

final

NUREG-0130

environmental statement

**for Facility License Amendment
for Extension of Operation
With Once-through Cooling**

INDIAN POINT UNIT NO. 2

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

NOVEMBER 1976

Docket No. 50-247

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NUREG-0130
November 1976

FINAL ENVIRONMENTAL STATEMENT
by the
U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
FOR
FOR FACILITY LICENSE AMENDMENT
FOR
EXTENSION OF OPERATION WITH
ONCE-THROUGH COOLING FOR
INDIAN POINT UNIT NO. 2

Docket No. 50-247

Published: November 1976

SUMMARY AND CONCLUSIONS

This Environmental Statement was prepared by the U.S. Nuclear Regulatory Commission, Division of Site Safety and Environmental Analysis.

1. This action is administrative.

2. The proposed action is the issuance of an amendment to the Facility Operating License No. DPR-26 held by Consolidated Edison Company of New York for Indian Point Unit No. 2, located in the State of New York, Westchester County, Village of Buchanan, 24 miles north of the New York City boundary line.

Under conditions of the operating license (Paragraph 2.E(1) of Facility Operating License No. DPR-26), the licensee is required to terminate once-through cooling at Unit No. 2 after an interim period, the reasonable termination date for which appeared at the time the license was issued to be May 1, 1979, and to operate thereafter with a closed cycle cooling system, unless licensee can show that empirical data collected during this interim operation justifies an extension of the interim operation period or such other relief as may be appropriate. An application was tendered on June 6, 1975 requesting an amendment to the license to extend the period of once-through cooling for two years.

Paragraph 2.E(1) also provides that:

"(b) The finality of the May 1, 1979 date also is grounded on a schedule under which the applicant, acting with due diligence, obtains all governmental approvals required to proceed with the construction of the closed-cycle cooling system by December 1, 1975. In the event all such governmental approvals are obtained a month or more prior to December 1, 1975, then the May 1, 1979 date shall be advanced accordingly. In the event the applicant has acted with due diligence in seeking all such governmental approvals, but has not obtained such approvals by December 1, 1975, then the May 1, 1979 date shall be postponed accordingly."

This statement considers the information provided by the licensee in the environmental report and supplements as well as other information developed by the staff in making its independent evaluation and analysis under NEPA. This includes staff reassessment and comments on the DES discussed in detail in Section 7 of this statement.

3. Summary of environmental and economic impacts, including beneficial and adverse impacts:

a. The major unavoidable adverse impact of the proposed delay of once-through cooling will be the loss of some striped bass and other fish species by impingement and entrainment at the plant. The staff has assessed this loss as not likely to lead to irreversible changes over the long term. The applicant has assigned a value of \$283,000 to the loss; the staff has not assigned a value to it but considers it to be small (Sections 3.2.2, 3.2.3 and 6.4.2).

b. A minor benefit would be the delay for one year of the operational costs and the terrestrial impacts of the closed cycle system.

4. The following Federal, State and local agencies and interested parties were asked to comment on the draft environmental statement which was issued in July 1976:

- *Department of Agriculture (AGR)
- *Department of Commerce (COM)
- *Department of Health, Education, and Welfare (HEW)
- *Department of the Interior (DOI)
- *Department of Housing and Urban Development (HUD)
- *Department of the Army, Corps of Engineers (CE)
- *Environmental Protection Agency (EPA)
- *Energy Research and Development Administration (ERDA)
- *Federal Power Commission (FPC)
- *National Advisory Council on Historic Preservation (NACHP)
- *New York State Department of Environmental Conservation (DEC)
- *State Historic Preservation Officer (SHPO)
- *Hudson River Fishermen's Association (HRFA)

- Save Our Stripers (SOS)
- *Consolidated Edison Company of New York, Inc. (CONED)
 - *Federated Conservationists of Westchester County, Inc. (FCWC)
 - Rockland County Conservation Association, Inc. (RCA)
 - Environmental Defense Fund (EDF)
 - North Brookhaven Sport Fishermen's Club, Inc. (NBSFC)
 - Great South Beach Mobile Sportfishermen (GSBMS)
 - *West Branch Conservation Association (WBCA)
 - Connecticut Coastal Anglers Association (CCAA)
 - *Village of Buchanan, N.Y.
 - *Westchester County, N. Y.
 - *City of Peekskill
 - *Town of Cortlandt

Comments were received from those indicated by an asterisk and the following:

- State of New York Public Service Commission
- State of New York Executive Department
- State of New York Attorney General

These comments are duplicated in Appendix A.

5. This Environmental Statement was made available to the Council on Environmental Quality, the public, the applicant, the above-mentioned agencies, and interested persons in November 1976.

6. From review and evaluation of the applicant's environmental report and supplements thereto, from independent observations and analyses discussed in this Statement, and from consideration of the comments received on the DES, the staff concludes that a delay of more than approximately one year (cessation date of May 1, 1980) in cessation of once-through cooling at Indian Point Unit No. 2 is not warranted and that the one year delay is the preferred alternative. Other alternatives considered were retention of the present license condition, greater extensions of time and reduced flow of cooling water during the extension period.

7. On the basis of the evaluation and analysis set forth in this statement and after weighing the environmental, economic, technical, and other benefits against environmental costs and risks and considering available alternatives, the staff concludes that, under the National Environmental Policy Act of 1969 (NEPA) and 10 CFR 51, a one-year extension of once-through cooling to May 1, 1980 is warranted. No facility operating license amendment is needed to implement the change in date in view of the provisions of paragraph 2.E(1)b of Facility Operating License No. DPR-26.

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FOREWORD

This environmental impact statement was prepared by the U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation (staff) in accordance with the Commission's regulations, 10 CFR Part 51, which implements the requirements of the National Environmental Policy Act of 1969 (NEPA).

The NEPA states, among other things, that it is the continuing responsibility of the Federal Government to use all practicable means, consistent with other essential considerations of national policy, to improve and coordinate Federal plans, functions, programs, and resources to the end that the Nation may:

- Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.
- Assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings.
- Attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences.
- 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.
- Achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities.
- Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Further, with respect to major Federal actions significantly affecting the quality of the human environment, Section 102(2)(C) of the NEPA calls for preparation of a detailed statement on:

- (i) the environmental impact of the proposed action;
- (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented;
- (iii) alternatives to the proposed action;
- (iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity; and,
- (v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.

When application is made for modification to a construction permit or a full-power operating license, the applicant submits an environmental report to the NRC. If it is determined, under 10 CFR Part 51, that a detailed statement be prepared on the foregoing considerations under Section 102(2)(C) of NEPA, the Commission publishes a notice of intent. In conducting the required NEPA review, the staff meets with the applicant to discuss items of information in the environmental report, to seek new information from the applicant that might be needed for an adequate assessment, and generally to ensure that the staff has a thorough understanding of the proposed modification. In addition, the staff seeks information from other sources that will assist in the evaluation, and visits and inspects the project site and surrounding vicinity. Members of the staff may meet with State and local officials who are charged with protecting State and local interests. On the basis of all the foregoing, and other such activities or inquiries as are deemed useful and appropriate, the staff makes an independent assessment of the considerations specified in Section 102(2)(C) of the NEPA and 10 CFR Part 51.

This evaluation leads to the publication of a draft environmental statement, prepared by the Office of Nuclear Reactor Regulation, which is then circulated to Federal, State and local governmental agencies for comment. A summary notice is published in the Federal Register of the availability of the applicant's environmental report and the draft environmental statement. Interested persons are also invited to comment on the draft statement.

After receipt and consideration of comments on the draft statement, the staff prepares a final environmental statement, which includes a discussion of questions and objections raised by the comments and the disposition thereof; a final benefit-cost analysis, which considers and balances the environmental effects of the facility and the alternatives available for reducing or avoiding adverse environmental effects with the environmental, economic, technical, and other benefits of the facility; and a conclusion as to whether--after the environmental, economic, technical, and other benefits are weighed against environmental costs and after available alternatives have been considered--the action called for, with respect to environmental issues, is the issuance or denial of the proposed modification to the permit or license.

Dr. Robert P. Geckler is the NRC Environmental Project Manager for this statement. Should there be questions regarding the contents of this statement, Dr. Geckler may be contacted at (301) 443-6950.

1. INTRODUCTION

1.1 THE PROPOSED ACTION

Pursuant to the Nuclear Regulatory Commission Regulations in Title 10, Code of Federal Regulations (CFR), an application was tendered on June 6, 1975, requesting an amendment of Facility Operating License No. DPR-26 by Consolidated Edison Company of New York, Inc. ("Con Edison"). License No. DPR-26 provides for, among other things, a period of "interim operation" with the existing once-through cooling; the period of "interim operation" is estimated to end on May 1, 1979. Con Edison's requested amendment would extend this period for another two years. The requested amendment is supported by an environmental report titled "Environmental Report to Accompany Application for Facility License Amendment for Extension of Operation with Once-through Cooling for Indian Point Unit No. 2," dated June 1975, Supplement 1 dated July 31, 1975, and Supplement 2 dated August 13, 1975.

1.2 PRESENT OPERATING LICENSE

Indian Point Unit No. 2 ("Indian Point 2") is a pressurized water reactor rated at 875 MWe owned and operated by Con Edison. The facility was constructed under the Provisional Construction Permit CPR-21, issued October 14, 1966 to utilize once-through cooling for turbine-generator heat rejection. A full-term, full power operating license was issued by the Atomic Energy Commission on September 28, 1973, subject to certain conditions for the protection of the environment.

The license is also subject to appropriate conditions imposed by the New York State Department of Environmental Conservation in its letter of September 24, 1973, to Consolidated Edison Company of New York, Inc., granting of certification under Section 401 of the Federal Water Pollution Control Act amendments of 1972.

Several amendments have been made since the license was issued. The latest dealing with the environment was made pursuant to a decision of the Atomic Safety and Licensing Appeal Board (ALAB-188) dated April 4, 1974. Paragraph 2.E of Amendment No. 4 dated September 28, 1973, and Amendment No. 5 dated February 13, 1974, to Facility Operating License DPR-26 was changed to read as follows in Amendment No. 6 dated May 6, 1974:

"Paragraph 2.E:

- (1) Operation of Indian Point Unit No. 2 with the once-through cooling system will be permitted during an interim period, the reasonable termination date for which now appears to be May 1, 1979. Such interim operation is subject to the following conditions, none of which shall be interpreted to limit or to affect in any way such other conditions as are imposed by the [Nuclear Regulatory] Commission or any other governmental body in accord with applicable law:
 - (a) Interim operation shall only be permitted to the extent that the requirements of this license to protect the aquatic biota of the Hudson River from any significant adverse impacts are satisfied; any necessary mitigating measure shall be promptly taken; such measures to include any authorized remedy deemed to be appropriate by the [Nuclear Regulatory] Commission, including an advancement of the May 1, 1979 date to an earlier date which is deemed reasonable and warranted by the circumstances.
 - (b) The finality of the May 1, 1979 date also is grounded on a schedule under which the applicant, acting with due diligence, obtains all governmental approvals required to proceed with the construction of the closed-cycle cooling system by December 1, 1975. In the event all such governmental approvals are obtained a month or more prior to December 1, 1975, then the May 1, 1979 date shall be advanced accordingly. In the event the applicant has acted with due diligence in seeking all such governmental approvals, but has not obtained such approvals by December 1, 1975, then the May 1, 1979 date shall be postponed accordingly.

- (c) If the applicant believes that the empirical data collected during this interim operation justifies an extension of the interim operation period or such other relief as may be appropriate, it may make timely application to the [Nuclear Regulatory] Commission. The filing of such application in and of itself shall not warrant an extension of the interim operation period.
 - (d) After the commencement of the construction of a closed-cycle cooling system, a request for an extension of the interim operation period will be considered by the [Nuclear Regulatory] Commission on the basis of a showing of good cause by the applicant which also includes a showing that the aquatic biota of the Hudson River will continue to be protected from any significant adverse impacts during the period for which an extension is sought.
- (2) Evaluation of the economic and environmental impacts of an alternative closed-cycle cooling system shall be made by the licensee in order to determine a preferred system for installation. This evaluation shall be submitted to the [Nuclear Regulatory] Commission by December 1, 1974, for review and approval prior to construction.
 - (3) A plan of action of operating procedures and design of the once-through cooling system for Indian Point Unit No. 2 will be developed by the licensee in order to minimize detrimental effects on aquatic biota in the Hudson River to a practicable minimum during the interim period prior to installation of a closed-cycle cooling system. The plan shall include means of reducing thermal shock; impingement on the intake structure; entrainment of fish eggs, larvae and plankton; reduction of chemical and thermal discharges and loss of dissolved oxygen below 4.5 parts per million; reduction of radioactive discharges, in accordance with 10 CFR Part 50; and other mitigating measures available. The plan shall be submitted to the [Nuclear Regulatory] Commission by January 1, 1974, and, upon approval by the Commission, the plan shall be implemented so as to eliminate or substantially reduce such adverse effects as are revealed by the monitoring and surveillance study program presented in the Technical Specifications.
 - (4) In addition to the reporting requirements otherwise imposed by this license, the applicant is directed to file with the Commission and serve on the parties reports, under oath or affirmation, of its analysis of data collected during interim operation which bear on the environmental effects of once-through cooling on the aquatic biota of the Hudson River. Such reports shall be made publicly available. The first such report shall be made as soon as is feasible after the end of the 1974 striped bass spawning season, and thereafter as significant new data become available."

1.3 PROPOSED LICENSE AMENDMENTS

The applicant, Con Edison, submitted its application for an operating license amendment in accordance with the license provision sub-paragraph 2.E(1)(c). The requested amendment substitutes May 1, 1981 for May 1, 1979 wherever the latter date appears. This would in effect extend the interim period operation with once-through cooling an additional two years.

1.4 APPLICANT'S BASIS FOR PROPOSED AMENDMENT

This application is supported by observational data collected in Con Edison's Hudson River Ecology Study Program. This includes data collected during 1973 and 1974, as well as other biological data not previously available. The information and analysis are contained in the following documents:

- (1) E. R. to accompany application for facility license amendment for extension of once-through cooling for I.P. Unit No. 2.
- (2) Supplement No. 1 and Amendment 1 dated July 31, 1975 - Response to staff questions.
- (3) Supplement No. 2 and Amendment No. 2 - 2 Vols. 1974 data from Multi-Plant Impact Study of the Hudson River Estuary dated August 8, 1975.

(4) Additional information - Hudson River Ecological Study, in the area of Indian Point, 1974 annual report, prepared for Con Edison by Texas Instruments, Inc. Ecological Services.

(5) Other reports listed in Appendix A (Con Edison's responses to the DES).

On the basis that it believes a substantial possibility exists that the completed research study program and report (on or about January 1, 1977) will provide a sufficiently improved data base that reanalysis will demonstrate that a closed cycle cooling system will not be required for Indian Point Unit No. 2, the applicant presents its evaluation of the costs and benefits expected during a two year continuation of once-through cooling to complete the study and concludes that the benefits far outweigh the environmental and other costs associated with deferral.

2. DESCRIPTION OF SITE AND PLANT

This chapter contains a brief description of pertinent features of the Indian Point site and the units making up the plant located at this site. A more detailed description of the site and plant is given in the staff's Final Environmental Statements for Unit No. 2 (FES, IP-2)¹ and for Unit No. 3 (FES, IP-3)² and in the applicant's Environmental Reports for Unit No. 2 (ER, IP-2)³ and for Unit No. 3 (ER, IP-3).⁴

2.1 THE SITE

2.1.1 General

The site of the Indian Point Plant, near Peekskill, New York, occupies 239 acres on the east bank of the Hudson River, the predominant environmental feature of the area. Important geographical features within 5 miles of Indian Point are shown in Fig. 2-1. The three nuclear reactors and associated buildings occupy approximately 35 acres at the bank of the river near the southern end of the site (Fig. 2-2). About 14 acres at the northern end of the site have been transferred by the applicant to the Village of Buchanan for development as a park and marina. The applicant is building a new visitors' center and plans to maintain an 64-acre forested area and lake for recreation in the northern portion of the site.

The resident population (1970) within a 1-mile radius of the station is 745; within a 5-mile radius, 52,700; within a 10-mile radius, 218,400; and within a 50-mile radius, 17,500,000 (FES, IP-3, Table II-1). The projected resident population within a 10-mile radius is 297,000 for 1980 and 735,000 for 2010; and within a 50-mile radius, 19,000,000 for 1980 and 26,000,000 for 2010 (FES, IP-3, Table II-1).

The majority of the land to the east of the river within 15 miles of the site is zoned for residential use or for parks. To the west of the river within 15 miles of the site, the majority of the land is zoned for parks (Palisades Interstate Park) or residential use. The area immediately around and including Indian Point is zoned for heavy industry. The industries nearest the plant are a wallboard factory and a yeast plant.

A number of historic points of interest are located in the vicinity of the Indian Point site⁵. The closest of these are the Stony Point Battle Reservation on the west bank of the river about two miles downstream, the Palisades Interstate Park west of the river, and the Van Cortlandt Manor in Croton-on-Hudson.

The estuarine nature of the Hudson River is a major environmental factor and from an ecological viewpoint, most significant. This river, which supplies the cooling water for all three units at Indian Point, is a tidal estuary at the plant site.

Tidal mixing brings salt water upstream beyond Indian Point part of the year; the saltwater boundary occasionally reaches as far as Poughkeepsie, 30 miles upstream of the site. The upstream extent of the intrusion of salt water varies strongly with the input of fresh water into the river. At a freshwater flow in excess of 20,800 cfs, the salt intrusion front is driven downstream of the Indian Point site for the entire tidal cycle.

The average freshwater flow for the entire Hudson River is about 20,000 cfs.⁶ The flow of fresh water is subject to large variations with maximum values of up to 68,000 cfs in the spring and minimum values of 3,000 to 4,000 cfs in late summer (FES, IP-3, p. II-11). The maximum tidal flow is about 300,000 cfs.⁷ The maximum temperature in the river at Indian Point is about 81°F (FES, IP-3, pp. II-19 to II-26). The salinity at Indian Point varies with the magnitude of the freshwater flow and consequent movement of the salt front.⁷ Maximum values of about 7 ppt are observed during periods of low freshwater flow, but the normal range is from 0 to 5.5 ppt (FES, IP-3, pp. II-11 to II-19). The dissolved oxygen content of the river varies from about 5 ppm in the summer to about 12 ppm in the winter.

Because the Hudson River is in a deep valley at Indian Point, the local and general weather conditions are not the same. At river level and several hundred feet above, the winds are upstream during the day and downstream at night more than a third of the time. The usual wind speed is 5 to 6 mph. Precipitation averages 46 in./year and is rather uniform month by month; the annual precipitation ranges from 36 to 63 in.

