, 1972, follow. Tr. 6276. Indeed, Con Edison's witness testified that the reports, plus the investigations made by the Applicant, formed a basis for Con Edison's determination that a natural draft cooling tower would be the most suitable alternative for the Indian Point 2 site. Tr. 7569; 7581-7582.

The record thus supports the finding that meaningful data is and will be available so that Con Edison will be able to evaluate the various impacts of alternate closed-cycle cooling systems and describe what these would be by March 1, 1974. The purpose of the report is not to provide an exhaustive treatment of the environmental impacts, but rather to provide sufficient information to establish the preferred alternative system. As the Licensing Board noted in the course of the hearings, the

striving for higher amounts of data will go on forever, but at some point, a balance must be struck in order to get something done. Tr. 6979. It should be pointed out that the Board has provided for amendment of the environmental report should completion of Con Edison's meteorological study alter certain of the report's conclusions. Initial Decision, p.83.

There is no evidence to support Con Edison's argument that the Licensing Board's finding that Con Edison's proposed schedule for completion of a closed-cycle cooling system reflected a slippage in the beginning of its environmental studies, affected the Board's establishment of March 1, 1974 as the date for submission of the environmental report. The Licensing Board stated that it in effect adopted the Staff position which as discussed above was that data presently available are sufficient for the environmental report. Initial Decision, p.83. Therefore, the fact that Con Edison's study did not commence on the date the Board presumed,but four months later (Applicant's Brief, pp.43-44), should not affect the basis for the Board's finding that an environmental report could be submitted by March 1, 1974.

EXCEPTION 14

> "The finding that '...it is reasonable to expect that the reviews [by appropriate agencies] can be completed and the necessary approvals for the closed-cycle cooling systems can be obtained before March 1, 1975.' (Page 83)"

The Licensing Board found that twelve months is a reasonable time for review by regulatory agencies of Con Edison's economic and environmental evaluation of alternative closed-cycle cooling systems. Initial Decision, p.109. Con Edison itself had proposed a 12-month review period. Applicant's Proposed Findings, May 17, 1973, at 193 (M29). Con Edison's principal objection therefore is to the setting of March 1, 1975 as the date for completion of this review. This objection is based on Con Edison's challenge, in its Exception 13, to the March 1, 1974 date set by the Licensing Board for submission of the environmental report. As HRFA pointed out in its response to Exception 13, there is substantial evidence to support the Board's finding that by March 1, 1974 Con Edison can produce an evaluation of the economic and environmental aspects of alternate closed-cycle cooling systems. If the March 1, 1974 date is upheld, as indeed it should be, Con Edison should not object to March 1, 1975, which provides the period of review which Con Edison itself proposed. Nevertheless, the Applicant does object and proposes that, even if the environmental report is to be submitted by March 1, 1974, the date set for

completion of agency review should be December 1, 1975. Applicant's Brief, p.45. The Applicant supports its argument with the Licensing Board's statement, Initial Decision, p.83, that the environmental report may be amended if data obtained from environmental studies alter the conclusions of the report submitted. Con Edison thus proposes an extra nine months to provide for such an occurrence. If the new data is such that it mandates further agency consideration, an extension of the review period can be obtained at that time. There is no need nor any evidence to justify the establishment of a 21-month review period now.

As HRFA carefully articulated in its Brief in Support of its Exceptions to the Initial Decision (pp.5-6), a 12-month review period is already unnecessarily long. Indeed, the only evidence on the issue in the record supports a 3 to 6 month review period. Tr. 6957; 7584. Since there was no evidence placed in the record regarding which agencies, other than the AEC, must review the Applicant's environmental report, nor how long any such reviews would be likely to take, the need for even a 12-month review period is unsubstantiated by the record. If 12 months is unnecessarily long, Con Edison's proposed 21-month review period has even less of a basis in the evidence. There is no reason to expect that any amendment to the environmental report would so substantially prolong review.

EXCEPTION 15

> "The finding that cooling towers could be completed at Indian Point within 45 months (December 1, 1978) after appropriate State and Federal approvals had been received. (Page 83)."

