

Docket File

APR 2 1973

Docket No. 50-247

ENVIRON, FILE (NEPA)

Note to: John O'Leary, Director of Licensing

STATUS ON ENVIRONMENTAL CONSIDERATIONS OF INDIAN POINT UNIT NO. 2

Since the issuance of the Final Environmental Statement for Indian Point Unit No. 2 in September 1972, extensive testimony, redirect, and rebuttal statements have been exchanged between the parties in the proceeding during the protracted hearings on environmental matters related to operation of Unit No. 2. The outcome of the hearings has highlighted the following issues of concern:

1. Timing and Costs of the Closed-Cycle Cooling System.
2. The Impact of the Present and Future Power Plants on the Hudson River.
3. Consolidated Edison's Research Program.
4. Consolidated Edison's Proposal for a Fish Hatchery and Fish Replacement.
5. Interim Operation of Unit No. 2 Prior to Installation of a Closed-Cycle Cooling System.

The staff's position regarding these issues is outlined in Attachment 1.

Of particular concern in the hearing on Indian Point Unit No. 2 is the basis upon which the date of January 1, 1978 was selected for continuing operation of Unit No. 2 with a closed-cycle cooling system. In essence, this date was selected based on the fact that (1) it would allow Consolidated Edison a reasonable period of time to design, construct, and start operation with the alternate closed-cycle cooling system; (2) the ecological damage, although severe, is not expected to be irrecoverable or irreversible during the short term; (3) the cost-benefit balancing shows that the short-term benefits of the urgent need for power outweigh the corresponding environmental costs during this time period. The January 1, 1978 date was considered an outside date for allowing operation with the once-through cooling system beyond which ecological damage would become unacceptable. The ecologists feel that the sooner an alternate closed-cycle cooling system is installed, the lesser the impact on the fishery. Furthermore, the FWPCA of 1972 calls for July 1, 1977 as the latest date for the best practicable control technology for all point sources.

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In terms of the hearing schedule on environmental issues, it is expected that the applicant will submit a document on the impact of multiple plants on the river at the next session starting April 9, 1973. Both the applicant and the staff will be cross-examined on the testimony each has submitted on this subject. All the environmental issues should be completed within one or two days. The hearing will continue on discussion of radiological issues and should be completed by April 20, 1973. The ASLB Initial Decision is expected by August 6, 1973.

Original Signed By

A. Giambusso
 A. Giambusso, Deputy Director
 for Reactor Projects
 Directorate of Licensing

Attachment:
 Summary of Staff's Position on
 Major Environmental Issues

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Attachment 1

Summary of Staff's Position on Major Environmental Issues

I. The Timing and Costs of Closed Cycle Systems

The staff has presented information in the hearing on the schedules to build cooling towers at different power plants and has also contacted cooling tower vendors. The information furnished by the applicants at the Davis-Besse, Vermont Yankee, and Palisades Plants shows that the elapsed time from the initial decision to build towers to the completion of preoperational testing of the towers ranges from 3 years, 8 months (Davis-Besse) down to 2 years, 8 months (Palisades expedited schedule). Ecodyne reported that to build natural draft cooling towers, a minimum of about 2 years, 9 months to a maximum of about 4 years, 9 months would be required.

Con Ed is required to submit a report to the AEC by July 1, 1973 in which the applicant has selected a preferred system. Although it is not expected that a final design of cooling towers will be finished by that time, it will allow the applicant a maximum period of 4-1/2 years to conduct meteorological studies, finalize design, construct the towers, and tie into the plant to meet the January 1, 1978 deadline date. From experience at other plants, we believe that we have recommended a reasonable period for the applicant to meet. We consider January 1, 1978 as an outside date that should be feasible to meet.

Furthermore, in view of the FWPCA of 1972, "the best practicable technology" is required by July 1, 1977. The staff would have no objection if the applicant could meet this date. This is what EPA has recommended for Unit No. 2. The ecologists feel that the sooner the cooling towers are built, the lesser the impact on the river.

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In addition, the ecologists have analyzed information on the fishery which indicates that operation of Unit No. 1 may have already resulted in a six-fold decrease in the whiteperch population within a five year span. However, as stated below in Section V, operation with the once-through cooling system during the short-term period is not expected to result in an irreparable nor irrecoverable damage to the fishery. But over the long term, the impacts are considered by the staff to be an unacceptable assault on the fishery resource which would lead to an irreversible loss of productivity of the river. As such, the impact expected by the staff is of such magnitude to justify considering an alternative closed-cycle cooling system. Furthermore, although the applicant has made valid attempts to solve the problems of fish damage from operation of Unit No. 1 and has modified its cooling system to avoid problems, it does not appear that one can predict with such certainty that the efforts planned by the applicant promise much success. Thus, the staff estimated that the 4-1/2 years after the date of selection of a closed-cycle cooling system (July 1, 1973) would be sufficient to finish the 5-year ecology study started on April 1, 1972 (before issuance of the DES on April 13, 1972) during which time monitoring of the operation of the once-through cooling can occur and to complete the installation of the closed-cycle cooling system.