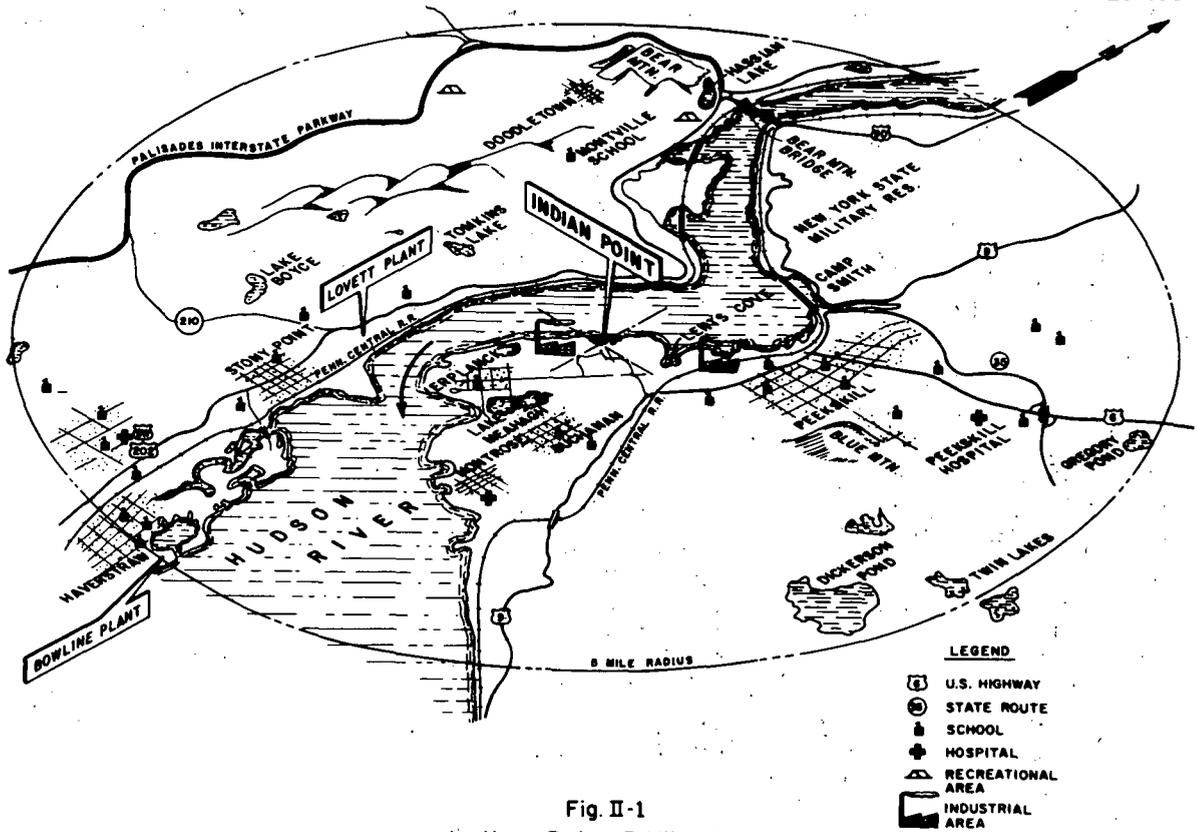


Fig. II-1
Indian Point 5 Mile Area.

Fig. 2-1 Important features within a 5-mile radius of the Indian Point site.

Source: FES, IP-2, Fig. II-1

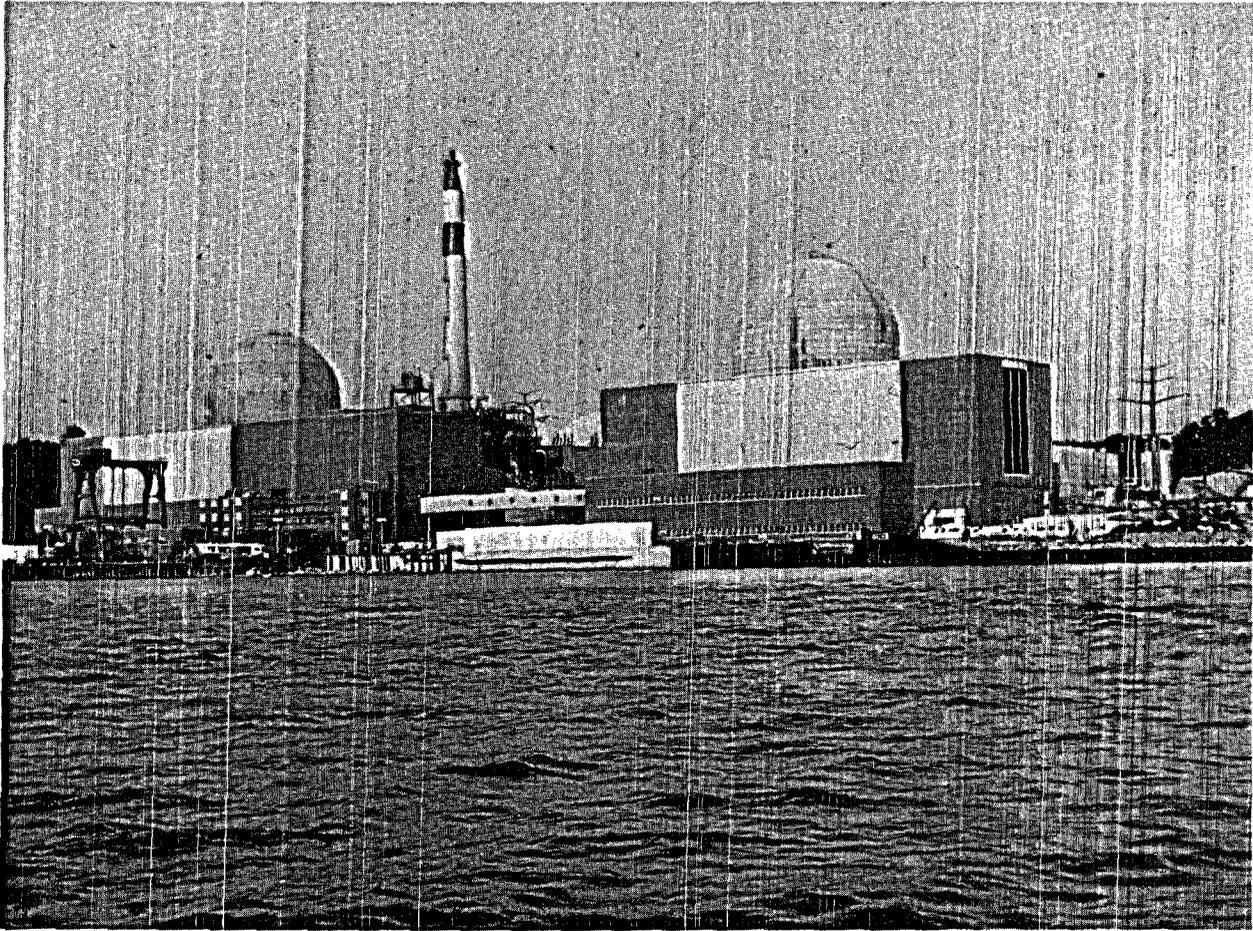


Fig. 2-2 Photograph showing Indian Point Units Nos. 1, 2 and 3
 on the Hudson River Estuary

Source: FES, IP-3, Fig. III-1

2.1.2 Ecology of the Site

2.1.2.1 Terrestrial Biota

Areas of the site unaffected by construction activities for Units Nos. 2 and 3 are largely wooded, with a well-developed mixed oak and eastern hemlock stand over the northernmost portion of the site. A recent floral survey of the site (ER, IP-3, App. FF, p. II-1 through II-15) indicates that the dominant overstory species include: white oak, red oak, chestnut oak, black oak, eastern hemlock, river birch, shagbark hickory, white pine, black cherry, and maple. Understory species include yellow poplar, sassafras, sumac, and catalpa. Shrub and herbaceous layers include Virginia creeper, poison ivy, wild grape, swamp junberry, and various perennial weeds.

2.1.2.2 Aquatic Biota

The area is rich in aquatic biota, containing numerous and diverse species (FES, IP-3, Tables II-7, II-8, and II-9). The principal aquatic primary producers in the vicinity of Indian Point are phytoplankton. The high turbidity and deepwater are not conducive to the development of extensive communities of periphyton, or rooted vascular aquatics, in the immediate vicinity of the plant; however, such communities exist within the area that will be affected by operations at Indian Point. Phytoplankton studies conducted by Howells and Weaver⁸ indicated that members of some 53 genera of planktonic algae are present in the area.

The zooplankton of the area include most major groups.⁹ Generally, the zooplankton species include protozoans, occasional medusal coelenterates, rotifers, nemertines, and microcrustaceans (including Cladocera, Ostracoda, Mysidacea, Copepoda, Amphipoda, Isopoda, and some Decapoda). Also included are the larvae and juveniles of larger pelagic forms. In this category are the larval stages of barnacles (Cirripedia), larger decapods, annelids, mollusks, and early developmental stages of several fish species.

As is typical of estuarine situations, there are a great number of species of fish (FES, IP-3, Table II-8). These may be divided into two broad classes, resident fish and migratory fish. The principal resident fish are catfish, minnows, white perch, and sunfish. Migratory fish in the area include striped bass, shad, alewife, smelt, sturgeon, blue-back herring, tomcod, and eels. The shad and striped bass are the most important sport fish. A more detailed analysis of aquatic biota is given in the environmental statement for Unit No. 3 (FES, IP-3, Sect. II.F.2 and App. F).

Because it is an estuary, the lower Hudson, including the Indian Point area, is a spawning and nursery area for species that populate not only the Hudson River but also Long Island Sound and the Atlantic Ocean. The most prominent species is the striped bass.

The Hudson is a major spawning area for the striped bass found in the Hudson River itself, Long Island Sound, and the New York Bight and, to a lesser extent for the striped bass found along the coasts of New England and southern New Jersey (FES, IP-3, pp. V-166 to V-178). Besides being an important sport and commercial species, the striped bass plays an important ecological role as a predatory fish. Several other anadromous species (e.g., shad, alewife, blue-back herring, and tomcod) also use the Hudson River as a spawning or a nursery area or both. The applicant has identified one rare fish species (Atlantic sturgeon, *Acipenser oxyrinchus*) and one endangered fish species (shortnose sturgeon, *A. brevirostrum*) in the Indian Point area.

2.2 THE PLANT

2.2.1 General

The Indian Point Nuclear Generating Plant consists of three units utilizing pressurized light water reactors. Unit No. 1 began commercial operation in October 1962 and has a net output of 265 MWe. This unit was shut down on October 31, 1974, for a minimum of two years pending modifications required by the NRC. Unit No. 2 has a net output of 873 MWe and received a license to operate at full power on September 28, 1973. Unit No. 3 has a net output of 965 MWe and is scheduled for commercial operation in 1976; the operating license (fuel loading) was issued in December 1975, and a license for 91% of full power was issued in April 1976.

2.2.2 Condenser Cooling Water Systems

Waste heat from all three units is dissipated by once-through cooling with water from the Hudson River. The general arrangement of the cooling water systems is shown schematically in Fig. 2-3 and the amounts of heat rejected and water circulation rates are given in Table 2-1. Each

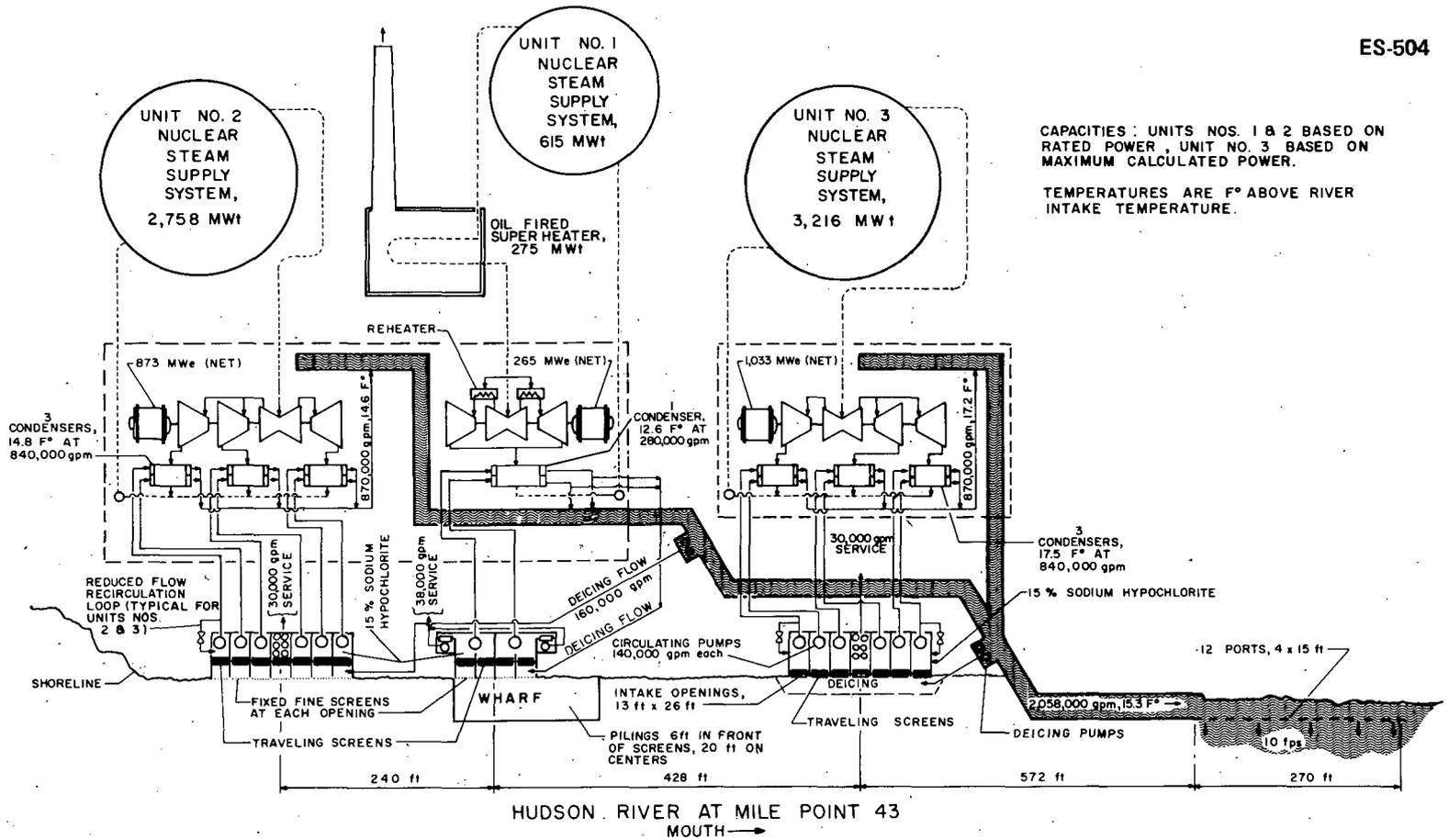


Fig. 2-3 Schematic representation of Indian Point Plant cooling water systems.

Source: FES - IP-3, Fig. III-2

Table 2-1 Heat-rejection and water-circulation rates for Indian Point Nuclear Generating Station

	Unit No. 1	Unit No. 2	Unit No. 3	Total
Net electrical power, MWe ^a	265	873	1,033	2,171
Heat rejection, billions of Btu/hr				
Service water	0.150	0.100	0.140	0.390
Condensing water	1.765	6.250	7.350	15.365
Total	1.915	6.350	7.490	15.755
Normal water circulation rates, gpm				
Service water	38,000	30,000	30,000	98,000
Condensing water	280,000	840,000	840,000	1,960,000
Total	318,000	870,000	870,000	2,058,000
Water circulation rates at 60% flow, gpm				
Service water	38,000	30,000	30,000	98,000
Condensing water	168,000	504,000	504,000	1,176,000
Total	206,000	534,000	534,000	1,274,000
Temperature rise of water, F°				
Normal flow rate	12.0	14.6	17.2	15.3
60% of normal flow rate	18.6	23.8	28.0	24.7

^aRated capacity for Units Nos. 1 and 2, maximum calculated capacity for Unit No. 3.

Source: FES, IP-3, Table III-2.

unit has a separate cooling water intake system and all three units discharge through a common discharge canal. During periods of low ambient river temperatures, the intake flow for all three units can be reduced to 60% of the normal flow rate.

2.2.2.1 Intake Systems

Each unit has its own intake system (Fig. 2-3). For Units Nos. 1 and 2, the cooling water first passes through an air-bubble screen and a fixed screen located immediately in front of each intake opening. Water then passes through a trash rack and a vertical travelling screen located in the forebay and then enters the intake pump bay. The intake pumps force the water through the condenser tubes and into the discharge canal. For Unit No. 3 the air-bubble screens and fixed screens are not used because the travelling screens are at the river face of the intake structure so fish cannot be trapped in the forebays.

2.2.2.2 Discharge System

All three units use a common discharge structure located about 1,100 ft downstream of the Unit No. 1 intake and about 600 ft downstream of the Unit No. 3 intake (Fig. 2-3). The discharge structure is about 270 ft long and consists of 12 underwater openings, 4 ft high x 15 ft long, located on 21-ft centers. Ten of the ports are provided with hand-operated gates that can be raised or lowered to regulate the water velocity leaving the opening. Two of the ports do not have adjustable gates and can be used only in the fully open or fully closed position. The centerline submergence of the ports with the gates in the fully open position is 12 ft below the elevation of the standard sea level datum of the river. The level of the water in the discharge canal upstream of the ports will be higher than that in the river by the head necessary to obtain the required velocity leaving the ports. The water level in the canal rises and falls with the tidal fluctuation of the river level with little time lag. The gates are adjusted to maintain a discharge water velocity of 10 fps.

The residence time for nonscreenable biota from the time it enters the intake structure to the time it leaves the discharge canal, with all three units operating, is about 8 min under full condenser flow conditions and about 13 min under reduced flow conditions. The residence times with only Units Nos. 2 and 3 operating are 9 and 15 min, respectively.

2.2.2.3 Closed Cycle Cooling Systems

In assessing the impact of the Indian Point Plant, the staff assumed intake flow rates of 709, 1938, and 1938 cfs for Units Nos. 1, 2, and 3, respectively, operating with once-through cooling. With closed cycle cooling, the intake flow rates were assumed to be 125 cfs for Unit No. 2 and 135 cfs for Unit No. 3. Thus, the total flow rates are 4585 cfs with all three units operating with once-through cooling, 2772 cfs with Units Nos. 1 and 3 operating with once-through cooling and with Unit No. 2 operating with closed cycle cooling, and 969 cfs with Unit No. 1 operating with once-through cooling and Units Nos. 2 and 3 operating with closed cycle cooling. When the ambient river temperature is below 40°F, the condenser cooling water flow rates are reduced to 60% of their normal values. (FES, IP-3, Table V-2 and Appendix G).

REFERENCES

1. Directorate of Licensing, United States Atomic Energy Commission, *Final Environmental Statement Related to Operation of Indian Point Nuclear Generating Plant Unit No. 2*, vols. I and II, Docket No. 50-247, September 1972.
2. Office of Nuclear Reactor Regulation, United States Nuclear Regulatory Commission, *Final Environmental Statement Related to Operation of Indian Point Nuclear Generating Plant Unit No. 3*, vols. I and II, Docket No. 50-286; NUREG-75/002, February 1975.
3. Consolidated Edison Company of New York, Inc., *Environmental Report, Indian Point Unit No. 2*, issued August 6, 1970, including: Suppl. No. 1, September 9, 1971; Suppl. No. 2, October 15, 1971; and Suppl. No. 3, February 15, 1972; Docket No. 50-247.
4. Consolidated Edison Company of New York, Inc., *Environmental Report, Indian Point Unit No. 3 and Appendices* (vols. 1 and 2) issued June 14, 1971, including: Suppl. No. 1, December 8, 1971; Suppl. No. 2, September 11, 1972; Suppl. No. 3, November 8, 1972; Suppl. No. 4, February 7, 1973; Suppl. No. 5, March 15 and 30, 1973; Suppl. No. 6, April 6, 1973; Suppl. No. 7, April 18, 1973; Suppl. No. 8, April 30, 1973; Suppl. No. 9, September 12, 1973; Suppl. No. 10, October 29, 1973; Suppl. No. 11, December 26, 1974; and Suppl. No. 12, March 29, 1974; Docket No. 50-286.
5. U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, *Draft Environmental Statement for Selection of the Preferred Closed Cycle Cooling System at Indian Point Unit No. 2*, Docket No. 50-247, NUREG-0038, February 1976.
6. G. L. Giese, and J. W. Barr, *The Hudson River Estuary, A Preliminary Investigation of Flow and Water Quality Characteristics*, State of New York Conservation Department Water Resources Commission, Bulletin 61, 1967.
7. M. W. Busby, "Flow, Quality, and Salinity in the Hudson River Estuary," *Hudson River Ecology*, Hudson River Valley Commission of New York, 1966.
8. G. P. Howells and S. Weaver, "Studies on Phytoplankton at Indian Point," *Hudson River Ecology*, G. P. Howells and G. J. Lauer (eds.), New York State Department of Environmental Conservation, 1969, p. 231.
9. G. W. Saunders, Jr., "Some Aspects of Feeding in Zooplankton," *Eutrophication: Causes, Consequences, Correctives*, National Academy of Sciences, Washington, 1969, p. 556.