In this exception, Con Edison has focused its attack on that portion of the 45-month period allotted by the Board for excavation and construction. The Board has provided 36 months for these two phases of installation as opposed to the 42 finally proposed by Con Edison. Initial Decision, pp.83 and 109 (M30 and M31); Applicant's Proposed Findings of Fact, p. 194 (M32); Applicant's Brief, pp.45-47. Con Edison disputes the adequacy of this time period while agreeing with the Board's allotment of 9 months for work prior to groundbreaking.

Substantial evidence exists in the record to support a finding that 36 months is more than enough time for completion of construction. HRFA put in evidence to the effect that excavation and construction of a natural draft cooling tower would take only 18 to 24 months. Aynsley, Alternatives to Once Through Cooling at Indian Point Unit No. 2, April 5, 1972, pp.24-25; follow. Tr. 4839. The Staff on the basis of cooling tower experience at the Vermont Yankee, Palisades and David Besse plants testified that excavation and construction could be completed in two to three years. Knighton on Supporting Information on Cooling Towers, February 22, 1972, p.3, follow. Tr. 9892.

Con Edison in its own Environmental Report, on the stand, and in its Consultant's report allotted less than 3 years for excavation and construction. In the cost-benefit analysis contained in Supplement 3 to its Environmental Report, Con Edison gave the construction time for a natural draft closed-cycle cooling system as 3 years. Applicant's Exhibit 3-A, Environmental Report Supplement No. 3. When questioned, Con Edison's witness testified that construction of a single natural draft cooling tower should not take any longer than construction of a double tower upon which the 3-year projection in the Environmental Report was based. Tr. 7555. The same Con Edison witness testified that 3 years, including 7 months for plant shutdown, would be the time necessary for actual work on completion of the cooling tower, after bids had been received and a detailed design selected. Newman on Alternative Cooling, Oct. 30, 1972, at pp.8-9, follow. Tr. 10,339. Con Edison's consultant estimated that 3 years would be the maximum time necessary for construction of any of the alternate closed-cycle cooling systems. Burns & Roe Report on Studies of Alternate Cooling Systems, June 28, 1972, p.X-1, HRFA Exhibit V, follow. Tr. 10,543. Although this 3-year estimate does not include excavation time, it does allot 6 months for engineering and design, much of which work has already been done. Newman on Alternative Closed Cycle Cooling Systems at Indian Point 2, October 30, 1972, p.7, follow. Tr. 6254; Tr. 7578; 9711-12.

The Board's conclusion that 36 rather than 42 months would be sufficient time for completion of excavation and

construction is thus supported by substantial evidence. It was perfectly reasonable for the Board to conclude that Con Edison's estimates of time for excavation that vary from 6 to 12 months and for construction which vary from 30 to 38 months were not firmly enough established in the record for the Board to accept the Applicant's conclusion. The final Con Edison estimate of 42 months for excavation and construction was based on an allotment of 2-1/2 years to construction and 1 year to excavation. Newman on Alternative Closed Cycle Cooling Systems at Indian Point 2, April 9, 1973, Exhibit F, follow. Tr. 10,339. The time allotted to construction had not changed from the previous estimate (Newman on Alternate Cooling Systems, Feb. 5, 1973, follow. Tr. 9405), but the time for excavation was extended from 6 to 12 months. Newman at 30. While the reason given for this extension of excavation time was alleged excavation experience at Indian Point 2, Newman failed to detail the excavation experience on which this conclusion was based. The Board could thus reasonably choose not to accept the necessity for such an extension, in which case Con Edison's estimate for excavation and construction is not that far off from the Board's own estimate of 36 months.

EXCEPTION 16

> "The finding that '[e]vidence does not demonstrate need for 5 months outage in addition to normal refueling outage.' (Page 114, item M13)."

