BEFORE THE UNITED STATES

ATOMIC ENERGY COMMISSION

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

Rebuttal Testimony of
Dr. James T. McFadden, Dean
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on

Effects of Indian Point Units #1 and #2
on Hudson River Fish Populations

February 5, 1973

I. CRITICISM OF BASIS FOR ASSESSMENT OF ENVIRONMENTAL IMPACTS

The impact upon the fish populations of the Hudson River resulting from the operation of Indian Point Units #1 and #2 has been evaluated by the AEC Staff and the Intervenors from an arbitrarily narrow focus. Seven different levels at which the impact could be assessed are identified as follows:

1. Death of individual fish.
2. Decrease in survival of fish populations as a result of (1) above.
3. Compensatory responses of the population through changes in growth or survival which take place within the period of the environmental impact and within the particular group of fish affected (e.g. an increase in survival of juvenile striped bass offsetting removals due to impingement).
4. Compensatory response by the fish population taking place within the group of fish affected by the impact but at a later stage of the life cycle (e.g. a decrease in survival of early juveniles caused by power plant operation being offset by subsequent increase in survival of over-wintering juveniles due to their reduced density).
5. Compensation in the population taking place in a year class subsequent to the one which received the impact (e.g. a decrease in the number of juveniles produced is caused by operation of the power plant and results in a decrease in the size of the spawning stock when this juvenile group has matured. The survivors from the spawning of this reduced year class experience lower mortality rates due to their reduced density).
6. Compensation effected at the ecosystem level rather than the population level through shifts in the relative abundance of species.
7. Complete replacement of a reduced or destroyed species through natural processes or managerial intervention by man.

Assessment of the impact of Indian Point Units #1 and #2 has been focused by the AEC Staff and Intervenors largely at the first and second levels above: with assessment levels 3 through 5 being discounted in testimony by the Staff and intervenors and impact levels 6 and 7 scarcely being considered at all. The impact assessment has focused on the existing

assemblage of species, apparently assuming that these are of high or irreplaceable value by virtue of their current occupancy of the Hudson River Estuary. This veiw ignores the ephemeral status of the present species assemblage even under natural conditions. The present ecological community is of relatively recent, post-glacial origin and is undoubtedly subject to substantial natural shifts in relative abundance of different species. From time to time new species may be introduced into the system through completely natural processes and drastically alter the present balance. In attaching paramount value to the present state of the Hudson Ecosystem, impact evaluations have not taken sufficient cognizance of the highly disturbed state of the ecosystem. A management focus is adopted which assumes that maintenance of the biological status quo is in the best interest of society and therefore that status quo should be preserved even at great cost. The full potential for considering the estuarine ecosystem and the technological developments of man as a single integrated system and devising optimal management approaches has not been given adequate consideration in the testimony presented to date.

Considering the substantial costs of alternatives to once-through cooling -- such as evaporative cooling towers -- a wide range of feasible management alternatives exists which has not been given adequate consideration, largely because of lack of necessary data. For example, a systems management plan could be devised which allowed for disposal of waste heat originating from power production and at the same time assured a productive fishery made up of commerically or recreationally desirable species. This would be possible by investment of part of the cost associated with such alternatives as evaporative cooling towers into intensive management of fish populations. This management might take the form of reduction of competitive species of low value and supplementation (as through hatchery production) of more desirable species. The striped bass are clearly a high value fish. It is ironical, however, that mortalities of the companion species, white perch, in the Hudson Estuary are viewed with such alarm. During the past year, fishery experts cited potential danger to sport fish populations from introductions of white perch into other natural waters, due to their tendency to prey on eggs and larvae of other species; and to overpopulate and stunt from excessive food competition (reference to white perch seminar at Annual Meeting of American Fisheries Society reported in The Newsletter of The American Fisheries Society, Vol. 16 No. 78, September - October, 1972, page 14). The Hudson River Ecology Study described in the Woodbury - McFadden testimony of February 5, 1973 is designed

to obtain the information needed in order to evaluate properly the feasible management alternatives which exist.

II. Rebuttal to Specific Points Raised in Testimony of Staff and Intervenors

This rebuttal is directed towards the following composite argument by AEC Staff and Intervenors. It is claimed in the testimony of John Clark (page 49 and transcript 8323-8324) that the phenomenon of overcrowding in fish populations (equivalent to a compensatory reduction in growth in the face of high population density) has not been demonstrated for large open water systems such as estuaries and oceans. It is stated that Hudson River fish exhibit average growth rates (Clark transcript 8417); that there is no evidence of crowding and depressed growth rate; and that the fish stock is sparse for a productive environment such as an estuary (John Clark testimony page 50). It is maintained by the staff that the predatory influence of the fishery controls the striped bass population and that the compensatory reserve of this population has been exhausted (AEC Environmental Statement V-56). It is further maintained (John Clark testimony page 52, 58 and AEC Environmental Statement V-61) that removals of striped bass by operation of the Indian Point Power Plant will result in a proportional reduction to the adult fish stock. This reduction is estimated at 39% (entrainment and impingement) by John Clark (Testimony page 44) and in the neighborhood of 30 to 50% by the AEC Staff (Environmental Statement V-61).*

This testimony responds to the composite arguments of staff and intervenors as sketched above through the following points:

- Compensatory processes have been shown to be operative in estuarine and high seas fish populations including striped bass and indeed are operative in all animal populations. This argument is based on an extensive review of the ecological literature.
- Contrary to testimony introduced so far in this hearing, data from the Indian Point Ecological Study shows that striped bass and white perch in the Hudson River are below average in growth rate and that the white perch population can accurately

*See also Tr. 9137-9138, January 18, 1973.