3. ENVIRONMENTAL IMPACTS

3.1 TERRESTRIAL ECOSYSTEM

The staff has previously assessed in detail the potential terrestrial impacts and land effects associated with various types of closed cycle cooling alternatives.¹ In summary, the staff identified the following potential adverse impacts on the terrestrial ecosystem from natural draft cooling towers, which was selected by the staff as the preferred closed cycle cooling system at Unit No. 2.

- a. A slight reduction of local plant communities and associated wildlife due to cooling tower construction.² Some of the land needed for the cooling tower will impact part of the 80 acres of land planned for use as a natural park area on site.³
- b. Visible damage to offsite vegetation due to drift effects is expected to be slight or nonexistent during years of normal frequency and amounts of rainfall. If any damage to offsite vegetation occurs, it is likely to be episodic and noncumulative. The three species sufficiently intolerant of foliar salt deposition to be considered potentially at risk from cooling tower saline drift are white ash, flowering dogwood, and Eastern hemlock.⁴
- c. There is some risk of increase in plant diseases for onsite vegetation and to a lesser degree for offsite vegetation caused by increases in moistures.⁵
- d. There is limited risk of biological damage to vegetation due to induced icing.⁵
- e. The offsite acoustic environment will be less desirable⁶ and may exceed acceptable limits at some locations.
- f. There will be an aesthetic impact.⁷

The major result of the proposed action on the terrestrial ecosystem would be to delay for two years the above adverse impacts and potential adverse impacts of a cooling tower. The staff considers this two year delay of cooling tower impacts to be a minor benefit over the 35-40 year life of the plant.

3.2 AQUATIC ECOSYSTEM

3.2.1 Introduction

In this section the incremental impact on the Hudson River aquatic biota of a two-year extension of operation of Indian Point Unit No. 2 with once-through cooling is considered. In making this assessment the staff has relied heavily on the Final Environmental Statement (FES) for Indian Point Unit No. 3 which represents a revision of the staff's earlier assessment (FES, IP-2) with respect to aquatic impacts and takes into consideration the results of the applicant's research program through 1973 and part of 1974. However, in this present assessment the staff has supplemented the Indian Point Unit No. 3 FES wherever appropriate based on new data and analyses submitted by the applicant in its Environmental Report.⁸

In the Indian Point Unit No. 3 FES (p. V-214), it was concluded that once-through cooling at all three Indian Point units would have no measurable direct effect on the benthos, phytoplankton, microzooplankton, and macrozooplankton (except *Neomysis*) in the vicinity of Indian Point. The staff defined the phrase "in the vicinity of Indian Point" to refer to a far-field region such as Region I in the Texas Instruments' Hudson River Ecological Study, which extends from upper Haverstraw Bay to Bear Mountain Bridge (FES, IP-3, p. V-51). Furthermore, no measurable indirect effect on the fish populations dependent upon these lower trophic levels (excluding the macrozooplankton, *Neomysis*) for food would be anticipated. The staff has seen no new data which would change this conclusion.

With respect to *Neomysis*, the staff concluded that when the salt front is in the vicinity of Indian Point for much of June through October, entrainment mortality of *Neomysis* at Indian Point, Lovett, and Bowline may well cause local reductions in the standing crop of this mysid crustacean. Although *Neomysis* does not appear to be a dominant food item in striped bass and white perch diets in the Indian Point region,^{9, 9a} this reduction of *Neomysis* could result in reduced growth and survival of striped bass and white perch young-of-the-year and of other fish species in this region of the river if alternative foods are not available in sufficient abundance (FES, IP-3, p. V-215).

The remainder of this section is focused on the incremental impact on fish populations of a two-year extension for once-through cooling at Indian Point Unit No. 2. As in the Indian Point Unit No. 3 FES, the assessment deals primarily with striped bass although some attention is given to white perch, tomcod, American shad, alewives, and blueback herring. The power plant impacts of primary concern are entrainment and impingement, while the effects of discharges (thermal, chlorine, and reduced dissolved oxygen levels) are of secondary concern based on presently available information (FES, IP-3, Section V.D.2).

3.2.2 Striped Bass

In assessing the incremental impact on the Hudson River striped bass population of a two-year extension for once-through cooling at Indian Point Unit No. 2, the staff has focused on the incremental long-term (i.e., multi-year) entrainment impact over the life of the plant. The annual entrainment impact with once-through cooling at Indian Point Unit No. 2 has already been assessed in detail through an analysis of the applicant's data (1973 data in particular) and application of the staff's population transport model for the young-of-the-year striped bass population in the Hudson River (FES, IP-3, Sections V.D.2.b(2) and V.D.2.d(3)(c) and App. B). The staff has found no new information in the applicant's Environmental Report for a two-year extension that requires changes in the staff's young-of-the-year striped bass model as applied to the 1973 data.

3.2.2.1 Incremental Long-term Entrainment Impact on the Hudson River Striped Bass Population

In its assessment of the long-term impact on the striped bass population, the staff has previously used its life-cycle population model (FES, IP-3, pp. V-151 through V-166, pp. XI-39 through XI-43, and pp. B-129 through B-188). The same approach has been utilized in assessing the impact of the requested delay in termination of once-through cooling at Unit No. 2. The model uses as input, *inter alia*, the percent reduction in number of young-of-the-year striped bass for given power plant configurations, which are obtained from the staff's young-of-the-year striped bass population model (FES, IP-3, pp. B-54 through B-128). Various values of percent reduction are used in a time sequence corresponding to the anticipated sequence of plant configurations.

The main output of the life-cycle model is the relative yield by year to the striped bass fishery, where relative yield for each year is defined as the ratio of the yield of striped bass with a given level of power plant impact to the yield with no power plant impact. The staff has utilized two criteria to analyze these results. The first is the number of years the relative yield is below a given fraction. The staff considers the number of years the relative yield is less than 0.75 or 0.50 (Fig. 3-1) as two indices of the risk of irreversible effects on the striped bass population. The second criterion is the increase in cumulative yield (shaded area in Fig. 3-1) for an alternative expressed as a percent of the cumulative yield for a reference condition. The staff considers the increase in cumulative yield to be an approximate estimate of the benefit to the striped bass fishery of an alternative as compared to a reference condition.

The values used for the percent reduction of the young-of-the-year striped bass are given in Table 3-1 (FES, IP-3, Tables V-20 and XI-10). No additional runs of the young-of-the-year model beyond the power plant configurations considered in Table 3-1 were required for the present assessment. The percent reduction values used were for $f_1 = 1.0$ without Cornwall and without plants on the river as the baseline (Table 3-1).

The scenarios assumed for the life-cycle model runs are given in Table 3-2. Case 1979 represents the conditions under the existing licensing requirements, which permit operation of Indian Point Unit No. 2 with once-through cooling until May 1, 1979. Case 1981 represents the conditions with the requested two-year delay, which would permit operation of Unit No. 2 with once-through cooling until May 1, 1981. For each scenario (i.e., for each row in Table 3-2), the mode of operation (once-through cooling or closed cycle cooling) is indicated for Indian Point Units No. 2 and 3. Decommissioning is assumed to occur after 35 years, in 2008 for Unit No. 2 and 2010 for Unit No. 3. It is assumed that Indian Point Unit No. 1, Bowline, Lovett, Roseton, and Danskammer are all operating continuously at full power with once-through cooling from 1974 through 2010. The particular period of time (see column headed "Years") and the number of years for each scenario are also given. For each of the two cases the life cycle model is run through the sequence of scenarios specified in Table 3-2 starting in 1974 and ending in 2073. Other parameters used in the life-cycle model are those in Parameter Set 1 in Table B-43 of the FES for IP-3.

The results of the life-cycle model runs are given in Table 3-2 and in Figure 3-1. The number of years the relative yield is below 0.75 is 45 in both cases and the number of years below 0.50

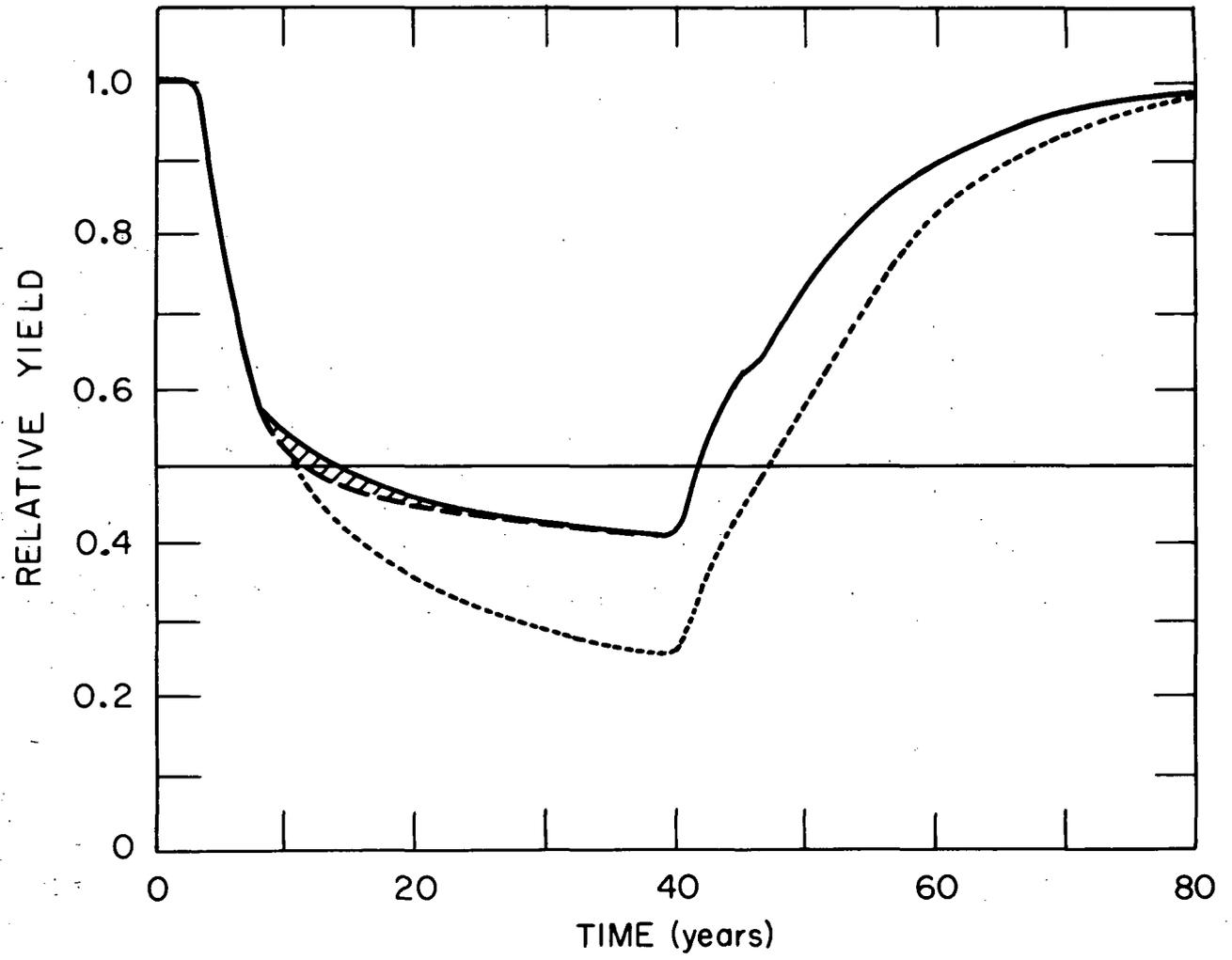


Fig. 3-1. Curves for relative yield versus time. The three curves are for cessation of once-through cooling at Indian Point Unit No. 2 on May 1, 1979 (solid line) and on May 1, 1981 (dashed line) and for the base design of once-through cooling for 35 years at both Unit Nos. 2 and 3 (dotted line).

Table 3-1 Young-of-the-year model results

Numbers for the various cases indicate percent reduction in the young-of-the-year from the base populations as indicated for each set of results

Case	Other plants ^b	Cornwall	Method of cooling ^a			Percent reduction ^d	
			IP-1	IP-2	IP-3	Intake f-factor (f _I)	
						0.5	1.0
						Without plants on the river as the baseline (Case 1)	
1 ^c	-	-	-	-	-	15.86	15.86
2	1973	-	-	-	-	14	23
3	+	-	-	-	-	21	34
4	+	-	OT	OT	-	29	45
5	+	-	OT	OT	OT	34	50
6	+	-	OT	CC	OT	30	46
7	+	-	OT	CC	CC	23	37
8	+	+	OT	OT	OT	47	64
9	+	+	OT	CC	OT	44	61
10	+	+	OT	CC	CC	38	55
11	-	-	OT	OT	OT	21	32
12	-	+	-	-	-	24	33
						All other plants except Cornwall as the baseline (Case 3)	
3 ^c	+	-	-	-	-	12.50	10.42
4	+	-	OT	OT	-	10	16
5	+	-	OT	OT	OT	17	24
6	+	-	OT	CC	OT	11	17
7	+	-	OT	CC	CC	3	5
8	+	+	OT	OT	OT	33	46
9	+	+	OT	CC	OT	28	40
10	+	+	OT	CC	CC	22	32

^aOT means once-through cooling; CC means closed-cycle cooling. See Sect. XI.C for further discussion of closed-cycle cooling alternatives.

^bOther plants include four units at Albany, four units at Danskammer, two units at Roseton, five units at Lovett, two units at Bowline, and seven units at 59th Street. In 1973 (case 2), the two units at Roseton and the second unit at Bowline were not operating. + indicates plants included in the calculation, and - indicates plants not included in the calculation.

^cValues in this row are millions of young-of-the-year striped bass in the Hudson River on October 15 of each year.

^dConvective transport defect factor (CTDF) = 0.8.

Source: FES, I.P.-3, Table V-20.

Table 3.2. Estimate of the incremental long-term impact on the Hudson River striped bass population of the proposed two-year extension for once-through cooling at Unit No. 2

Case ^a	IP-2 ^b	IP-3 ^b	Years	Number of years	Percent reduction ^c	PPO ^d	Results ^e		
							A	B	C
1979	OT	-	1974-1975	2	45	0.55			
	OT	OT	1976-1978	3	50	0.50			
	^f	OT	1979	1	45	0.55			
	CC	OT	1980-1981	2	46	0.54			
	CC	CC	1982-2008	27	37	0.63			
	-	CC	2009-2010	2	36 ^g	0.64			
	-	-	2011-2053	43	0	1.00	45	28	1
1981	OT	-	1974-1975	2	45	0.55			
	OT	OT	1976-1980	5	50	0.50			
	CC	OT	1981-1982	2	46	0.54			
	CC	CC	1983-2008	26	37	0.63			
	-	CC	2009-2010	2	36 ^g	0.64			
	-	-	2011-2053	43	0	1.00	45	31	0

^aYear in which operation of Unit No. 2 with once-through cooling ceases as of May 1 of that year.

^bOT means once-through cooling; CC means closed-cycle cooling. A dash (-) indicates unit not in operation.

^cThe values used correspond to those in Table 3.1 for $f_1 = 1.0$ without Cornwall and without plants on the river as the baseline.

^d $PPO = (100 - \text{percent reduction})/100$.

^eNumber of years relative yield is less than 0.75 (column A) or 0.50 (column B) and the increase in cumulative yield as a percent of the cumulative yield for the 1981 case (column C).

^fUnit No. 2 out of operation during spawning season for cut-over to closed-cycle cooling.

^gEstimated by assuming that the shutdown of Unit No. 2 with closed-cycle cooling after the year 2008 would decrease the percent reduction by 1%.

is 28 for the present case and 31 for the delayed schedule (note the horizontal line in Fig. 3-1 for relative yield = 0.50). The increase in cumulative yield achieved by adhering to the present schedule relative to that for the delayed schedule is 1% (the shaded area in Fig. 3-1 as a percent of the total area under the May 1, 1981 curve).

The bottom curve in Fig. 3-1 is for the base design (i.e., once-through cooling at both Units Nos. 2 and 3 for the life of these two units) and is included for purposes of reference; this power plant configuration is considered in detail in the FES for IP-3 (pp. V-144 to V-166).

From the point of view of reducing the impact on the striped bass population, the sooner once-through cooling ends at Unit No. 2 the better. However, the striped bass population projections from the staff's life-cycle model indicate to the staff that the incremental long-term impact on the striped bass population due to the requested extension of time is negligible.

3.2.2.2 Impingement of Striped Bass

The incremental number of striped bass (primarily young-of-the-year averaging 3.3 inches in length) expected to be impinged at Indian Point Unit No. 2 as a result of a two-year extension of operation with once-through cooling may be estimated based on the analysis given in the Indian Point Unit No. 3 FES (pp. V-57 to V-58 and XI-32 to XI-34). The number of striped bass expected to be impinged annually at Unit No. 2 may be calculated as (Total number of fish of all species impinged annually) x (Fraction that are striped bass). For once-through cooling this results in $1,118,589 \times 0.031 = 34,676$ striped bass per year. For closed-cycle cooling this results in $89,343 \times 0.031 = 2,770$ striped bass per year. The difference between these two figures, multiplied by two, provides an estimate of the incremental number of striped bass expected to be impinged at Indian Point Unit No. 2 as a result of a two-year extension of operation with once-through cooling. This estimate is 64×10^3 (63,812) striped bass (primarily young-of-the-year). Although the staff certainly does not consider these impingement losses to be trivial, the staff concludes that the incremental long-term impact from these losses is not expected to be large and has essentially no risk of being irreversible.

3.2.2.3 Compensation

The applicant's presentation of evidence of compensation in the Hudson River striped bass population¹⁰ is the most interesting new information to come out of the applicant's research program since issuance of the Indian Point Unit No. 3 FES. The applicant presents two analyses suggesting (a) a Ricker-type, stock-recruitment relationship and (b) density-dependent growth of juveniles. While there are uncertainties and problems associated with each analysis,¹¹ the two analyses do suggest that some density-dependent population changes may have occurred during the period 1955 through 1973. In the staff's judgment, a reasonable position, as required by ALAB-188¹² and discussed in the Partial Initial Decision for the Summit Power Station,¹³ is that the Hudson River striped bass population probably has the capacity to compensate to some extent for increased mortality such as that imposed by power plants. However, the applicant's analyses do not remove the staff's concern for the long-term consequences of a protracted increase in density-independent mortality, such as the cropping imposed by power plants, since the range of cropping rates which could be offset by compensatory responses, and the degree of offset, are not known.

3.2.3 Other Fish Species

As in the case of the striped bass, the primary concern with respect to the effects of operation of Indian Point on other fish species is the potential for population reductions due to cropping by entrainment and impingement. In the Indian Point Unit No. 3 FES (pp. V-178 through V-183), the staff concluded that (a) the species (other than striped bass) of greatest concern are white perch, tomcod, alewife, blueback herring, and anchovy; (b) combined entrainment and impingement impacts of the Hudson River power plants would probably reduce the standing crops of young-of-the-year and adults of each of these species; and (c) with respect to an interim period of open-cycle cooling up to, say, 1981 for Indian Point Unit No. 2 and 1983 for Unit No. 3, the reductions are not expected to be irreversible.