The applicant has tentatively selected natural draft cooling towers as the most suitable closed-cycle cooling system for the Indian Point site. He has considered both a single tower concept and a double tower concept. In terms of costs of design, construction and operation of natural draft cooling towers, the applicant has also provided a wide range of present worth costs involving capital investment of equipment (cooling elements, pump, pipes, and ancillary equipment), construction, excavation, power derating, replacement and purchase of power, maintenance, backfitting, etc. For the one tower concept, the applicant estimates a total present worth cost of about \$138 million and for the two tower concept, about \$182 million. The staff has presented testimony which discusses the problem of identifying realistic costs expected for towers at the Indian Point site. The major unknown is the cost of backfitting the plant with the one or two tower arrangement. Extensive cross-examination of all parties in the hearing has occurred regarding cost for construction and operation

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of cooling towers. With such a wide range of values presented in the testimony by the Staff and in particular by the applicant, involving such high values relative to the cost of cooling towers at other plants, the ASLB has requested the applicant at the March 8, 1973 hearing session to provide realistic first costs of cooling towers at the April 9, 1973 hearing session.

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II. The Impact of the Present and Future Power Plants on the Hudson River

The staff prepared two documents, one on evaluation of thermal discharges and the other on biological impact from operation of Indian Point Units Nos. 1 and 2 alone and in conjunction with Danskammer, Lovett, Roseton, and Bowline fossil plants on the Hudson River in response to the request of the ASLB of December 15, 1972.

In regards to the evaluation of thermal discharges, although the applicant's thermal model cannot be used for the prediction of the multiplant effects, the staff has developed a truly time dependent one-dimensional thermal model (cross sectioned averaged) applicable for single- and multiple-plant heat discharges and has carried out an extensive parametric study using this model to evaluate various possible assumptions to determine the distribution of the thermal plume. The staff's preliminary estimates of the tidal maximum excess temperature averaged over the cross sectional area at the IP site is about 2.8°F when only IP 1 and 2 are in operation and about 6.14°F when all the plants are in operation. The parametric study with the present results can only strengthen the staff conclusions already stated in the NRS, namely: (1) the staff believes that the 90°F maximum surface NYS temperature criteria might still be met but the confidence in this prediction is reduced considerably because of the problem of recirculation of the heated water from all the plants; but (2) the staff is concerned that the temperature distribution of the plume at the IP site will be well above the values reported by the applicant even for operation of IP 1 and 2 only. This is certainly true when the effects of the other power plants are taken into account. Furthermore, the staff is concerned that the NYS thermal criteria for the 4°F excess temperature isotherm for the cross sectional area and surface width will be violated, particularly when the effects of the other plants are considered.

Regarding the biological impact, the results indicate that during different fresh water flows in the river and taking into account the thermal effects mentioned above, the estimated reduction in striped bass young of the year ranges between 14 to 43% for IP 1 and 2 only, and 33 to 64% with all the power plants on the river. This information reinforces our original position taken in the NRS, namely, that operation of the IP-2 over the lifetime of the plant would result in a long term unacceptable impact on the aquatic biota of the Hudson River, resulting in permanent damage and severe reduction to the fish population, particularly striped bass.

III. Consolidated Edison's Research Program

The staff believes that Con Ed's research program, particularly the biological study, is a thorough, ambitious, and well-presented research program. However, it is not likely that the results of the 5-year study will produce sufficient information to properly quantify possible plant impact, particularly on fish populations in the Hudson River. Since the study started April 1, 1972, and operation of Unit No. 2 at full power will probably not begin around September 1, 1973, useful operating data can be collected only for about 3-1/2 years. A number of criticisms follow:

- A. It is doubtful that with the 5-year study period, the criteria selected by the applicant to assess impacts can be fully, or in many cases even partially, assessed. Of the criteria presented, it is likely only two out of ten presented could be accurately determined, with a third as a possibility.
- B. Experimental design, particularly sampling locations and techniques, as presently proposed by the applicant, will not provide statistically significant information within the 5-year period to distinguish the effects of plant operation from those caused by natural environmental fluctuations since the study design does not appear to be flexible enough to evaluate cause-and-effect relationships as they are related to environmental variations. For certain species, the impact could be quantified by long-term (10 year) field studies but by that time irreversible damage may have been incurred.
- C. Since any statistical analysis is constrained not only by the quality of the data collected but also by the experimental design, the major and unavoidable flaw in the design is that there is no replication and no control nor alternative treatment with which to compare the results from the research program. Con Ed will be forced to use pre-1973 data as a baseline. The problem is that the ecosystem at the Indian Point site is extremely complex and it is not sufficiently well described to permit testing of specific hypotheses or application of the experimental criteria by comparing pre-1973 and post-1973 data.