Con Edison testified that installation of a natural draft cooling tower system would require a plant outage of 5 months in addition to the normal refueling outage. Newman on Alternative Cooling Systems, April 9, 1973 at p.16, follow. Tr. 10,339. According to the same Con Edison witness, the normal refueling outage would be approximately 2 months per year. Tr. 7558. On the basis of these Con Edison estimates, the Licensing Board provided in its schedule for installation of a closed-cycle cooling system, a seven month period for plant outage during the last part of construction. Initial Decision p.83. The Board recognized and accepted Con Edison's argument regarding the outage period required in installation of a closed-cycle cooling system. Therefore, whether or not the Board's finding that the evidence did not support the necessity for 5 months outage in addition to normal refueling outage was correct or not, it was harmless to theApplicant, since in its decision the Licensing Board provided for the outage time Con Edison had said was necessary.

EXCEPTION 17

> "The finding that Applicant's excavation and construction schedule estimates for the implementation of a natural draft cooling system at Indian Point 2 were not 'firmly established enough to reach conclusion' as to excavation and construction time (Page 115, item M32), and that '[t]he schedules presented by the Applicant include very liberal allowances of time for all construction operations and contingencies.' (Page 82)."

The first finding to which Con Edison here takes exception is dealt with in HRFA's response to Exception 15. The second finding to which Con Edison excepts - that the schedules presented by the Applicant include very liberal allowances of time for all construction operations and contingencies - is clearly supported by the evidentiary record.

Con Edison argues that the Licensing Board was here referring to Con Edison's schedule for actual construction and that there was virtual unanimity among the parties as to the time required for this step in the installation process. Applicant's Brief, pp. 48-50. In fact, as pointed out in HRFA's response to Exception 15, the 3-1/2 year construction period proposed by Con Edison exceeded by 6-18 months the time period the Staff testified was necessary and by at least 18 months that proposed by the Intervenors. Knighton on Supporting Information on Cooling Towers, February 22, 1972, p.3, follow. Tr. 9892; Aynsley on Alternatives to Once Through Cooling at Indian Point Unit No. 2, April 5, 1972, pp.24-25, follow. Tr. 4839.

More importantly, a careful reading of the Licensing Board's statement regarding Con Edison's schedules and the context in which that statement was made reveals that the Board was speaking not of the Applicant's schedules for actual construction time only but of the Applicant's schedules covering all steps related to completion of construction of the closed-cycle cooling system, i.e., preparation and submission of the environmental report, getting out bids and finalizing design, excavation and construction. Initial Decision, pp.82-83. The record clearly shows that these schedules allotted unnecessary amounts of time to the completion of almost every step.

During the course of the proceeding, Con Edison proposed three schedules for building and placing in operation a closed-cycle cooling system: The first set September 1, 1981 as the date for the beginning of service with a closed-cycle cooling system; the second set September 1, 1980 as the completion date; the final schedule proposed set November, 1979 as the earliest feasible date for completion. Initial Decision pp.81-82. As discussed in HRFA's responses to Con Edison's earlier exceptions relating to the timing requirements for installation of a closed-cycle cooling system, even the final schedule provided almost 2 years more than the Staff's schedule (January 1, 1978) and almost 3 years more than the Intervenors' schedules (January 1, 1977) for completion of installation. Initial Decision, p. 82. The main components of Con Edison's final schedule which accounted for the time difference were the periods allotted for submission of the environmental report and the

period allotted for excavation and actual construction. As discussed in HRFA's responses to Exceptions 13 and 15, substantial evidence in the record supports the conclusion that these time periods set by Con Edison were unnecessarily long. The Licensing Board was therefore perfectly correct in concluding that Con Edison's schedules were too liberal.

This conclusion was reasonable for an additional reason. Throughout the proceeding, Con Edison opposed installation of a closed-cycle cooling system at Indian Point 2. It was not until the Applicant submitted its Proposed Findings of Fact on May 17, 1973 that it took the position that a closed-cycle cooling system should be installed and then only by September 1, 1981.

EXCEPTION 18

> "The ruling that there will be an adequate opportunity for review by appropriate regulatory agencies of the results of Applicant's research program prior to the start of construction of an alternative closed-cycle system in the summer of 1975, assuming a continuing requirement for termination of operation with once-through cooling on May 1, 1978. (Pages 83, 101)."