No new information has been received about entrainment studies for other fish species at the various power plants along the Hudson. New information is available, however, concerning impingement at these plants for the period January 1973-September 1974. The primary difference between these latest estimates and those previously available (FES, IP-3, Section V.D.2.a and p. V-178) is the higher proportion of Atlantic tomcod in the impinged population, especially during

1974. This increase is not particularly surprising in view of the apparent substantial increase in the 1974 tomcod population in the river.¹⁴ To some extent, the changes in relative abundance of impinged species likely reflect both variation (particularly on an annual basis) in the distribution and abundance of the species involved and the somewhat uneven pattern of plant operational schedules.¹⁵

The incremental number of fish of species other than striped bass expected to be impinged at Indian Point Unit No. 2 as a result of a two-year extension of operation with once-through cooling may be estimated as done in Section 3.2.2.2 for striped bass by just subtracting the incremental number of striped bass from the incremental number for all species. The incremental number of fish of all species expected to be impinged at Unit No. 2 over the two years is $(1,118,589 - 89,343) \times 2 = 2,058,492$. The incremental number of striped bass is 63,812 (see Section 3.2.2.2). The difference is 2.0×10^6 (1,994,680) additional fish of other species expected to be impinged at Indian Point Unit No. 2 as a result of a two-year extension of operation with once-through cooling. Although the staff certainly does not consider these impingement losses to be trivial, the staff concludes that the incremental long-term impact from these losses is not expected to be large and has essentially no risk of being irreversible.

3.2.4 Comparison of the 1973 and 1974 Data on Distribution and Abundance of Young-of-the-year Life Stages of Striped Bass and Other Fish Species in the Hudson River Estuary

The staff has reviewed the 1974 data on the distribution and abundance of young-of-the-year life stages of striped bass and other fish species in the Hudson River Estuary. The material quoted in Appendix B from the recent Texas Instruments Multiplant Report¹⁶ summarizes the major findings and discusses the similarities and differences between the 1973 and 1974 data. There were differences between 1973 and 1974 in longitudinal distribution and abundance, which would be expected, and some of these differences are of importance in determining the entrainment and impingement impact of each power plant on each fish population. The 1975 data will provide yet a third case which will exhibit similarities and differences when compared with the data for each of the two previous years. The staff emphasizes, however, that, by themselves, the 1974 data do not provide and the 1975 data will not provide the data base for a quantum jump in ability to forecast the impact of plant operation on the Hudson River ecosystem or fish populations.

Some support for not expecting irreversible reductions of populations of these other fish species is available from Texas Instruments' analysis of "direct impact."¹⁷ While the assessment method differs conceptually from the models used by the staff [FES, IP-3, Section V.D.2.d(3)(c)(iii)] and by Lawler, Matusky, and Skelly¹⁸ for the striped bass population, some preliminary comparisons based on Texas Instruments' "direct assessment" (assuming no compensation) are instructive.

- (1) In comparison with striped bass, the percentage cropping of white perch due to entrainment appears to be about 0.6 as large, and that due to impingement slightly over twice as large. Results presently available would suggest a slightly greater overall annual percentage reduction of white perch as compared to striped bass.
- (2) Estimated percentage cropping of American shad due to impingement is well over an order of magnitude smaller than that due to impingement of either striped bass or white perch.
- (3) Estimated percentage cropping of "other *Alosa* spp." (presumably alewives and blueback herring) due to impingement is approximately one-fourth as large as that due to impingement of striped bass.

These comparisons, taken together, suggest that the percentage cropping of white perch is not greatly dissimilar from that of striped bass, and that the percentage cropping of American shad (seldom found in entrainment samples)¹⁹ is considerably smaller. Further information on estimated impingement impact on all five species and entrainment impact on alewives and blueback herring (as well as American shad) will be forthcoming.²⁰ The tomcod population is deserving of further attention, since it is subjected to relatively heavy impingement mortality. Although precise estimates of fishing mortality are not available for any of these fish species, it appears that fishing is not a major source of mortality except for American shad.²¹

3.2.5 Applicant's Research Program

3.2.5.1 Applicant's Description of its Research Program

The environmental studies of major importance in the applicant's view are the present studies which will be completed by 1977. The general objectives of these studies (ER, IP-3, Suppl. 9, Sect. 13) are as follows:

- (1) "Determine the biological significance of impingement of screenable fishes at the intakes of Indian Point Units Nos. 1, 2, and 3.
- (2) Determine effects and biological significance of Plant operation on non-screenable organisms (including fish eggs and larvae, and plankton) in the coolant water passing through the once-through cooling systems for Units Nos. 1, 2, and 3.
- (3) Determine the biological significance on the Hudson River ecosystem of thermal and chemical additions from Indian Point Units Nos. 1, 2, and 3.
- (4) Determine the biological significance on the Hudson River ecosystem of aquatic organisms passing through or being attracted to the thermal plume and/or into the effluent canal or intake.
- (5) Develop and test concepts of protective measures for minimizing adverse biological effects and ascertaining biological benefits and costs of such measures.
- (6) Develop and use mathematical models to aid in the evaluation of the effects of entrainment and impingement on the population of striped bass."

A flow chart showing the duration and key points of the studies being performed is shown in Fig. 3-2.

The applicant will use the results from these studies to evaluate the effects of operation of once-through cooling of Indian Point Units Nos. 1, 2, and 3 on the Hudson River ecosystem. Data provided from these studies will aid in determining stresses on the aquatic biota as well as methods and means for minimizing adverse effects.

In addition to the Indian Point ecological studies, the applicant has been carrying out additional studies during 1973 and 1974 to estimate the potential impact of the Cornwall project on the Hudson River fishery. This is in partial fulfillment of the Federal Power Commission license requirements for this project. The applicant has been conducting intensive far-field and near-field ichthyoplankton surveys over the entire spawning ground of the striped bass.

Additional studies sponsored by other utilities are being carried out at the other power plants on the Hudson to determine entrainment and impingement impacts. The chemical discharges also will be monitored along with the river water chemistry. Furthermore, New York State Department of Environmental Conservation, through the Department of Commerce, has started a three-year striped bass tagging program to determine the contribution of the Hudson River striped bass to the mid-Atlantic fishery. The Power Authority of the State of New York began a tag and recapture program in early fall, 1973, for white perch and striped bass. An Inter-Utility Coordinating Committee (IUCC) has been established to coordinate the efforts of several utilities conducting studies on the river. Further details of ongoing ecological studies are presented in Suppl. 9, Sect. 13 of the Environmental Report for Unit No. 3.

The staff's judgment is that the applicant's research program has already improved the scientific basis for assessing the impact of the Indian Point plants on the aquatic ecosystem.

The staff expects that by January 1, 1977 the applicant's research program may provide additional relevant results, particularly along the lines of comparing years and of analyzing and synthesizing the data collected both prior to 1972 and since 1972. Furthermore, the first year of the proposed extension will allow the staff and other governmental agencies and interested parties to finish ongoing studies aimed at providing a more complete and sound scientific basis for a reasoned decision than was available at the end of 1974.

3.2.6 Conclusions

The staff concludes that the incremental long-term impact on the Hudson River ecosystem, the striped bass and other fish populations in particular, due to a two-year extension of operation with once-through cooling for Indian Point Unit No. 2 would not be expected to be large and has essentially no risk of being irreversible.

3-9

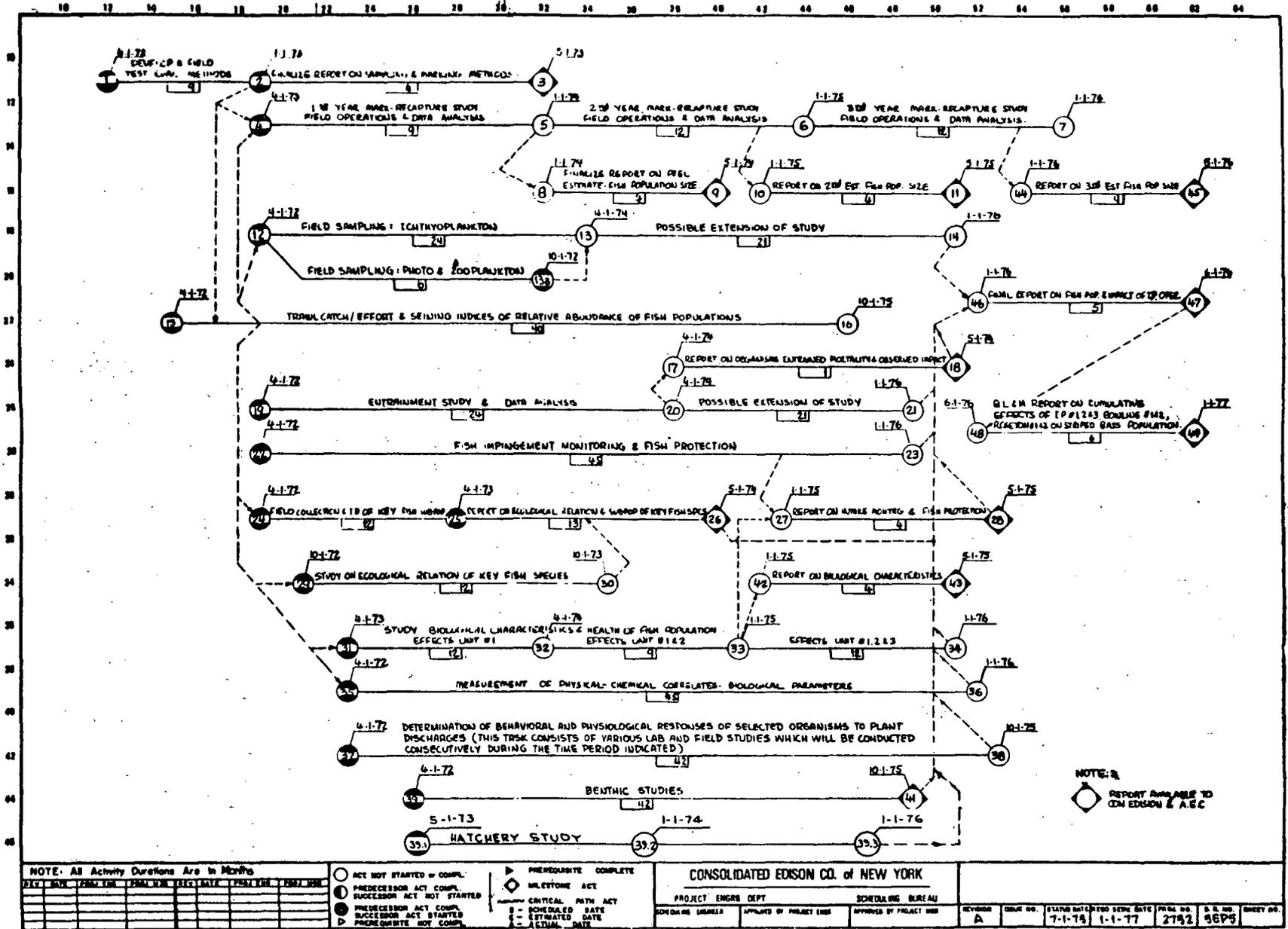


Fig. 3.2 General ecological survey and special studies.

REFERENCES

1. U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Final Environmental Statement for Selection of the Preferred Closed Cycle Cooling System at Indian Point Unit No. 2," Docket No. 50-247, NUREG-0042, August 1976.
2. Ref. 1, p. 5-28.
3. Ref. 1, p. 5-39.
4. Ref. 1, pp. 5-28 through 5-37.
5. Ref. 1, p. 5-38.
6. Ref. 1, pp. 5-39 through 5-60.
7. Ref. 1, pp. 6-39 through 6-52.
8. Consolidated Edison Company of New York, Inc., "Environmental Report to Accompany Application for Facility License Amendment for Extension of Operation with Once-Through Cooling for Indian Point Unit No. 2," June 1975; Supplement No. 1, July 1975; and Supplement 2, August 1975.
9. Texas Instruments, Inc., "Hudson River Ecological Study in the Area of Indian Point, 1973 Annual Report," July 1974.
- 9a. Texas Instruments, Inc., "Hudson River Ecological Study in the Area of Indian Point, 1974 Annual Report," July 1975.
10. Ref. 8, Section 2.1.3.1.4 and Supplement 2, Vol. 1, Section VIII.
11. Texas Instruments, Inc., "First Annual Report for the Multiplant Impact Study of the Hudson River Estuary," July 1975 (Supplement No. 2 to Ref. 8), Vol. 1, Section VIII.
12. U.S. Atomic Energy Commission, "In the Matter of Consolidated Edison Company of New York, Inc., Indian Point Station, Unit No. 2, Docket No. 50-247, Decision," ALAB-188, April 4, 1974; RAI-74-4, p. 323.
13. U.S. Nuclear Regulatory Commission, "In the Matter of Delmarva Power and Light Company and Philadelphia Electric Company, Summit Power Station, Units 1 and 2, Docket Nos. 50-450 and 50-451, Partial Initial Decision (Partial Construction Permit Proceeding - Environmental Matters and Site Suitability Only)," LBP-75-43, August 1, 1975; NRC1-75/8, p. 215.
14. Ref. 11, Vol 2, Tables D-33, D-34, D-83, and D-84.
15. Ref. 11, Vol. 2, Tables F-25 through F-28.
16. Ref. 11, Vols. 1 and 2.
17. Ref. 11, Vol. 1, Section VII.
18. Ref. 8, Appendix A.
19. New York University Medical Center, Institute of Environmental Medicine, "Hudson River Ecosystem Studies, Effects of Entrainment by the Indian Point Power Plant on Biota in the Hudson River Estuary, Progress Report for 1971 and 1972," September 1973, p. 229.
20. Ref. 11, Vol. 1, p. VII-3.
21. Ref. 11, Vol. 1, Section V.B.
22. New York University, "A Preliminary Analysis of the Abundance of Four Life History Stages of Striped Bass (*Morone saxatilis*) Collected in the Intakes of Indian Point Unit 1 and in the Hudson River in Front of Indian Point," December 1974.

4. OTHER IMPACTS OF THE PROPOSED ACTION

4.1 BENEFITS

4.1.1 Benefit of Preserving Options

The estimated delay of nine months in the DES was due to the time involved in preparing the DES and FES, the hearing process and the issuance of an initial decision concerned with the preferred closed cycle cooling system. All of these, with the exception of the initial decision were complete as of October 5, 1976. The full initial decision is expected before January 1, 1977. The consequence, in accordance with paragraph 2.E(1) b of the Facility Operating License No. DPR-26, is expected to be a one-year delay in cessation of once-through cooling on both units.

In response to numerous comments on the DES, and especially those from the Environmental Protection Agency, the staff has modified its position from that expressed in the DES. The net result is that Con Edison is expected to gain approximately a one year delay due to paragraph 2.E(1)b of the Facility Operating License which deals with delays incurred as a result of lack of all government approvals for a closed cycle cooling system. The staff no longer recommends the second year of delay.

The applicant has submitted an evaluation of the economic and environmental impacts of alternative closed cycle cooling systems in compliance with the facility operating license (see Section 1.2). The applicant's conclusion is that a wet natural draft cooling tower is the preferred system. The staff reviewed this submittal and found no evidence sufficient to warrant changing the applicant's selection.¹

Another factor which must enter into consideration is the NRC public hearing to be held on the selection of the preferred closed cycle cooling system. Considerable public interest has been expressed in correspondence, prior hearings, and responses to the Draft Environmental Statement for Selection of the Preferred Closed Cycle Cooling System.² In preparing the referenced DES, the staff made a determined effort to evaluate as many viable alternative cooling systems as possible in order to assure an optimum selection of the preferred system. It was the staff's objective to provide sufficient information in the assessment to permit the parties to any subsequent public hearing on the subject and commentators to judge and weigh the subjective constant aesthetic impact against the varying environmental impacts such as salt deposition, fog, and noise. Every effort was made to produce an optimum selection of the preferred system recognizing the impacts on the local population and biota.

Not to delay the start of construction would, as a practical matter, foreclose one option currently available, namely, the possibility of selection of a different type of closed cycle cooling system through the public hearing process. Because of the public interest (such as that expressed by the Village of Buchanan and others), it is important to preserve the opportunity for presentation of additional material to the hearing body for use in its deliberations and decision making.

In accordance with Sections 316(a) and (b) of the Federal Water Pollution Control Act of 1972, (FWPCA), the applicant has submitted requests to the Environmental Protection Agency (EPA) requesting an exemption from the EPA thermal standards and for a determination that once-through cooling is the best technology available. Action on these requests will constitute the final decision under the FWPCA regarding closed cycle cooling at Unit No. 2. Hearings on the request for the 316(b) determination are scheduled for early 1977.

4.1.2 Improvements in Biological Evaluation

According to the applicant, the chief benefit to be derived from the proposed action is the achievement of a substantial improvement in the biological data base--particularly as regards the impact of operation of the plant on the striped bass--through completion of the applicant's research program. Principal data improvements anticipated include, for example, (1) estimates of the variability from year-to-year of the impact, (2) assessment of multi-plant impact, and (3) further investigation of compensatory response and the contribution of the Hudson River striped bass to the Mid-Atlantic fishery. The principal benefit, according to the applicant, of completing the program, however, is the possibility that the results may demonstrate that a closed cycle cooling system is not required. The staff does not agree. However, the staff expects that by January 1, 1977, the applicant's research program may provide additional relevant results, particularly along the lines of comparing years and of analyzing and synthesizing the data collected both prior to 1972 and since 1972. As noted elsewhere (Section 7.2.1), additional data are not expected to change the staff position. Furthermore, the proposed one year extension will allow the staff and other governmental agencies and interested parties to finish ongoing studies aimed at providing a more complete and sound scientific basis for a reasoned decision that was available at the end of 1974.

4.1.3 Delay in Incurring Impacts

A minor benefit would be the delay for one year of the operational costs and the terrestrial impact of a closed cycle system.

4.1.4 Prevention of Non-Water Quality Impacts

The staff agrees with the applicant that the construction and operation of a wet natural draft cooling tower could result in some adverse environmental impacts, including damage to aesthetically valuable trees and the possible deterioration of scenic views. These impacts are discussed in the staff's Draft Environmental Statement for Selection of the Preferred Closed Cycle Cooling System at Indian Point Unit No. 2.³ While such damages cannot be readily quantified, it is the staff's position that they are small and that postponement of these impacts for two years is a minor benefit of the proposed action.

4.1.5 Summary

Based on the foregoing discussion, the staff considers a one year delay justified in order to preserve the choice of closed cooling system and to obtain the improvement in the biological evaluation.

No facility operating license amendment is needed to implement the change in date in view of the provisions of paragraph 2.E(1) b of Facility Operating License No. DPR-26.

4.2 COSTS

There will be some costs associated with the loss of striped bass and other fish species by impingement and entrainment at the plant. The staff considers these losses to be small (see Section 3.2).

REFERENCES

1. United States Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Draft Environmental Statement for Selection of the Preferred Closed Cycle Cooling System at Indian Point Unit No. 2, Docket No. 50-247, NUREG-0038, February 1976, Chapter 7.
2. United States Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Draft Environmental Statement for Selection of the Preferred Closed Cycle Cooling System at Indian Point Unit No. 2, Docket No. 50-247, NUREG-0038, February 1976.
3. Ref. 2, Chapter 5.

5. ALTERNATIVES

The staff has considered the following alternatives: retention of the present license condition, extension of once-through cooling for a greater or lesser period of time, and a requirement for reduced flow during the extension period.