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Therefore, although the present data and models used have their limitations and weaknesses, the staff feels that the 5-year study program should provide much valuable and needed information, but, no matter how competently and unbiasedly designed and executed, the program cannot conclusively lead to rejection of the hypothesis that operation of Indian Point Unit No. 2 with once-through cooling does not have an unacceptable adverse impact on the aquatic ecosystem of the Hudson River.

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IV. Consolidated Edison's Proposal For a Fish Hatchery and Replacement

Consolidated Edison has presented a standing offer to the New York State Department of Environmental Conservation to build a fish hatchery to replace the fish unavoidably killed at Indian Point. Previous attempts to build and operate fish hatcheries of particularly shad and striped bass have had some success many years ago but for various reasons have since been discontinued. However, Com Ed testified on March 8, 1973 that although the record of success of plantings of striped bass has been rather meager, there apparently has been some recent information indicating successful planting in the Florida Rivers and Mobile Bay in Alabama. Much of the success of culturing striped bass has been by transplanting fingerlings of up to one inch in length. Most of the stocking in the Southeastern states has occurred in fresh water reservoirs on a "put and take" basis but the survival of fish is unknown. Although the fish can be raised in ponds under controlled conditions, when they are removed and placed in open bays or lakes, they cannot be found after a specified period of time. Cannibalism of young bass by the older bass is quite common.

Both from a theoretical and from a practical point of view, the artificial propagation of fishes to replace those killed by impingement and entrainment cannot be expected to maintain fish populations because of lack of availability of culture techniques and the low efficiency of these techniques. Techniques for mass culture of all the species affected by the plant operation are not available for those species which spawn in saltwater and move into the Indian Point area from downstream such as the bay anchovy, Atlantic tomcod, tidewater silverside, and others. Although culture techniques are available for a few species such as shad and striped bass, these have been of little value for maintaining or increasing population levels, and in many cases could have a negative effect on the population because the hatchery operation itself is less efficient than natural spawning for these species. Thus, Com Ed's proposal may be quite noble but we have no way of knowing with any degree of confidence if the replenishment of fish of sufficient magnitude would prove to be successful to replace all of the fish we expect the plant will kill during its lifetime. The costs of a hatchery and plant may also be prohibitively higher in the long term than the costs for the cooling towers.

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V. Interim Operation Prior to Installation of A Closed Cycle Cooling System

The staff investigated the benefit-cost analysis of reduced operation during the interim period of operation from 1973-1977. The urgent need for power has been adequately demonstrated in terms of decreasing reserve margins particularly during the summer peaks and increasing frequencies of brownouts and voltage reductions of the applicant's supply system. In addition, the staff estimated for different levels of power reduction of Unit No. 2 the increase in the stack emissions from fossil plants resulting from replacement of the reduced power of Unit No. 2 and the increase in the generating costs to replace the power of Unit No. 2 through purchase of power, and the use of other methods. Furthermore, the ecologists have stated that during the first five years of plant operation, the damage to the aquatic biota is not expected to be irreversible but is expected to be recoverable after the amount of withdrawal of water and thermal effects of the plume are reduced by means of a closed-cycle cooling system. The conclusions reached in the benefit-cost analysis for restricted operation of Unit No. 2 include:

- A. Scheduling all shutdowns and maintenances for the periods of restricted operation will likely result in uneconomic use of fuel and reduced system reliability.
- B. Maintaining Unit No. 2 in hot standby for 4.5 months per year would be a gross misuse of a high capital investment plant designed for base load operation.
- C. The incremental generating costs of \$86.8 million for the periods of 4.5 months of restricted operation, environmental costs of increased stack emissions in New York City, increased capital equipment replacement costs, and reductions in system reliability cannot be balanced by the environmental benefits that would accrue to the Hudson River biota as a result of the proposed mode of restricted operation.

Thus the staff's position remains the same as stated in the PMS, namely, that in the short-term (until January 1, 1978) no irreversible damage would occur to the biota and that the benefits of meeting an urgent need for power in the New York area outweigh the estimated corresponding environmental costs incurred over the short term period.

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