The Licensing Board has found that Con Edison will be close to completing its research program by May 1, 1975, so that if the research results are as favorable as it anticipates, Con Edison will have sufficient evidence to apply for permission to delay construction before excavation is due to start. Initial Decision, p.101. The Licensing Board is not necessarily saying that an amendment to the operating license modifying the requirement for a closed-cycle cooling system would be issued before the summer of 1975, which is when the Board calculates excavation must begin. Rather, the Licensing Board is saying that, if the new data demonstrates the need for license modification, Con Edison will have an adequate opportunity to obtain a delay in the construction schedule until its research program is completed. Con Edison's argument that an amendment to the operating license could not be issued by the summer of 1975 (Applicant's Brief, p.51) is therefore off the point.

It is essential to point out that Con Edison will be receiving the results of its research efforts periodically

from the present until May 1, 1975. If any startling new data emerges during this period which would be likely to result in license modification, the Applicant can apply to the Board for such modification right away. It need not wait until May 1, 1975 when the time to begin actual construction approaches. In addition, Con Edison by its own cooperation can help assure the granting of a timely delay in the construction schedule. As the Licensing Board states, a decision to grant a delay would be facilitated greatly if Con Edison keeps the Staff and Intervenors completely informed of the details, progress and results of the research program. Initial Decision, p.101. Thus, Con Edison's best guarantee that any needed delay will be obtained is its own regular reporting of research results over the next 1-1/2 years. This will provide ample opportunity for agency review.

EXCEPTION 19

> "The finding that Federal income and property taxes should be excluded from the annual levelized cost for the implementation of cooling towers at Indian Point 2 and hence that such cost is 16 million dollars. (Pages 80-81.)"

The Licensing Board's decision to reduce Con Edison's calculations of the incremental generating cost attributable to a closed-cycle cooling system by an amount roughly equal to the present worth of federal income and property taxes was entirely proper. These tax payments are rightly considered transfers within the economy. Economists define a transfer within the economy as a payment for items other than goods or services. Since Con Edison has never alleged nor introduced evidence to show that its tax payments to the federal and local governments are related to government expenditures for goods or services attributable to the closed-cycle cooling system, tax payments were properly considered transfer payments.

Con Edison spuriously argues that since the major portion of the government's tax revenues are expended on goods and services, Con Edison's tax payments do not amount to payments for items other than goods or services. The test, however, is whether the payments are related to governmental expenditures for goods and services arising from the existence and operation of Con Edison's closed-cycle cooling system, not whether the major portion of Con Edison's tax payments go to government expenditures on goods and services generally. Con Edison's

failure to adduce evidence establishing any relationship between its tax payments and government expenditures attributable to the closed-cycle cooling system thus defeats its position. Such evidence would be essential to support Con Edison's position, particularly in light of the fact that the calculation of indirect costs and benefits is extremely complex and controversial. Commission Guide for Submission of Information on Costs and Benefits of Environmentally Related Alternative Designs, p.4 (May 1972).

As the Licensing Board points out, while taxes are a very real component of the cost of electricity to the consumer, these monies are returned to the public for other use. Initial Decision, pp.80-81. The Licensing Board is supported in its position by the Staff. Staff's Proposed Findings of Fact and Conclusions of Law, June 11, 1973, p.62, item M6. In addition, the Commission Guide for Preparation of Environmental Reports provides that while tax payments should be treated as costs, tax revenues to be received by local and federal governments should be treated as benefits. Regulatory Guide 4.2, p.4.2-33,34, (March 1973). Accordingly the Guide treats such tax payments as transfer payments.

The Licensing Board's exclusion of federal and local taxes from the increased generating cost is thus in accord with economic theory and is entirely supported by the evidentiary record and the Commission's own guide.

EXCEPTION 21

"The Board's ruling as to alleged deficiencies in Applicant's research program reflected in the statements that:

(a) '...the natural variations in the populations and phenomena being observed are so great as to make it unlikely that the Applicant can provide in a period as short as five years a statistically valid demonstration that the adverse impact of Unit No. 2 operations on the river ecology is acceptably small.' (Pages 99-100)

(b) "[t]he Applicant's studies will not provide a direct answer to the question" of the effect Indian Point 2 "operations may have on the Middle Atlantic striped bass fishery." (Page 100) (emphasis added) and

(c) '...Applicant's research program is unlikely to resolve the important questions ...' (Page 101) (emphasis added)"

In this exception, Con Edison attacks those conclusions of the Licensing Board which set forth the deficiencies of its proposed research program and thus once more asks the Appeal Board to substitute its judgment for that of the Licensing Board on issues of fact. The conclusions of the Licensing Board are fully supported by the record and there is no basis for the Appeal Board to overturn the factual findings on the research program.