5.1 RETENTION OF PRESENT LICENSE CONDITION

This alternative is the same as denial of the action proposed by the applicant (Section 1.3) and is an inherent part of the benefit-cost analysis of the proposed action (Chapter 6).

5.2 GREATER OR LESSER EXTENSION OF TIME

Extension of the time for once-through cooling for a period of more than one year is a possible alternative only if it permitted an extension of the present research program or some other clearly defined benefit. Obviously, additional research will generate additional data. However, the applicant has reached the point with its research program that it is collecting more and more of the same type of data. The staff commented in the IP-3 FES that:

"If there is to be any quantum jump in ability to forecast the impact of Plant operation on the Hudson River ecosystem (and on the striped bass young-of-the-year population in particular), as a result of the extensive TI, NYU, and QLM environmental studies presently scheduled to be completed by January 1, 1977 (Fig. V-19), that quantum jump will be based primarily on the 1973-74 cycle of data and analysis." (FES, IP-3, p. V-209)

It is the staff's opinion that more data of the type collected from 1973 through 1975 will not further substantially improve the biological data base available to the Commission or any other parties. One of the major contributions of the applicant's research program has involved the analysis and comparison of yearly data going back to 1965, 1955, or 1931.¹ Each additional year of research would provide but one more data point, the incremental importance of which would become progressively less as the total number of years for which there were data increased.

For the reasons stated above, the staff does not consider extension of the termination date for once-through cooling for a period greater than one year to be a viable alternative to the proposed action.

5.3 REDUCED FLOW DURING THE EXTENSION PERIOD

As required by the Unit No. 2 operating license the applicant has submitted a Plan of Action² for plant operation to minimize detrimental effects on aquatic biota during the period of operation with once-through cooling. One such action is to operate the main circulating water pumps at 60% of full flow from October 1 to March 31 each year resulting in a decrease in impingement of aquatic biota.

A possible alternative to the proposed action is to grant the requested extension of time and require operation at reduced flow for the entire two-year period.

Operation at reduced flow results in a higher temperature increase in the cooling water on passage through the condenser and a resulting increase in the temperature of the water discharged. Such an effect has little consequence in the winter when the river temperature is low. However, in the summer such operation would likely cause violation of the maximum allowable discharge temperatures. Such violation could only be avoided by reducing the power output of the plant (derating). The required derating would be costly because of the higher cost of power from oil-fired plants as compared to nuclear plants. It would also be difficult to replace this power with purchased power since other nearby systems also have their peak demand in the summer. For these reasons the staff does not consider this to be a reasonable alternative.

REFERENCES

1. Texas Instruments, Inc., First Annual Report for the Multiplant Impact Study of the Hudson River Estuary, July 1975, Vol. I, Chapters V and VIII.
2. Consolidated Edison Company of New York, Inc., A Plan of Action for Operating Procedures and Design of the Once-Through Cooling System for Indian Point Unit No. 2, Submitted in Accordance with Section E(3) of Facility Operating License DPR-26, as amended by Amendment No. 4 dated September 28, 1973, Docket No. 50-247, January 1, 1974.

6. EVALUATION

6.1 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

The major unavoidable adverse impact of the proposed delay of once-through cooling will be the loss of some striped bass and other fish species by impingement and entrainment at the plant. The staff has assessed this loss as small.

6.2 RELATIONSHIPS BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE OF LONG-TERM PRODUCTIVITY

On the time scale reaching several generations into the future, the useful life of the nuclear station is considered short-term. The resources are dedicated to the production of useful electrical energy during the anticipated life-span. The staff concludes that the proposed action will have no significant effect, if any, on long-term productivity.

6.3 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The major commitment of the proposed action will be the loss of striped bass and other fish species by impingement and entrainment at the plant. The staff considers this to be a small irretrievable loss. However, this reduction of the fish population is not considered by the staff to be irreversible.

6.4 BENEFIT-COST BALANCE

6.4.1 Benefits

The proposed delay for termination of once-through cooling will have two important benefits. It will maintain the option for possible selection of an alternative closed cycle cooling system as a result of the public hearing process and permit further evaluation of results of the applicant's research program. The completion of this evaluation is important under the terms of paragraph 2.E of the Facility Operating License (section 1.2) which provides for an application for an "extension of the interim operation period or such other relief as may be appropriate" should the applicant believe that the data collected warrant it. The one year extension would provide an opportunity for the review and evaluation of all available information.

In addition to the above non-quantifiable benefits there will be an economic benefit of the proposed action. While the staff and the applicant disagree as to the magnitude of this benefit, both conclude that there is a benefit.

6.4.2 Costs

The major cost of the proposed action is the loss of some striped bass and other fish by impingement and entrainment at the plant. The applicant has assigned a value of \$283,200 to this loss. The staff has not assigned a monetary value to this loss but considers it to be small.

6.4.3 Benefit-cost Balance

Although not all of the benefits and costs associated with the proposed action can be quantified, the staff considers that, on balance, the benefits exceed the costs. Thus, it is the staff's conclusion that a one year delay is warranted.

7. RESPONSES TO COMMENTS

7.1 INTRODUCTION

Pursuant to 10 CFR 51, the Draft Environmental Statement (DES) was transmitted in February 1976, with a request for comment, to the Federal, State, and local agencies listed in the Summary and Conclusions at the beginning of this Final Environmental Statement (FES). In addition, comments on the DES from interested parties were requested by a notice in the Federal Register on August 20, 1976.

Comments in response to these requests were received from the agencies and interested parties shown in the following list.

- . Consolidated Edison Company of New York, Inc.
- . U. S. Environmental Protection Agency
- . United States Department of Agriculture*
Soil Conservation Service
Agricultural Research Service
- . U. S. Department of the Army, Corps of Engineers*
- . United States Department of Commerce
National Oceanic and Atmospheric Administration, National Marine Fisheries
Service, Gloucester, Mass.
National Oceanic and Atmospheric Administration, Rockville, Md.
- . Department of Housing and Urban Development*
- . United States Department of Interior
- . Energy Research and Development Administration*
- . Federal Power Commission*
- . New York State Department of Environmental Conservation
- . State of New York Public Service Commission
- . State of New York Executive Department*
- . New York State Attorney General
- . Hudson River Fishermen's Association
- . West Branch Conservation Association
- . Village of Buchanan
- . County of Westchester
- . Federated Conservationists of Westchester County, Inc.

*The comments from those organizations marked with an asterisk do not require responses.

- . City of Peekskill
 - Mayor
 - Planning Commission
- . Town of Cortlandt

7.2 RESPONSES

7.2.1 Responses to Comments by Consolidated Edison

Part 1 - Principal Comments

1. Conclusion is correct.

In response to numerous comments on the DES, and especially those from the Environmental Protection Agency, the staff has modified its position from that expressed in the DES. The net result is, as discussed below (Section 7.2.5.1), that Con Edison gains approximately a one year delay due to paragraph 2.E(1)b of the Facility Operating License which deals with delays incurred as a result of lack of all government approvals for a closed cycle cooling system. The staff no longer recommends the second year of delay.

2. Additional reason for granting license amendment is important.

While it is true that the possibility exists that the present requirement of a closed cycle cooling system could be reversed, the staff cannot predict the likelihood of this occurring. In view of the NRC's responsibilities under NEPA and the fact that closed cycle cooling is mandated by a Commission Order based upon an extensive record, the staff believes it is the Commission's responsibility to determine with finality a date for cessation of operation with once-through cooling.

3. Ecological study program is providing significant new data.

In one sense, the staff certainly has prejudged the value of the 1975 data from the applicant's Ecological Study Program. The point the staff is making is that no additional, single-year's data from the applicant's Ecological Study Program or any other feasible research program will provide a quantum jump in ability to forecast the impact of power plant operation on the Hudson River ecosystem or fish populations. The applicant's comment, perhaps unwittingly, appears to give the impression that the applicant is unduly impressed with each additional year's data without giving adequate attention to the value of each additional year's data as a basis for illuminating the issues in controversy, such as compensation. (See the staff's response to Con Edison's detailed comment 13 and the staff's general response on the benefit of additional data.)

Benefit of additional data

The staff made the following statements in the DES concerning the applicant's research program and ongoing studies by the staff and other governmental agencies as one benefit of granting the two-year extension.

Section 3.2.3, p. 3-7, first paragraph:

"There were differences between 1973 and 1974 in longitudinal distribution and abundance, which would be expected, and some of these differences are of importance in determining the entrainment and impingement impact of each power plant on each fish population. The 1975 data will provide yet a third case which will exhibit similarities and differences when compared with the data for each of the two previous years. The staff emphasizes however, that the 1974 data do not provide and the 1975 data will not provide the basis for a quantum jump in ability to forecast the impact of plant operation on the Hudson River ecosystem or fish populations."

Section 3.2.5, p. 3-8:

"The staff's judgment is that the applicant's research program has already improved the scientific basis for assessing the impact of the Indian Point plants on the aquatic ecosystem.."

The staff expects that by January 1, 1977 the applicant's research program may provide additional relevant results, particularly along the lines of comparing years and of analyzing and synthesizing the data collected both prior to 1972 and since 1972. Furthermore, the first year of the proposed extension will allow the staff and other governmental agencies and interested parties to finish ongoing studies aimed at providing a more complete and sound scientific basis for a reasoned decision than was available at the end of 1974."

Section 5.2, p. 5-1, second paragraph:

"Obviously, additional research will generate additional data. However, the applicant has reached the point with its research program that it is collecting more and more of the same type of data. The staff commented in the IP-3 FES that:

'If there is to be any quantum jump in ability to forecast the impact of Plant operation on the Hudson River ecosystem (and on the striped bass young-of-the-year population in particular), as a result of the extensive TI, NYU, and QLM environmental studies presently scheduled to be completed by January 1, 1977 Fig. V-19), that quantum jump will be based primarily on the 1973-74 cycle of data and analysis.' (FES, IP-3, p. V-209)."

It is the staff's opinion that more data of the type collected from 1973 through 1975 will not further substantially improve the biological data base available to the Commission or any other parties. One of the major contributions of the applicant's research program has involved the analysis and comparison of yearly data going back to 1965, 1955, or 1931.¹ Each additional year of research would provide but one more data point, the incremental importance of which would become progressively less as the total of years for which there were data increased.

Section 6.4.1, p. 6-1, first paragraph:

"The extension would provide an opportunity for the review and evaluation of all available information. While the staff believes that the probability is low that such evaluation would reveal that closed cycle cooling is not required, the preservation of this option is deemed to be a benefit."

It is obvious from the comments of the Hudson River Fishermen's Association (HRFA), the United States Environmental Protection Agency (EPA), The Department of Commerce (NOAA/ National Marine Fisheries Service), the State of New York (Department of Environmental Conservation), and Consolidated Edison that an elaboration on the above statements is required. The staff's response addresses the following two topics: (1) the distinction between the benefit of additional data and the benefit of completing ongoing analyses; and (2) the responsibility of the staff to base its decision on the most complete and scientifically sound analyses that can be made available within an acceptable time frame and without incurring unacceptable incremental damage to the environment.

- (1) The staff makes a distinction between the benefit of the additional data collected by Con Edison versus the benefit of completing ongoing analyses, not only by Con Edison (e.g., the January 1977 Final Report), but also by the staff and other governmental agencies. With respect to the benefit (or lack thereof) of additional field and laboratory data from studies supported by Consolidated Edison, the staff has stated its position in Section 3.2.3 (p. 3-7, first paragraph) and in Section 5.2 (p. 5-1, second paragraph). With respect to the benefit of completing ongoing analyses by the staff, other governmental agencies, and Con Edison, the staff has stated its position in Section 3.2.5 (p. 3-8, last paragraph) and in Section 6.4.1 (p. 6-1, first paragraph).

(2) With reference to the staff's statement in Section 6.4.1 (p. 6-1, first paragraph), although the staff considers that the probability is low that the above analyses by the staff, other governmental agencies, and Con Edison will reveal that closed cycle cooling is not required, that probability is not zero. In a decision of this importance, the staff has a responsibility to base its decision on the most complete and scientifically sound analyses that can be made within an acceptable time frame and without incurring unacceptable incremental damage to the environment. The data included in the current evaluation are those collected through the end of 1974.

4. Deferral benefits are not minor

The comment dealt with the impacts over a two year period which the staff characterized as minor; the staff's reassessment that only a one year delay is acceptable makes the impacts even less.

The adverse impacts of closed cycle cooling systems were presented in detail in the FES related to selection of the Preferred Closed Cycle Cooling System (NUREG-0042) and it was concluded that, on balance, the natural draft cooling tower was the one preferred. On September 29, 1976, the parties to the proceeding on selection of the preferred closed cycle cooling system filed a stipulation with the Atomic Safety and Licensing Board in which they concurred in this choice.

In preparation of the FES, comments from local communities and individuals were considered in the staff evaluation (see generally Section 8 of NUREG-0042) and specifically section 8.2.16 on p. 8-39):

"In preparing the DES, the staff recognized the widespread public interest in the potential impacts of a closed-cycle cooling system at Indian Point. As a result, the staff made a determined effort to evaluate as many viable alternative cooling systems as possible in order to assure an optimum selection of the preferred closed system. To this end, the staff obtained much information from sources other than the applicant and performed extensive analyses and evaluation of what appeared to be the better systems. Although the effort took longer than anticipated, it appears justified by the staff's objective to provide sufficient information to permit the parties to any subsequent public hearing and commentors to judge and weigh the subjective aesthetic impacts against the varying environmental impacts. Every effort was made to produce an optimum selection of the preferred system recognizing the impacts on the local population and biota."

One of the benefits recognized by the staff with respect to the first year of the requested delay was that the option as to type of closed cycle system to be installed would be retained until such a decision could be made. The hearing portion of the proceedings was completed on October 5, 1976, the parties have agreed that the preferred system is a natural draft cooling tower and the initial decision is expected in November 1976. Thus, the benefit described above has now obtained and there is no further need for delay because of lack of decision as to type of tower to be installed.

Part 2 - Detailed Comments

p. 1-2 Applicant's basis for proposed extension

p. 2-1 Section 2.1.1 The Site, General

Originally, an 80 acre recreational area was planned on site but was based on once-through cooling. The land requirement for the NDCT is estimated to be 16 acres (ER "Economic and Environmental Impacts of Alternative Closed-Cycle Cooling Systems for Indian Point Unit No. 2," Vol 1, p. 2-21) and the recreational area should be reduced proportionately. The appropriate change has been made in the text.

The data on dissolved oxygen provided by Con Edison have been incorporated into the text.

p. 2-4 Section 2.1.2.2 Aquatic Biota

...no way implies that the Hudson River is a major source of the striped bass caught in New England waters.

The text has been corrected.

p. 2-7, Section 2.2.2.3 Closed cycle cooling cycle

The text has been corrected.

p. 3-1, Section 3.1, b. Terrestrial Ecosystem

No response required.

p. 3-1, Section 3.2.1 Aquatic Ecosystem; Introduction

Neomysis is not the dominant food item in striped bass in the Indian Point area.

The text has been appropriately modified.

p. 3-2, Section 3.2.2. Striped bass

The staff is reassessing its use of compensation in its striped bass models and in the applicant's striped bass models and was doing so before the applicant's Environmental Report, Supplement 2 (pages VIII 1-14) was filed. See the staff's general response on the benefits of additional research (Section 7.2.1 Principal Comment number 3) and below.

p. 32 Section 3.2.2.1 Incremental long-term entrainment impact on the Hudson River bass population

The staff's position with respect to the choice of a baseline case for calculating percent reduction values was presented in the Indian Point Unit No. 3 FES as follows:

"Baselines for calculating percent reduction values

The two baselines the staff has used to calculate percent reduction values address two somewhat different questions. Percent reduction values calculated with a baseline of no plants operating on the river (Case 1) are estimates of the entrainment and impingement impact through October 15 of each year* on the Hudson River spawned striped bass population relative to a hypothetical no-impact situation. With this baseline, the emphasis of the analysis is on the combined impact of all the power plants and how this combined impact may be reduced with closed-cycle cooling instead of open-cycle cooling at Indian Point Units Nos. 2 and/or 3. The striped bass population (as well as the applicant's research effort to measure the population) experience the reduction in the combined impact following a change from once-through cooling to closedcycle cooling at Indian Point.

Percent reduction values calculated with the second baseline of all plants on the river in operation except Indian Point Units Nos. 1, 2, and 3 (and Cornwall) (Case 3) provide estimates of the incremental entrainment and impingement impact through October 15 of each year due to Indian Point Units Nos. 1, 2, and 3 (and Cornwall). With this baseline, the emphasis of the analysis is on the incremental impact of Indian Point (and Cornwall) and how this incremental impact may be reduced with closed-cycle cooling instead of open-cycle cooling at Indian Point Units Nos. 2 and/or 3. However, the striped bass population will not experience this isolated incremental impact of Indian (and Cornwall) apart from experiencing the combined impact of all the power plants. Likewise, neither will the population experience the reduction of this isolated incremental impact following a change from once-through cooling to closed-cycle cooling at Indian Point Units Nos. 2 and 3 apart from experiencing a reduction of the combined impact. As expected, the percent reduction values are greater, when using Case 1 as the baseline (Table V-20). Also as expected, the estimated benefit of installing closed-cycle cooling systems at Indian Point Units Nos. 2 and/or 3 is greater when using Case 3 as the baseline (Table V-20).

The presentation of percent reduction values from the young-of-the-year model using both baselines emphasizes that the choice of a baseline has a marked effect on the apparent impact and the extent to which this impact may be reduced with closed-cycle cooling at Indian Point. Although this FES has been prepared in the course of the licensing procedure for a single power plant (Indian Point Unit No. 3), the impact of Unit No. 3, which is of primary concern to the staff (entrainment and impingement of fish, striped bass in particular), involves populations that are not restricted to the vicinity of Indian Point. Rather these fish populations inhabit the entire Hudson River Estuary and beyond, and as such, they are subject to entrainment and impingement impacts from the entire complex of power plants on the Hudson River. In terms of intake represents only about 20% of the total intake flow at Indian Point Units Nos. 1, 2, and 3, Bowline, Lovett, Roseton, and Danskammer (10,308 cfs).

For the above reasons, the staff's position is that the baseline of no plants operating on the river is the more appropriate baseline for assessing the entrainment and impingement impact of Indian Point Unit No. 3 and of the other plants on the Hudson River spawned striped bass population. Accordingly, analysis of the long-term impact on the adult population. Accordingly, analysis of the long-term impact on the adult population using the staff's life-cycle model \pm Section V.D.2.d(3)(c)(iv)1 and analysis of the economic impact on the fisheries (Section XI.J.2.c) are based on percent reduction values from the staff's young-of-the-year model calculated with this baseline. (IP3, FES, pp. V-145, V-147 and V-148)"

The applicant's plans for Indian Point Unit No. 1 over the next 30 to 40 years have not yet been made clear. The staff has assumed in its life-cycle model runs that Unit No. 1 will be operating. If the staff had assumed that Unit No. 1 would not be operating, the estimates of impact in Tables 3-1 and 3-2 would be somewhat less.

Since the staff's striped bass transport model includes longitudinal spatial considerations relating to spawning and larval development, the applicant's concern about inclusion of the Albany and 59th Street power plants in the model is automatically taken care of:

p. 3-6, Section 3.2.2.2 Impingement of Striped Bass

No comment required.

p. 3-6, Section 3.2.2.3 Compensation

*Percent reduction values are calculated from the results of the young-of-the-year model on the basis of the number of juveniles surviving to October 15 of each year.

The staff acknowledges the need for incorporation of some form of compensation in fish population modeling efforts in order to produce more realistic, long-term estimates of impact. Compensatory natural mortality functions for the young-of-the-year life stages are included in the staff's striped bass transport model, results from which are given in the Indian Point Unit No. 3 FES (pp. V-149 to V-151), and are also included in the staff's generalized life-cycle model which will be available in early 1977. The original striped bass life-cycle model used in the Indian Point Unit No. 3 FES and in the present FES includes a compensatory function for fishing mortality about which the staff commented:

"An alternative interpretation of the staff's formulation of compensation in its striped bass life-cycle model is based on the same line of reasoning used in this subsection. Without attempting to distinguish between the relative likelihood and importance of natural compensation and compensation by the fishery, one can argue in favor of a single empirical function that is assumed to adequately represent the integrated result of all density-dependent mechanisms. This function is then assumed to operate on the fishing mortality, since there is reason to expect that the striped bass sport-fishing effort, in particular (which is considerably greater than the commercial-fishing effort), is dependent on the size of the striped bass population." (IP3, FES, p. V-143)

The staff agrees with the applicant that the stock-recruitment analysis presented by TI provides a basis for defining the range of cropping rates which could be offset by compensatory response. However, apparently the staff and TI are also in agreement that the uncertainties in the data base and in the assumptions on which the stock-recruitment analysis are based are so great that to develop a further analysis on this foundation is scientific charlatanism.

p. 3-9, Section 3.2.5.1 Applicant's description of its research program.

No response required

p. 4-2, Section 4.1.5 Summary

Staff is incorrect in saying that a one-year delay is sufficient to obtain the improvement in the biological evaluation.

Please see the discussion to principal comment number 3 above.

p. 5-1, Section 5.2 Greater or lesser extension of time.

The staff appreciates the statistical argument put forth by the applicant. Using this same line of argument, the staff would like to focus attention on two data sets of considerable interest to the staff, Con Edison, and the other parties. In support of its application for a two-year extension, the applicant presented (a) a correlation analysis between striped bass abundance vs abundance five years later during 1955-1972 and (b) a correlation analysis between young-of-the-year striped bass abundance vs growth. In the first analysis (TI, Multiplant Report, Fig. VIII-3, p. VIII-5) there were thirteen data points and $r = -0.81$. In the second analysis (TI, Multiplant Report, Fig. VIII-4, p. VIII-11) there were eight data points and $r = -0.72$.

df ^a	TI Analysis												
	2	3	4	5	6	7	8	9	10	11	12	13	
r ^b	0.95	0.88	0.81	0.75	0.71	0.67	0.63	0.60	0.58	0.55	0.53	0.51	

As indicated in the above table when the sample size has reached 8 (df = 6) and especially 13 (df = 11), the importance of adding one more data point is rather small. In the staff's judgment neither of the above two analyses will be appreciably more convincing or less convincing upon the addition of one more data point.

^aDegrees of freedom (df) = sample size - 2.

^bAbsolute value of the correlation coefficient required to achieve statistical significance at the 5% probability level.

7.2.2 Environmental Protection Agency

Response to letter of September 2, 1976

It is the staff's understanding that the NPDES permit reflects the EPA position that closed cycle cooling is required for this plant. The fact that a request for an adjudicatory hearing has been granted does not detract from this position, nor should the NRC take any action which would contradict EPA's interests as set forth in the EPA letter of September 2, 1976.

The staff believes that the revisions made in preparing this FES dispose of EPA's exceptions in an appropriate manner.

Responses to detailed evaluation of the proposed action

The staff believes that a license amendment is not required to accommodate a one-year delay in the termination date for once-through cooling.

The staff decision not to recommend a 2-year delay in termination of once-through cooling is responsive to paragraphs 2 and 3 of the Detailed Evaluation of the Proposed Action.

Insofar as a response to keeping options open, refer to the staff response to Con Edison's Principal Comment number 3 above.

The staff agrees with EPA that "to say that the damage will not be irreversible is not the same as to say that it will be minimal." In fact, where feasible, the staff has documented the extent of this damage, as in estimating the incremental number of striped bass and fish of other species expected to be impinged at Indian Point Unit No. 2 as a result of a two-year extension of operation with once-through cooling (Sections 3.2.2.2 and 3.2.3).

7.2.3 Response to United States Department of Commerce

General comments

The staff agrees with the general comments.

Specific comments

Please see Responses to comments by Con Edison (Principal comment No. 3) in Section 7.2.1 above for responses to comments on Aquatic biota and ecosystem. Changes in Section 3.2 also address the question of Neomysis.

Benefit of preserving options. See Responses to Comments by EPA in Section 7.2.2 above.

Comments on costs. The staff agrees

Alternatives. Greater or less extensions of time.

See Responses to comments by Con Edison (Principal comment No. 3) in Section 7.2.1 above.

Unavoidable adverse environmental impacts.

See Responses to Comments by EPA in Section 7.2.2 above.

Irreversible and irretrievable commitments of resources; Benefit-cost balance. In view of the change in staff position, no response to these comments is needed.

Coastal Zone Management

Steps are being taken in accordance with the suggestion made.

7.2.4 Responses to comments by the United States Department of Interior

The change in staff position on extension of once-through cooling accommodates the major concern of the U.S. Department of Interior. In addition, consideration of the detailed comments may be found in Section 9.2.5 of the FES related to the selection of the Preferred Closed Cycle Cooling System (NUREG-0042).

7.2.5 Responses to Comments by New York State

7.2.5.1 New York State Department of Environmental Conservation

Comments 1 and 2. See Responses to Comments by Con Edison in Section 7.2.1 above.

Comment 3. The estimated delay of nine months was due to the time involved in preparing the DES and FES, the hearing process and the issuance of an initial decision concerned with the preferred closed cycle cooling system. All of these, with the exception of the initial decision were complete as of October 5, 1976 (see Section 7.2.1, principal comment number 1 above). The full initial decision is expected before January 1, 1977. The consequence, in accordance with paragraph 2.E(1)b of the Facility Operating License No. DPR-26, is expected to be a one-year delay in cessation of once-through cooling.

7.2.5.2 State of New York Public Service Commission

For reasons stated elsewhere in this statement, both in the text and in Section 7, the staff does not recommend a two-year extension of once-through cooling at Indian Point Unit No. 2.

The other comments made by the Public Service Commission are addressed in Section 7.2.1 (Principal comment number 3) above.

7.2.6 Response to comments by the Attorney General of the State of New York

The comments made by the Attorney General are addressed in Section 7.2.1 (Principal comment number 3) above.

7.2.7 Responses to Comments by the Hudson River Fishermen's Association

Responses to most of the comments made by HRFA are included in the staff responses to EPA and Con Edison.

HRFA raises the question of the relation between cessation of once-through cooling at Indian Point Unit No. 2 and Unit No. 3. The staff notes that the cessation date for Unit No. 3 has been extended until September 15, 1982 pursuant to paragraph 2.E(1)(e) of the Facility Operating License DPR-64 and paragraph 7(c) of the stipulation (Licensee's "Notice of Extension of Interim Operation Period" dated August 27, 1976. This, coupled with the revised staff recommendation that only a one year extension be granted for Unit No. 2 has increased the time period between the cut-over of Unit Nos. 2 and 3.

7.2.8 Responses to Comments by the West Branch Conservation Association Comment No. 1

The first comment of the West Branch Conservation Association suggests a lack of appreciation for the magnitude of natural, annual variations in year-class strength for a fish population such as the striped bass. For example, indices of year-class abundance for striped bass from 1965 through 1974 (less 1966 and 1971) are given in the TI Multi-plant Report (Table V-3, p. V-26). These indices range from 1.7 (1968) to 78.8 (1973), i.e., a ratio of minimum to maximum of 0.022. The value for 1973 is the highest for any of these years, although the volume of water withdrawn by the power plants on the Hudson River during the entrainment season was considerably greater in 1973 than in any preceding year (Fig. A-1). Of course, what is lacking for each year except 1973 and 1974 are river-wide estimates of total standing crop of post yolk-sac larvae. Without this information it is not possible to estimate survival from post yolk-sac larvae to juveniles in August, which is really the issue at stake here.

A closer look at the 1973 and 1974 data in Appendix B indicates that the difference between 1973 and 1974 is even more pronounced than suggested by the comment of the West Branch Conservation Association. As indicated in Table 1 the survivability in 1974 between post

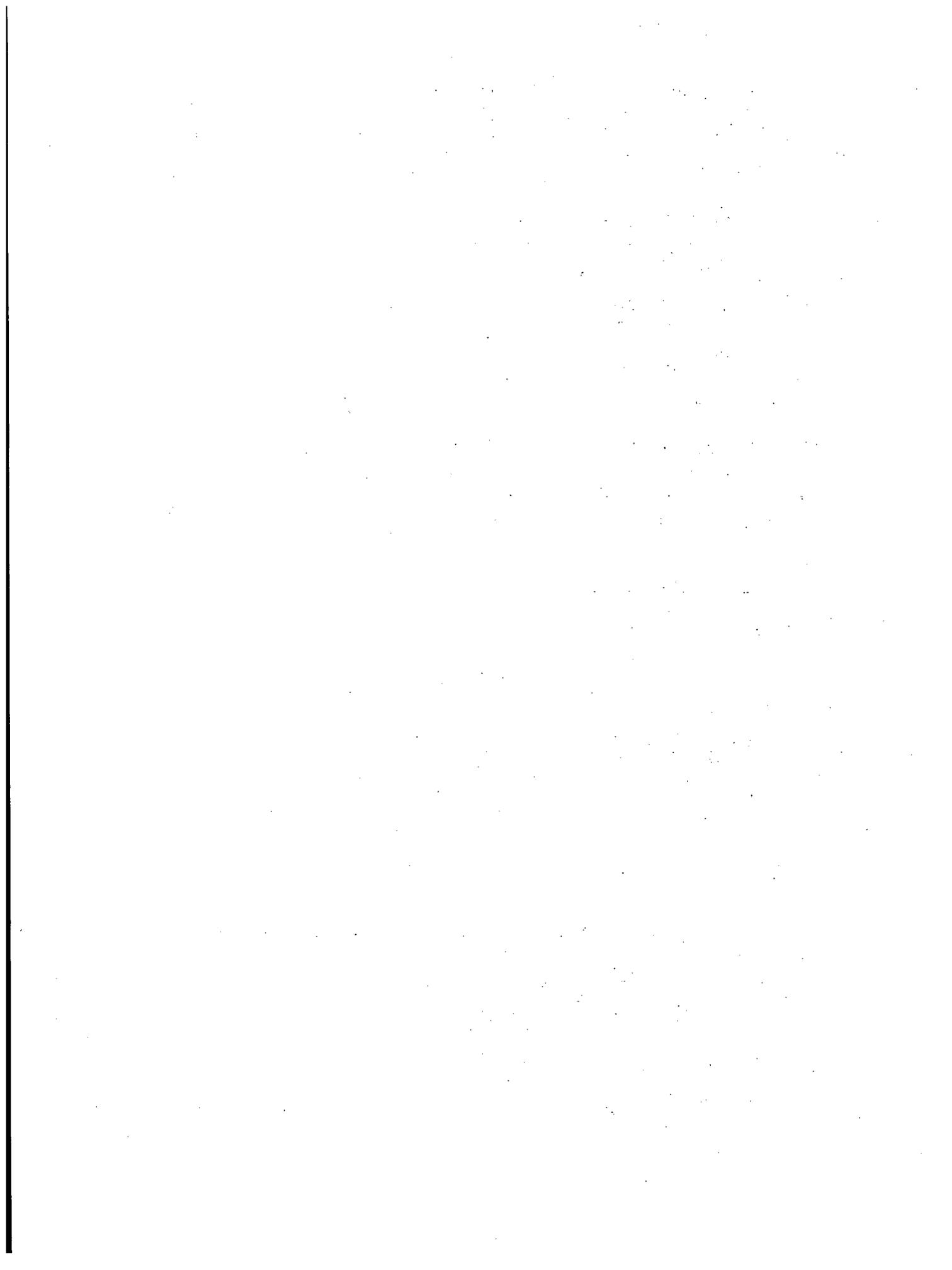


FIGURE A-1

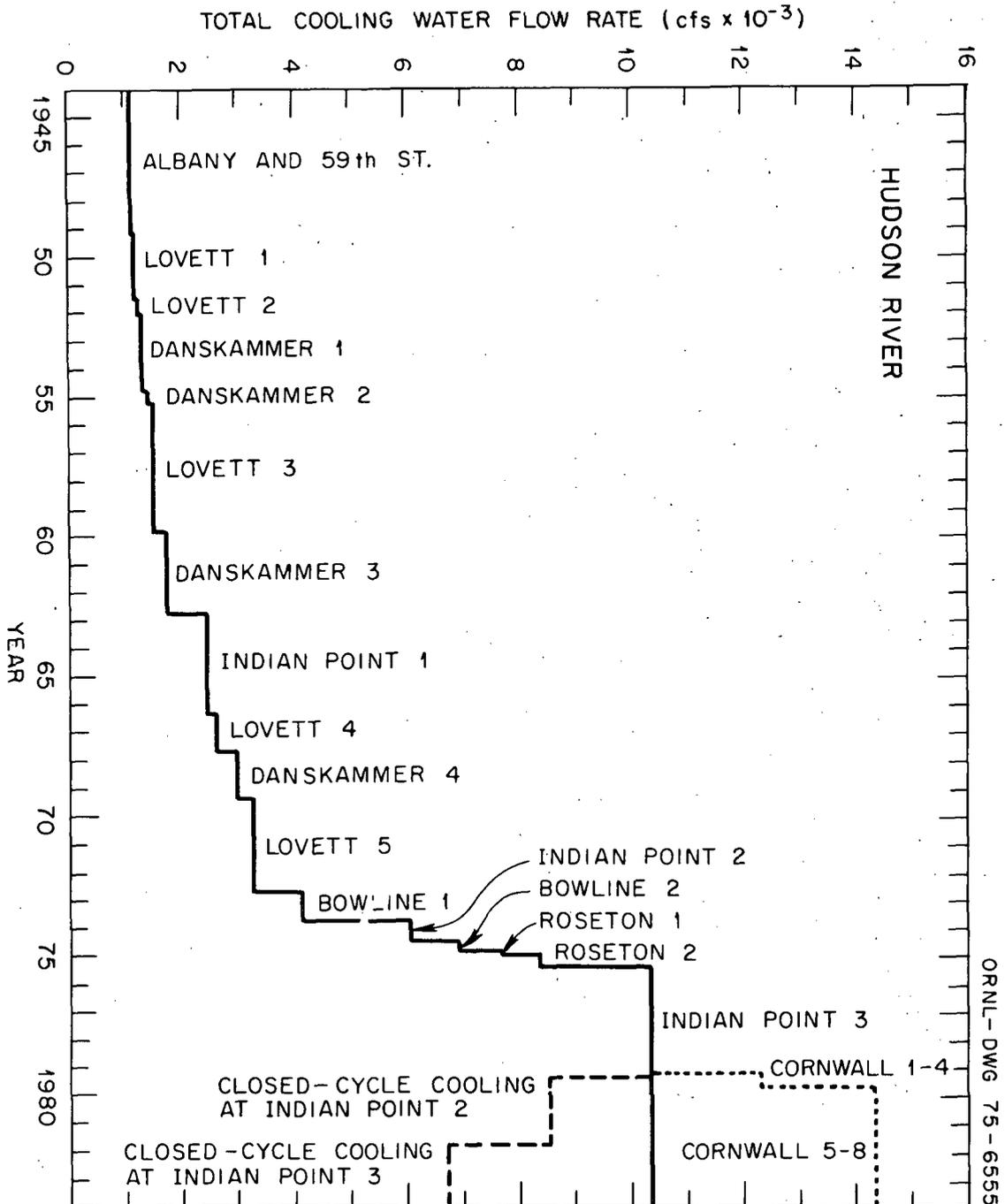


Table 1. Comparison of probability of survival from post-sac larvae to juveniles for 1973 and 1974^a

Year	Total standing crop of post yolk-sac larvae	Total standing crop of juveniles		P1 ^b	P2 ^c	$\frac{P1(1974)}{P1(1973)}$	$\frac{P2(1974)}{P2(1973)}$
		Ichthyoplankton Gear	Beach Seines				
1973	171,531,454	15,880,690	8,243,258	0.0926	0.0481	0.13	0.15
1974	326,445,620	4,053,956	2,415,500	0.0124	0.00740		

^aValues for number of organisms are taken from Appendix E of this FES, Tables B-1 and D-4.

^bP1 = $\frac{\text{Total standing crop of juveniles as estimated from ichthyoplankton gear}}{\text{Total standing crop of post yolk-sac larvae}}$

^cP2 = $\frac{\text{Total standing crop of juveniles as estimated from beach seines}}{\text{Total standing crop of post yolk-sac larvae}}$

yolk-sac larvae and juveniles was only 10-20% of the survivability in 1973. Based on the actual flow data for the various power plants for 1973 and 1974 (TI Multiplant Report, Appendix E, Tables E-1 through E-12), the cumulative intake flow during the entrainment season was 560,197,000 cubic meters in 1973 and 740,560,000 cubic meters in 1974; i.e., a 32% increase in the multiplant volume of water actually withdrawn. TI comments (Multiplant Report, p. VI-54) that the exposure indices for post yolk-sac larvae were higher in 1974 than 1973 at Bowline, Lovett, and Indian Point. TI also comments (Multiplant Report, p. VI-53) that the low juvenile abundance in 1974 (relative to 1973) suggests a decline in the population during the transition from the post yolk-sac larvae to juvenile life stages. TI does not offer any explanation of what factors, other than increased power plant mortality, might account for the difference in survivability.

Comment 2.

The staff has defined and discussed the concept of irreversibility in the Indian Point Unit No. 3 FES (pp. V-162 to V-166). In particular,

"The term irreversible (or permanent) as applied to the effect of a stress like entrainment and impingement on a population such as the striped bass has the ecological connotations of (1) biological extinction (i.e., no striped bass of any age class in the Hudson River for all time), (2) fishery extinction (i.e., such a small striped bass population spawning in the Hudson River as to be insignificant in its contribution to the sport and commercial striped bass fishery for all time), or (3) permanent reduction (but above the fishery-extinction level) in population size that continues even after the stress is removed." (IP3, FES, p. V-162)

The West Branch Conservation Association comments concerning Fig. 3-1 of the present RES (i.e., Relative Yield versus Years) "that even after cessation of once-through cooling the decline will continue." Such a time delay of three years between cessation of the power plant impact and an increase in yield to the fishery is exactly what would be expected (in fact, required) of any such life-cycle population model. Note that there is a similar three-year time delay between the initiation of power plant impact at year 0 and decrease in yield to the fishery. Both of these time delays occur because the power plants effect the zero age class, whereas fish are not recruited into the fishery until they are three-year olds. These time delays do not, in and of themselves, have any bearing on the question of irreversibility.

Comment No. 3

(a) A recent survey¹ indicates that for the first nine months of 1975 the average production costs of electrical power for nuclear fueled plants was 12.50 mills/kWhr while that for oil fueled plants was 33.88 mills/kWhr. A recent projection² of production costs in the period of 1983-85 indicates a cost of 36 mills/kWhr for nuclear and 52 mills/kWhr for oil. The staff believes that these and other similar studies justify the statement regarding the higher cost of power from oil fired plants.

(b) The full sentence regarding the difficulty of replacing power because of the derating indicates that the reason for the difficulty is that most nearby systems have their peak demand in the summer.

In addition, a comment was made concerning the staff's evaluation. The revised staff position and the discussion in Section 7.2.1 (Principal comment number 3) addresses this comment.

7.2.9 Response to comments by the Village of Buchanan

Letter (with enclosures) from Mayor George V. Begany to Robert P. Geckler, Environmental Project Engineer, dated August 27, 1976.