On the issue of natural variations in the population producing a range of background "noise" which will make it unlikely that an acceptably small impact will be demonstrated, there is relevant testimony from both Con Edison and the Staff. In its earlier conclusions, the Licensing Board made it clear that it finds unacceptable predictions that indicate that Indian Point 1 and 2 will reduce the first year class of Hudson striped bass by 15 percent in the first year rising to 20 percent after five years. Initial Decision at 44. Con Edison's expert on the research program indicated that the program would only be capable of detecting changes in abundance of 25 percent or more. Tr. 11,337-338. Thus by Con Edison's own admission, the program will be incapable of identifying changes which the Licensing Board found unacceptably large.

The second issue of the research program providing a "direct answer" to the Hudson contribution to the coastal fishery seems to amount to no more than a quibble. From the context of the passage in the Initial Decision, it is evident that the Licensing Board considers a direct answer to be one in which the effects of plant operation are monitored on a year class during the first year of life and then analyzed in terms of the amount of future spawning and the progeny which that year class then contributes to the Middle Atlantic fishery. The simple

fact that most striped bass do not spawn before the fifth year, makes it practically impossible for a five year research program to provide a firm and persuasive answer from direct observation as to the relation of Hudson spawning to the Middle Atlantic stock.

On the general conclusion that the research program is unlikely to resolve the important questions on the fishery encompasses review of extensive testimony on the research program. The Licensing Board devoted weven or eight pages of its initial decision to reviewing the testimony on the program and giving the basis of its conclusions. That lengthy review alone should make it evident that the Licensing Board has based its conclusions on substantial evidence and so here only a brief review of the evidence supporting them will be attempted.

HRFA raised a number of points indicating the inadequacy of the research program and pointed out that the most important controverted issues were hydraulics, compensation and the contribution to the Middle Atlantic fishery. On the disputed issue of the hydraulics of the Hudson, HRFA pointed out that no major research was proposed by Con Edison on this issue and in replying to HRFA's proposed findings of fact, Con Edison did not dispute this. HRFA Proposed Findings 8.4; Applicant's Reply at 56 et seq. An important part of the research program is devoted to the issue of compensation but Con Edison does not suggest any specific compensatory mechanism that it intends to investigate; combined with the problem of natural variation in the population, this

makes it very unlikely that the extent and nature of any compensatory mechanism can be properly and effectively analyzed. McFadden & Woodbury on Studies, February 5, 1973, follow. Tr. 9405. This is particularly true in light of the history of analysis of compensation. Goodyear on Research, February 22, 1973, pp.5-6, follow. Tr. 9,892; Tr. 10,028-40.

HRFA and the Staff were highly doubtful that the proposed electrophoretic determination of the Hudson contribution to the striped bass fishery of the Middle Atlantic would be successful. Clark on Cumulative Effects, March 30, 1973 at 8-9, follow. Tr. 10,349; Goodyear on Research, April 10, 1973 at 2, follow. Tr. 10,826.

All of these problems in relation to Indian Point are obviously made more difficult by the possible start of other major units nearby at Bowline and Roseton which will make the problem of isolating the effects of the Indian Point plant more than usually difficult.

To all of this must be added the candid statement of Con Edison's expert witness on the research program indicating that it is rare to be undertaking the management of fishery with full knowledge of all the facts one would ideally like to have:

> [T]he standard management situation is one of managing in the face of a large component of uncertainty. Tr. 11,368.

This long parade of competent expert testimony and analysis supports the finging of the Licensing Board that the Con Edison research program is unlikely to provide further sufficiently fine grained resolution to the important questions.