The first enclosure is a resolution by the Village of Buchanan Board of Trustees passed in favor of the extension of the date for cessation of over-through cooling.

¹Atomic Industrial Forum, INFO News Release, "Nuclear Power Saved 7.5 Billion Gallons of Oil, \$1.35 Billion in Costs in First Nine Months of 1975," January 1976.

²S. M. Stoller Corp., "Economic Comparison of Base-Load Generation Alternatives for New England Electric," March 1975.

The staff has, of course, been long aware of the position taken by many local residents and communities and has taken this into consideration in its evaluations (see FES related to selection of the Preferred Closed Cycle Cooling System at Indian Point Unit No. 2, NUREG-0042).

Letter from Hugh S. Gregory

The plan of action to "minimize detrimental effects on aquatic biota in the Hudson River to a practicable minimum" was submitted to the NRC in January, 1974. Various reports on results of investigations have resulted and some studies are still in progress.

The staff disagrees that it simply concurred in the selection of the NDCT as the preferred system (see NUREG-0042, cited above and Section 7.2.1 (Principal comment number 3) above. Further, the staff is of the opinion that the state of technology is such that a decision as to type of system is appropriate.

The other comments in Mr. Gregory's letter are addressed in the Responses to comments by Con Edison (Section 7.2.1) above.

Letter from William W. Shuster

Mr. Shuster's letter addresses the potential problem related to PCBs. This matter was addressed in NUREG-0042, on pages 1345, 47 and 8-27.

7.2.10 Responses to Comments by the County of Westchester

See Responses to comments by the Village of Buchanan (Section 7.2.9) above.

7.2.11 Responses to comments by the Federated Conservationists of Westchester County, Inc.

In view of the status of the proceedings (see Section 7.2.1, Principal comment number 4 above) and the change in the staff's recommendation, no response is required.

7.2.12 Response to comments by the City of Peekskill

Please see Response to comments in Section 7.2.1 (Principal comment number 3) and Section 7.2.9 above.

7.2.13 Response to comments by the Town of Cortlandt.

Please see Response to comments in Section 7.2.9 above.

7.3 STAFF POSITION

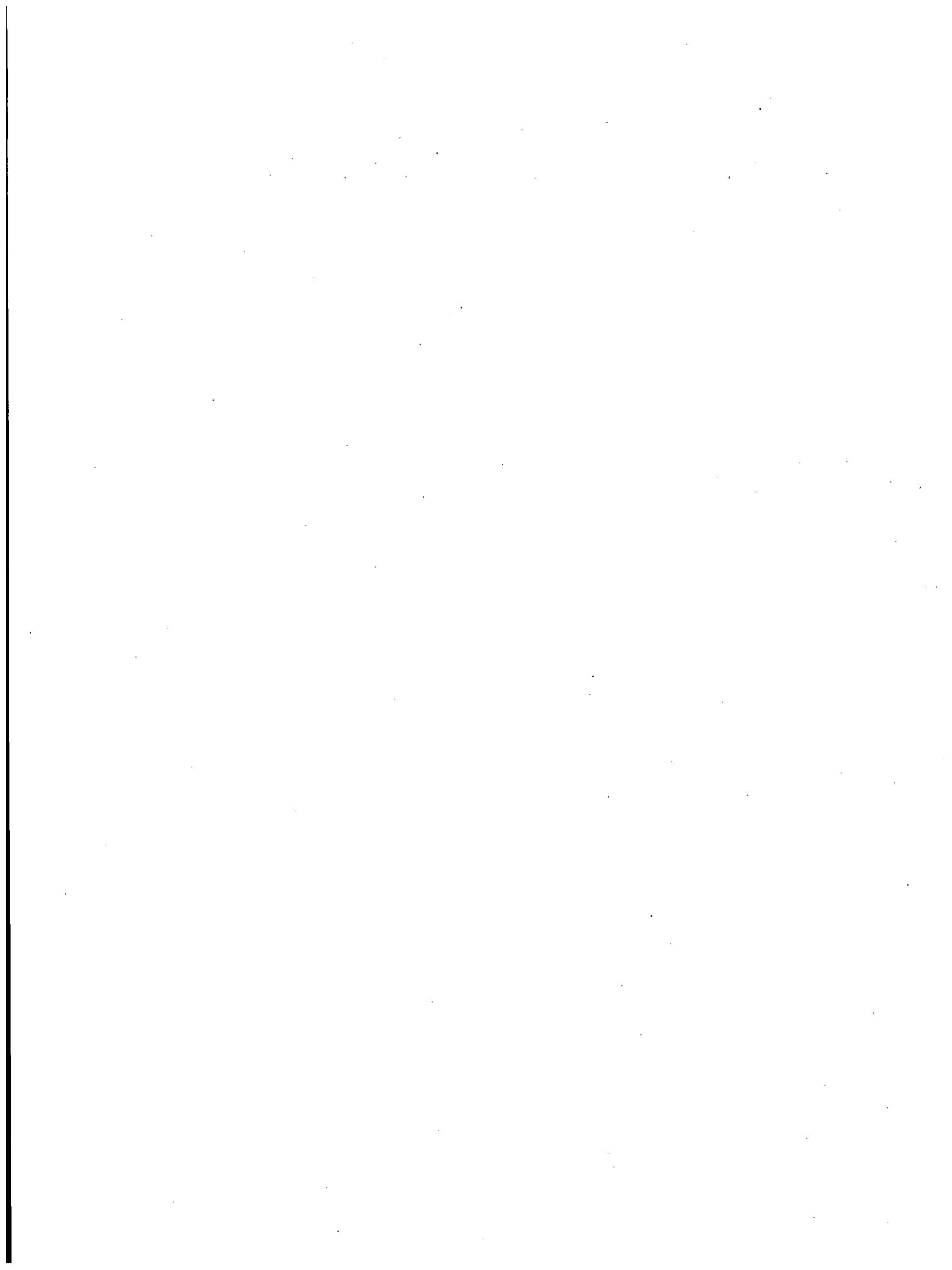
Two of the major benefits claimed for extending the cessation date for once-through cooling at Indian Point Unit No. 2 have been realized. These are 1) to pressure options as to the type of cooling system required and 2) to provide time to allow the staff and other organizations to finish ongoing studies. One year was estimated for this.

The parties to the proceedings have stipulated that a natural draft cooling tower is preferred and the evidentiary hearing are completed; the initial decision is expected before January 1977.

The significance of the ecological study program and the possibility of providing significant new data is discussed at length in Section 7.2.1 (Principal comment number 3). In this section the argument is made that more data of the type collected from 1973 through 1975 will not substantially improve the data base.

It is the staff's opinion that the probability of showing that a closed cooling system will not be required is so low that there is little risk that the expenditure of funds for construction of the tower will be unnecessary.

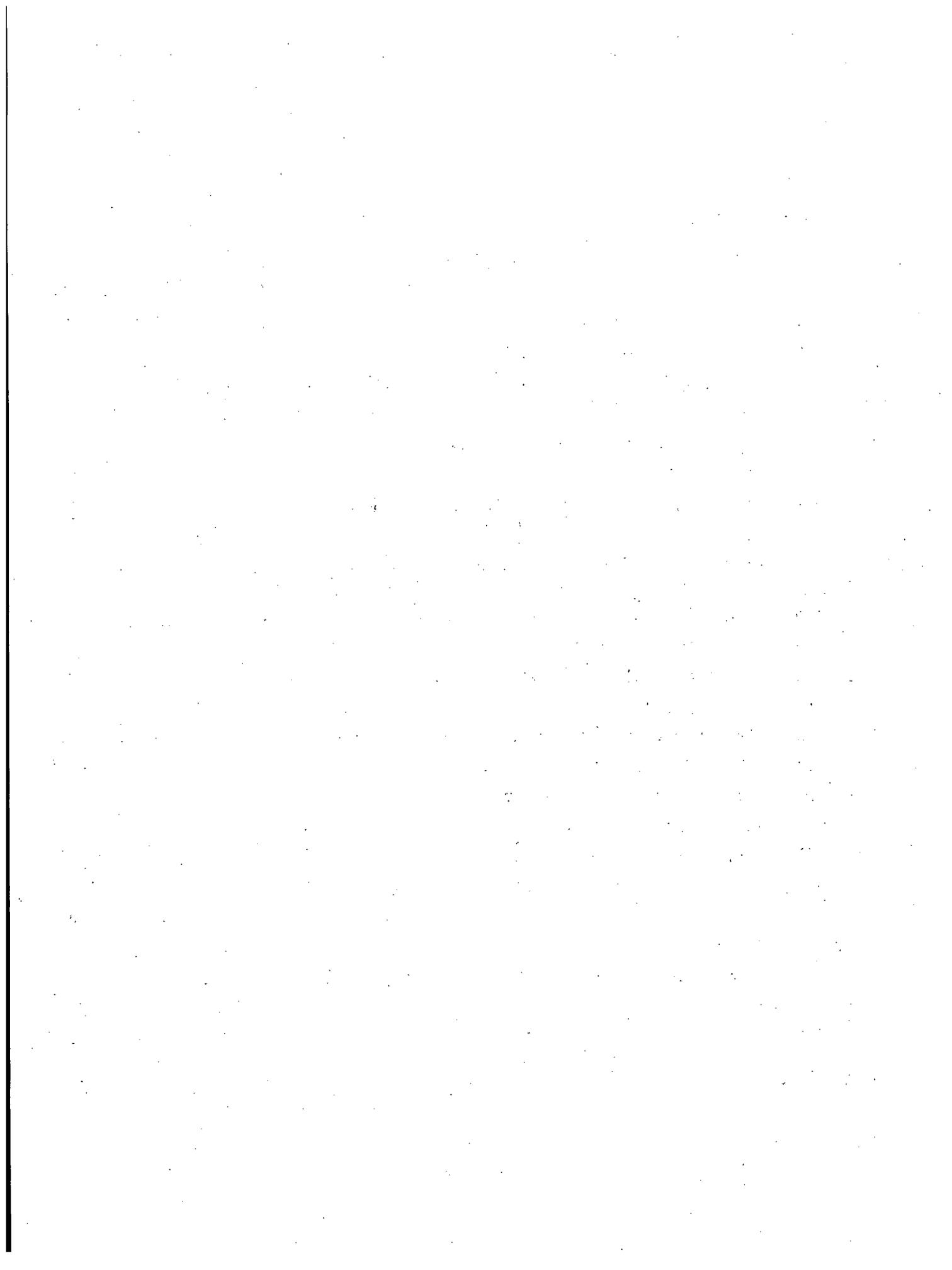
Paragraph 2.E(1) of the Facility Operating License provides for a delay in the cessation of once-through cooling should all regulatory approvals not be obtained by December 1, 1975. It is the staff's position that when the initial decision as to the type of closed cycle cooling system issues (expected before the end of 1976) the last required regulatory approval will have been granted and a new cessation date of May 1, 1980 would be established. This delay amounts to one year.



APPENDIX A

COMMENTS ON DRAFT ENVIRONMENTAL STATEMENT

Consolidated Edison Company of New York, Inc.	A-1
U. S. Environmental Protection Agency	A-10
U. S. Department of Agriculture, Soil Conservation Service.	A-13
U. S. Department of Agriculture, Agricultural Research Service.	A-13
U. S. Department of the Army, Corps of Engineers.	A-14
U. S. Department of Commerce.	A-15
National Oceanic and Atmospheric Administration National Marine Fisheries Service, Gloucester, Massachusetts	A-15
National Oceanic and Atmospheric Administration, Office of Coastal Zone Management, Rockville, Maryland	A-17
U. S. Department of Housing and Urban Development	A-18
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Hudson River Fishermen's Association.	A-28
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William J. Cahill, Jr.
Vice President

Consolidated Edison Company of New York, Inc.
4 Irving Place, New York, N Y 10003
Telephone (212) 480-3819

August 30, 1976

Director of Nuclear Reactor Regulation
Attn: Director, Division of Site
Safety and Environmental Analysis
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

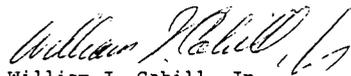
Dear Sir:

Consolidated Edison Company of New York, Inc. (Con Edison) respectfully submits its comments on the Draft Environmental Statement for extension of operation with once-through cooling for Indian Point Unit No. 2 (DES), dated July 1976, prepared by the Office of Nuclear Reactor Regulation of the United States Nuclear Regulatory Commission (the staff). These comments are submitted pursuant to the notice of the Nuclear Regulatory Commission in the Federal Register on July 15, 1976.

The comments are organized into two parts. The first contains Con Edison's principal comments on the DES. The second part contains detailed comments.

Con Edison hopes that these comments will be of use to the Office of Nuclear Reactor Regulation in preparing the Final Environmental Statement.

Very truly yours,


William J. Cahill, Jr.
Vice President

Enc.



COMMENTS ON DES

PART I - PRINCIPAL COMMENTS

1. Conclusion is Correct

Con Edison commends the staff for its conclusion that after considering various alternatives and weighing relevant factors in accordance with NEPA it has expressed a preference for a two year extension of operation of Indian Point Unit No. 2 with once-through cooling. Although this conclusion is consonant with Con Edison's application of June 1975, we consider it appropriate to point out certain significant differences between the staff's analysis and our own.

2. Additional reason for Granting License Amendment is Important

Con Edison believes that the most important benefit of the proposed license amendment will be to preserve options with respect to the necessity for constructing a closed-cycle cooling system. Although the DES refers to this benefit as a factor (p. 4-1), it does not appear to place much weight on it.

The staff's jurisdiction in this matter derives from the National Environmental Policy Act of 1969 (NEPA). One of the fundamental purposes of that Act was to avoid

unnecessary adverse environmental effects by requiring a detailed analysis of environmental impacts prior to Federal authorization of major actions. Con Edison's Ecological Study Program was designed to obtain the data required for that kind of environmental analysis prior to construction of a closed-cycle cooling system.

There is no doubt that construction of any closed-cycle cooling system results in an irrevocable commitment of resources and an environmental impact of significant proportions. We believe the staff should recognize its obligations under NEPA to review carefully the results of the Ecological Study Program and to balance the costs and benefits of closed and open cycle cooling systems before recommending irrevocable environmental impacts. Since the proposed license amendment permits the type of analysis required by NEPA, we believe the opportunity to make that analysis should be a major reason for granting the amendment.

3. Ecological Study Program is Providing Significant New Data

The DES, perhaps unwittingly, appears to give the impression that the staff has prejudged the results of the Ecological Study Program when it says (p. 3-7) that the 1975 data will not provide "a quantum jump in ability to forecast the

impact of plant operation on the Hudson River ecosystem on fish populations". This appears to ignore the enormous quantity of data that has been presented to the staff since the application for the license amendment was filed and also the nature of the study program.

The Ecological Study Program has developed a large body of data in the last few years all of which has been presented to the staff. The Detailed Comments contains a list of the reports submitted since the filing of the subject application. Reports furnished the staff to date include significant new data on the size of fish populations in the Hudson River, spawning areas, entrainment impacts, impingement impacts, the existence of compensation in striped bass populations, migratory range of the striped bass, influences of thermal discharges on biota and the characteristics of thermal plumes, and on the feasibility of a striped bass hatchery program to mitigate plant impacts.

Upon completion of the program relative to Indian Point 2 in January 1977, Con Edison intends not only to present the 1975 data but also a comprehensive analysis of the results of the Ecological Study Program and its conclusion as to impacts of power plant operation on the Hudson River ecosystem. This will be accompanied by a state of the art

benefit/cost analysis which will quantify environmental impacts to the extent possible as required by NEPA.

The accepted principles of scientific analysis and legal obligations under NEPA both preclude any prejudgment of this effort.

4. Deferral Benefits Are Not Minor

Con Edison questions the staff's conclusions that the benefits of a delay, assuming a closed-cycle cooling system is eventually constructed, are minor. The staff is aware of the fact that citizens of the communities effected by the cooling tower are deeply concerned with its impact on them. The comments of the Village of Buchanan and others on the DES for the Selection of the Preferred Closed-Cycle Cooling System reflect this deep concern. Two additional years without the adverse impacts of a closed cycle cooling system would be greatly appreciated by the community and should not be considered minor.

5. Proposed Amendment Should Include Provision for Governmental Approvals of Closed-Cycle Cooling System

The DES in its proposed amendment (p. ii-iii) has altered the terms of Con Edison's request. In particular the staff has omitted from Paragraph 2.E(1)(b) the following sentence:

"In the event the licensee has acted with due diligence in seeking all such governmental approvals, but has not obtained such approvals by December 1, 1977, then the May 1, 1981 date shall be postponed accordingly."

The Appeal Board in ALAB-188 made it abundantly clear that Con Edison cannot be responsible for the time it takes governmental agencies to act, and that it and its customers should not be penalized by regulatory delay. This applies with equal force to the new date. Con Edison believes that the changes in the license condition proposed by the staff, beyond those urged in the application, are inappropriate and inconsistent with the ground rules laid down in ALAB-188.

If the staff has based its views on the fact that the extended time should be sufficient to obtain regulatory approvals, it has failed to consider the problems which have arisen in the past year in this regard. The Village of Buchanan Zoning Board of Appeals denied Con Edison's request to build a natural-draft cooling tower. The matter is now in the State courts on appeal and this litigation is likely

to require a substantial period of additional time before a final decision can be obtained. Con Edison should not be required to proceed with construction of a cooling tower while the Village of Buchanan is continuing its legal battle on this issue.

COMMENTS ON DES

PART II - DETAILED COMMENTS

Page 1-2, section 1.4 Applicant's Basis for Proposed Extension

As discussed in Part I, a major reason for Con Edison's request for extending once through cooling is to make available enough data and analyses for an informed decision on the ecological need for closed cycle cooling. The staff's DES could have noted the fact that more information directly related to the extension issue had become available in the interval between Con Edison's application and the staff's issuance of the DES. The availability of this information supports the staff's conclusion that extension of once through cooling is merited. Furthermore, the staff could have emphasized that the information and analysis base was continually growing under Con Edison's comprehensive ecological study program. A list of reports, sent to the WRC since Con Edison's application and related to this application follows:

<u>Report Title</u>	<u>Date Sent</u>	
(1) TI (Texas Instruments Inc.) - Semiannual Progress Report for Hudson River Ecological Study in the Area of Indian Point, 1 January - 30 June 1974 (April 1975)	7/8/75	(9) TI - Bluefish Predation In The Lower Hudson River (February 1976) 3/26/76
(2) URI (University of Rhode Island) - Racial Investigation of the Striped Bass Using Critical Scale Analysis (May 23, 1975)	7/8/75	(10) NYU (New York University) - Effects of Entrainment by the Indian Point Power Plant on Biota in the Hudson River Estuary - Progress Report for 1974 (February 1976) 4/7/76
(3) UWA (UWA Engineering Pacific, Inc.) - Feasibility Study and Design Development, Striped Bass Fish Hatchery, Hudson River, N.Y. (December 15, 1974)	7/8/75	(11) NYU - The Effects of Temperature and Chlorine on Entrained Hudson River Organisms. (June 1976) 7/2/76
(4) TI - Hudson River Ecological Study in the area of Indian Point - 1974 Annual Report (July 1975)	8/4/75	(12) TI - Fisheries Survey of the Hudson River Volume IV March - December 1973 (Revised edition June 1976) 7/28/76
(5) TI - Final Report of the Synoptic Subpopulation Analysis, Phase I: Report on the Feasibility of Using Innate Tags to Identify Striped Bass (<i>Morone saxatilis</i>) from Various Spawning Rivers (September 1975)	10/22/75	
(6) SZW (Stone & Webster Engineering) - First Progress Report, Indian Point Flume Study (August 1975)	10/22/75	
(7) TI - Indian Point Impingement Study Report for the Period 1 January 1974 through 31 December 1974 (November 1975)	12/17/75	
(8) TI - Feasibility of Culturing and Stocking Hudson River Striped Bass. 1974 Annual Report (November 1975)	12/17/75	

Page 2-1, section 2.1.1. The Site, General

The plan for an 80 acre recreation area is based on the existing once through cooling system. Under the existing license the plan cannot be implemented and the size of the recreation area will have to be reduced to accomodate the cooling tower.