EXCEPTION 23

> "The finding that the Licensing Board 'does not presently accept rearing and stocking of striped bass as a viable alternative to a closed-cycle cooling system.' (Page 90)"

The Board's conclusions on the viability of stocking are applicable to stocking not only as a long term alternative to closed cycle cooling systems, but also as a short-term alternative. The Board analysed the number of striped bass fingerlings which would have to be stocked to counteract even one year of plant operation with once-through cooling and concluded that such an alternative is not a reliable one, even to counteract one year of operation. Initial Decision at 86-89.

The conclusion of the Licensing Board on the nonviability of stocking as a short or long term alternative is fully supported by the evidentiary record. The Staff submitted extensive testimony supporting the position that hatcheries were not an adequate substitute for a closed cycle cooling system. The Staff witness presented an analysis of experience with hatcheries which covered all stages of the rearing process, concluding that the survival rate was only 0.8%. In comparison, the natural survival rate for striped bass in the Hudson over a comparable period of time was estimated to be 1.4-7.8%. Goodyear on Artificial Propagation, April 23, 1973. Thus, the staff witness concluded that natural survival rates were much higher than those in hatcheries, particularly since he thought the hatchery survival rates to be overestimates and, therefore, the hatchery scheme was not sound. Ibid. The submission of data after the

close of the evidentiary hearing by the Con Edison witness did not change this conclusion. Stevens, Response, May 24, 1973, follow. Tr. 179(July 2, 1973).

Evidence was also given on the state of knowledge on stocking estuaries with striped bass and rearing and stocking Hudson River striped bass in particular. Almost all the successful experience with the stocking of striped bass in this country has involved the stocking of fresh water lakes and reservoirs. Stevens on Stocking, April 5, 1973. There has been only one clearly successful example of estuarine stocking, that of the Sacramento-San Joaquin system at the end of the last century with fingerlings from New Jersey. Stevens on Stocking, April 5, 1973, at 5. There are presently three experiments of this sort going on in Florida, Alabama and Mississippi, Tr. 10,376, but the results are inconclusive at best. Only small numbers of the fish have been recovered; the rate of survival in the estuarine environment is unknown; for unknown reasons the stocked fish appear to seek fresh water rather than going to sea in the manner of the Hudson fish, and their breeding success remains to be seen. Tr. 10,378-388; 11,049-052; 11,111.

In regard to the Hudson itself, there has been no hatchery program of any size which involved Hudson River striped bass. Tr. 11,088. The Con Edison witness stated that the success of a hatchery program depends on knowing the river and the race of fish in it. Tr. 11,144. He was frank to point out that he did not know "a damned thing about the Hudson." Tr. 11,145. One result of the present lack of knowledge is that it will take

at least three years before data can be had which will show the results of stocking in terms of migratory behavior and a much longer time may be necessary to know the results from one generation to the next. Clark on Hatchery, April 23, 1973; Tr. 11,096-97; 11,329-31.

Further, enough fish must be restocked to replace both the entire natural spawning capability of the fish taken from the river for the hatchery and the plant-induced mortality among those young spawned in the River. Goodyear on Artificial Propagation, April 23, 1973 at 2, follow. Tr. 11,220; Tr. 11,256. Unless hatchery efficiency is much greater than that of the natural system, which was not shown, the replacement of a large percentage of the River's annual production of many millions of fish is a mammouth task and probably an utterly impracticable one. Tr. 11,126; 11,275.

CONCLUSION

HRFA requests that the Appeal Board deny Applicant's exceptions to the Initial Decision issued by the Licensing Board on September 25, 1973.

Respectfully submitted,

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Dated: November 26, 1973

BEFORE THE UNITED STATES

ATOMIC ENERGY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

In the Matter of	)	
	)	
	)	
Consolidated Edison Company of New York, Inc. (Indian Point Station, Unit No. 2)	)	AEC Docket 50-247

CERTIFICATE OF SERVICE

I hereby certify that I have served a document entitled: "Intervenor Hudson River Fishermen's Association's Brief in Opposition to Applicant's Exceptions to the Initial Decision Authorizing Full-Term Full-Power Operating" by mailing copies thereof first class and postage prepaid to each of the following persons this 26th day of November, 1973:

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