Dissolved oxygen (D.O.) levels in the vicinity of Indian Point are usually about 5 ppm in summer and 12 ppm in late winter, not the 3 ppm and 11 ppm the staff suggests. D.O. values of 4 ppm may occur during summer months in some areas, but generally for only very short periods of time (days). (See Fig. V-2, page V-6, Hudson River Ecological Study, 1973 Annual Report dated July, 1974 prepared by Texas

Instruments.) The Staff should use recent data, when available, in view of the improving quality of the water in the Hudson River.

Page 2-4, section 2.1.2.2 Aquatic Biota

Although the Texas Instruments report "Hudson River Ecological Study, 1974 Annual Report", dated July, 1975, does state that Hudson River tagged striped bass do move into New England waters (page 1X-6), it in no way implies that the Hudson River is a major source of the striped bass caught in New England waters.

The anadromous species listed at Section 2.1.2.2 paragraph 5 or the DES use a considerable portion of the Hudson River for spawning and/or nursery areas, and most of these species spawn considerable distances above Indian Point. It is incorrect to imply that Indian Point is a critical spawning area for these species.

Page 2-7, section 2.2.2.3 Closed-Cycle Cooling Systems

In assessing the impact on the aquatic biota of the Indian Point Plant, the staff assumed that the intake flow rate would be 4565 cfs with all three units operating with once-through cooling, and 2772 cfs with Units Nos. 1 and 3 operating with once-through cooling and with Unit No. 2 operating with closed-cycle cooling. The actual annual

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average intake flow will be significantly lower than the staff estimate because the flow is reduced by 40% when the ambient river temperature falls below 40 F (generally from December 15 to about March 31) and because the flow is reduced during the refueling outages. Accounting for flow reductions during these periods, the annual average intake flow rate would be approximately 3350 cfs with all three units on once-through cooling and only 2150 cfs with Indian Point Unit No. 2 operating with closed-cycle cooling.

Page 3-1, section 3.1, b. Terrestrial Ecosystem

Con Edison's studies have shown that operation of a natural draft cooling tower can be expected to produce cumulative visible injury to Eastern hemlock. This injury to hemlock is thought to be drought dependent only to the extent that drought will increase its severity. Injury to white ash and flowering dogwood is expected to be slight except during extended rainless periods. This injury will probably not be visible to the residents of the area unless it occurs to their ornamental specimens.

Page 3-1, section 3.2.1 Aquatic Ecosystem: Introduction

Staff fails to take into account results of TI studies of white perch and striped bass food habits in the Indian Point region which indicated that Geonvysis was not the dominant food item in striped bass, white perch and tomcod diets, and

- 5 -

alternate food sources could be utilized in the absence of Neomysis. These results are reported in the Hudson River Ecological Study - 1973, Annual Report (page IV-44) and 1974 Annual Report (page VII-26).

Page 3-2, section 3.2.2 Striped Bass

The staff has apparently declined to revise its estimate of compensation in light of Supplement II (pages VIII 1-14) to the Environmental Report to support the Extension Request. We also point out the staff's conclusion at Section 3.2.2.3 of the DES where they stated "The applicant's presentation of evidence of compensation in the Hudson River striped bass population is the most significant new information to come out of the applicant's research program since the issuance of the Indian Point Unit No. 3 FES." Accordingly we believe the staff should reassess its use of compensation in the Striped Bass Model.

Page 3-2, section 3.2.2.1 Incremental long-term Entrainment Impact on the Hudson River Striped Bass Population

Paragraph 4, and Tables 3-1, pp. 3-4, footnote 6. The staff incorporated the operations of Indian Point 1, Lovett, Danskammer, Albany Steam Station and the 59th Street Stations in Impact Analyses. Since these are older stations, their impacts, if any, have already been accommodated by the Striped Bass population, and they

therefore represent background conditions. In addition, Indian Point 1 has been inoperative since October 1974. Albany and 59th Street are well away from the areas of spawning and larval development for striped bass and consequently impart no entrainment impacts.

Page 3-6, section 3.2.2.2 Impingement of Striped Bass

We disagree with the staff's statement that its estimated annual loss of striped bass due to impingement (estimated at 31,906) is not trivial when compared to the expected juvenile standing crop. The impingement loss expressed in both numbers and weight (300 lbs.) is, in our judgement, trivial.

Page 3-6, section 3.2.2.3 Compensation

We note that the staff's position on compensation, which is similar to the one taken in the Indian Point 3 FES, i.e. willingness to accept the probable existence of compensation in the striped bass population but no acknowledgement of the need for incorporation of compensation in modeling efforts to produce more realistic estimates of impact. The meaning of "... uncontrolled density-independent mortality" is unclear, but seems to imply inaccurately that mortality caused by power plants is both unpredictable and incapable of being reduced.

Contrary to the statement in the last two lines of section 3.2.2.3, the stock recruitment analysis presented by TI provides a basis for defining the range of cropping rates which could be offset by compensatory response. The statement represents an unfounded minimization of the significance of the TI data.

Page 3-9, section 3.2.5.1 Applicant's Description of its Research Program

Figure 3.2 indicates that assessment of effects of Indian Point Unit 3 will be completed by January 1977. Because of construction delays, Unit 3 did not begin operational tests until May, 1976, and hence its effects will not be assessable until after 1977. However, predictions of plant impact based on data collected at Unit 2 will be made and presented in the January, 1977 report.

Page 4-2, section 4.1.5 Summary

The staff is incorrect in stating that a one-year delay is sufficient to obtain the improvement in the biological evaluation. The schedule requested by Con Edison calls for submittal of the biological data and analysis of power plant impacts in January 1977. In Con Edison's Environmental Report to Accompany the Application for a License Amendment dated June 1975, a schedule was presented for compliance with a May 1, 1981 date for termination of operation with

- 8 -

once-through cooling which showed completion of agency review on May 1, 1975. (Figure 1-2.) This differs from the earlier schedule for the May 1, 1979 date (Figure 1-1) in that in the new schedule Con Edison agreed to award contracts for site preparation prior to completion of agency action in order to allow more time for Commission review and recognizing that the preferred alternative system should be established by that time. A one-year delay, however, would require completion of Commission action by May 1, 1977, which would appear unrealistic.

Page 5-1, section 5.2 Greater or Lesser Extension of Time

We agree with the staff that one of the major contributions of the research programs has been analysis of yearly data going back into history. This additional data should be utilized in order to determine whether adverse impacts have in fact occurred as a result of adding power plants to the system. This was the basis of the original Indian Point study program. To date, we have no such evidence of adverse impacts occurring.

The statement asserting decreasing incremental importance of each data point is misleading. The data base on ichthyoplankton, for example, includes only one year of usable data during the 1960's and does not resume until 1973; thus for analysis of ichthyoplankton mortality, only 3

- 9 -

years of data existed for "the 1973-74 cycle of data and analysis" (1967, 1973, 1974). If these data were to be used in an assessment of compensation by correlating mortality rate with density, we would have only one (1) degree of freedom, and a correlation of 0.997 would be required to achieve significance ($\alpha = .05$). Correlations needed to achieve significance for each subsequent year of data are 0.950, 0.878, 0.811, 0.754, 0.707, 0.666. Similar situations occur for other data sets.

The historical data is not as extensive as the staff suggests and the addition of each data point is indeed very important. A further consideration is that we often must deal with more than one independent variable at a time causing us to lose even more degrees of freedom.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION II
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10007

2 SEP 1976

Mr. George W. Knighton, Chief
Environmental Projects Branch No. 1
Division of Site Safety and
Environmental Analysis
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555



50-247

Dear Mr. Knighton:

We have reviewed the draft environmental impact statement (EIS) on the Facility License Amendment for the Extension of Operation with Once-Through Cooling for Indian Point Unit No. 2. We believe the proposed amendment to be unwarranted and in conflict with EPA's decisionmaking authority. This belief is based on a careful evaluation of the proposed action in the context of the present situation, that is, actions taken to date by the applicant, Con Edison, and EPA's authority and responsibilities under the Federal Water Pollution Control Act Amendments of 1972 (FWPCA) and the National Pollutant Discharge Elimination System (NPDES).

The NPDES permit for Indian Point Units 1 and 2 was issued on February 8, 1975. It requires that Con Edison cease once-through cooling for Unit 2 by May 1, 1979 based upon Section 316(b) of the FWPCA, which requires that the intake system reflect the "best technology available for minimizing adverse environmental impact." The requirement that a closed-cycle cooling system be installed is based upon Section 316(b) and upon the "Steam Electric Power Generating Point Source Category Effluent Guidelines and Standards" (Federal Register, October 8, 1974). Con Edison has requested an adjudicatory hearing on both the closed-cycle cooling requirement and the related compliance schedule; this has resulted in a stay of these permit conditions. Con Edison has also applied to EPA for an exemption from the thermal standards pursuant to Section 316(a) of the FWPCA.

As NRC acknowledges in the draft EIS, EPA action on Con Edison's Section 316(a) and adjudicatory hearing requests "will constitute the final decision regarding closed cycle cooling at Unit No. 2" (p. 4-1). We believe that any action by NRC should await EPA's final decision, according to the regular procedures established for resolving such matters. By taking the proposed action, NRC would contradict EPA's

2

permit requirements, conflict with EPA's decisionmaking responsibility, and perhaps even prejudice the adjudicatory hearing on the closed-cycle cooling system and compliance schedule. In our judgment, the proposed action will serve no practical purpose and may even interfere with the expeditious resolution through normal channels of the questions concerning closed-cycle cooling at Unit 2.

Our detailed comments on the proposed action are enclosed. We are available to discuss these comments with you or members of your staff. Please contact the Environmental Impacts Branch at (212) 264-8556.

Sincerely yours,

Gerald M. Hansler, P.E.
Regional Administrator

9166

Detailed Evaluation of the Proposed Action

Con Edison has requested that NRC amend the facility operating license for Indian Point Unit 2 such that operation with once-through cooling would be allowed to continue for two years beyond the scheduled termination date of May 1, 1979. This date was made contingent upon Con Edison's obtaining all of the necessary government approvals by December 1, 1975. Since Con Edison has not yet obtained all of the necessary approvals, the termination date for once-through cooling is automatically postponed. Thus, the proposed amendment is not needed to compensate for inflexibility in the existing termination schedule.

The proposed amendment is itself inflexible in that it does not provide for automatic advancement or postponement of the termination date based on the date when all government approvals have been obtained. It assumes that all approvals will have been obtained by December 1, 1977. We question the rationale for not providing for earlier or later termination based on approvals because under the proposed amendment, once-through cooling could continue for two additional years even though NRC estimates that the "total delay [in obtaining approvals] will probably approximate nine months" (p. 4-1). This appears to be a good approximation since only the approvals from NRC and the Village of Buchanan have not yet been obtained. With respect to the latter, the New York State Supreme Court, Westchester County has ruled that a permit from the village is not required. However, this ruling is under appeal.

In addition, the EIS states that Con Edison may apply to NRC for a further extension of operation with once-through cooling if Con Edison thinks that the empirical data collected during this first interim period justify an extension or such other relief as may be appropriate. In sum, this means that once-through cooling at Indian Point Unit 2 may be allowed to continue beyond 1981. This would contradict the existing NPDES permit for the plant, which requires cessation of once-through cooling by May 1, 1979 based on Section 316(b). It would also confuse the issues currently under consideration by EPA: Con Edison's 316(a) request that Indian Point Unit 2 be exempted from the thermal standards and Con Edison's adjudicatory hearing request related to Section 316(b), in which Con Edison takes the position that once-through cooling is the "best technology available" for Indian Point Unit 2. Finally, it is quite possible that the amendment and any further extension granted by NRC would be rendered meaningless because, as noted on page 4-1 of the EIS, EPA action on Con Edison's 316(a) and 316(b) requests "will constitute the final decision regarding closed cycle cooling at Unit 2."

Despite all of this, the NRC staff sees several benefits in granting Con Edison's request for the amendment. The staff considers the first year of the two-year delay justified for two reasons: it will keep all... options open as to the type of closed-cycle cooling system that will be constructed, and it will allow time for an improved biological evaluation of the impact of the plant's operation, particularly its

impact on striped bass. Considering the importance that NRC attaches to these additional biological studies, the EIS should have presented a clearer and more detailed description of Con Edison's monitoring program, particularly as it relates to impingement and entrainment.

Moreover, the flow chart on page 3-9 indicates that all but one of the studies and final reports were completed as of June 1, 1976. The exception is the report on cumulative plant impacts. Since NRC apparently considers this report crucial to its analysis, a detailed discussion of its expected contents should have been presented in the EIS. As it stands, it is difficult to reconcile NRC's emphasis on the benefits of further biological evaluation with its statement on page 3-7 of the EIS:

The staff emphasizes, however, that the 1974 data do not provide and the 1975 data will not provide the basis for a quantum jump in the ability to forecast the impact of plant operation on the Hudson River ecosystem or fish populations.

or with its statement on page 6-1 of the EIS:

The extension would provide an opportunity for the review of all available information. [However,] the probability is low that such evaluation would reveal that closed cycle cooling is not required....

We are in full agreement with this assessment. It is highly unlikely that the additional data would result in a change in EPA's position on the closed-cycle cooling requirement. Since this is so and since the one report yet to be submitted will contain only refined analyses of data available in previously published reports, we find the extension of the termination date for the purpose of gathering additional data to be unwarranted.

The NRC staff considers the second year of the two-year delay justified because it will provide time for EPA to act on Con Edison's 316(a) and 316(b) requests. An exact date has not yet been set for the adjudicatory hearing requested by Con Edison on the closed-cycle cooling requirement and the related compliance schedule (although the hearing is expected to take place during the spring of 1977). To base the proposed amendment on an as yet unspecified date for the hearing is both unsound and premature. Extending the termination date for the purpose of awaiting EPA's decision on Con Edison's requests is not only unwarranted but also contradictory to the NPDES permit requirements and in conflict with EPA's decisionmaking authority. Any revision of the present compliance date will be made as a result of EPA's adjudicatory hearing.

Besides the question of whether the proposed amendment is necessary and valid, there is the question of its environmental effects. The NRC staff believes that no irreversible harm to the Hudson River ecosystem,

in particular the striped bass and other fish populations, will be caused by a two-year extension of operation with once-through cooling. We question the NRC's criterion of irreversibility; Section 316(b) of the FWPCA states that intake structures must reflect the best technology available to minimize adverse environmental impact. To say that the damage will not be irreversible is not the same as to say that it will be minimal. In fact, substantial damage could result from the two-year extension of operation with once-through cooling.

Finally, we wish to point out that NRC's reference on page 3-6 to operation of Indian Point Unit 3 with once-through cooling until 1983 contradicts the compliance date specified in the NPDES permit for Unit 3 (September 15, 1980). A 1983 compliance date also contradicts the National EPA Effluent Guidelines requirement of closed-cycle cooling by July 1, 1981.

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

U. S. Courthouse and Federal Building, Syracuse, New York 13202

Mr. George W. Knighton
Chief, Environmental Projects
Branch No. 1
Division of Site Safety and
Environmental Analysis
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555



Re: Docket No. 50-247

Dear Mr. Knighton:

We have reviewed the Draft Environmental Statement for Facility License Amendment for Extension of Operation with Once-Through Cooling for Indian Point Unit No. 2, Docket No. 50-247, dated July 1976 and have no comments to make related to SCS authorities or responsibilities.

We appreciate the opportunity to review and comment on this draft.

Sincerely yours,

Robert L. Hilliard
State Conservationist

cc: R. M. Davis, Administrator, SCS, Washington, D. C.
Dr. Fowden G. Maxwell, Coordinator, Office of Environmental Quality Activities, Office of the Sec'y, Washington, D. C.
Council on Environmental Quality, Washington, D. C. (5 copies)



AGRICULTURAL
RESEARCH
SERVICE

WASHINGTON, D. C.
20250

UNITED STATES
DEPARTMENT OF
AGRICULTURE

OFFICE OF ADMINISTRATOR

July 27, 1976

Mr. George W. Knighton
Division of Site Safety and
Environmental Analysis
Nuclear Regulatory Commission
Washington, D.C. 20555



Dear Mr. Knighton:

We have reviewed the Draft Environmental Statement related to the Indian Point Nuclear Generating Unit No. 2, Docket No. 50-247, and have no comments.

We appreciate having an opportunity to review this Statement.

Sincerely,

H. L. Barrows
Deputy Assistant Administrator

7730



7640



DEPARTMENT OF THE ARMY
 NEW YORK DISTRICT, CORPS OF ENGINEERS
 26 FEDERAL PLAZA
 NEW YORK, N. Y. 10007

IN REPLY REFER TO
 NANEN-E

24 August 1976

50-247



George W. Knighton
 Chief, Environmental Projects Branch No. 1
 Division of Site Safety and Environmental
 Analysis
 United States Nuclear Regulatory Commission
 Washington, D.C. 20555

Gentlemen:

This office has reviewed your DEIS entitled " Extension of Operation With
 Once-Through Cooling for Indian Point Unit No. 2 ".

The proposed extension of operation will not effect any area within the
 purview of the Corps of Engineers.

It should be noted, that the New York District will shortly enter into an
 Inter-Agency Agreement with the Energy Research and Development Administra-
 tion. This Agreement will permit the Oak Ridge National Laboratories to
 develop and submit to the Corps a report entitled " A Selective Analysis
 of Power Plant Operation on the Hudson River with Emphasis on the Bowline
 Point Generating Station ". This analysis will be incorporated in a Draft
 EIS the Corps is initiating for the Bowline Point and Roseten Generating
 Stations whose operation is, in part, under our regulatory jurisdiction.

A copy of this report and the Draft EIS will be submitted to your Agency
 upon its completion in the Fall 1977.

We appreciate the opportunity to review your report.

Sincerely yours

J.A. WEISS
 Chief, Engineering Division



5214





UNITED STATES DEPARTMENT OF COMMERCE
The Assistant Secretary for Science and Technology
Washington, D.C. 20230

September 2, 1976

50-247



Mr. George W. Knighton, Chief
Environmental Projects Branch No. 1
Division of Site Safety
and Environmental Analysis
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Knighton:

This is in reference to your draft environmental impact statement entitled, "Extension of Operation with Once-Through Cooling for Indian Point Unit Number 2." The enclosed comments from the National Oceanic and Atmospheric Administration are forwarded for your consideration.

Thank you for giving us an opportunity to provide these comments, which we hope will be of assistance to you. We would appreciate receiving ten (10) copies of the final statement.

Sincerely,

Sidney R. Galler

Sidney R. Galler
Deputy Assistant Secretary
for Environmental Affairs

Enclosures -- Memo from: NOAA - National Marine Fisheries Service (8-24-76)
NOAA - Office of Coastal Zone Management (8-3-76)

9116



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northeast Region
Federal Building, 14 Elm Street
Gloucester, Massachusetts 01930

AUG 30 1976

DATE : August 24, 1976

TO : Director, Office of Ecology and Environmental Conservation, EE

THRU *For Robert L. Schuler* AUG 27 1976
Associate Director for Resource Management, F3

FROM : *Wm G. Gordon*
William G. Gordon *Martin A. Bousen*
Regional Director, FNE

SUBJECT: Comments on Draft Environmental Impact Statement--Extension of Operation with Once-Through Cooling for Indian Point Unit No. 2--NRC--DEIS #7607.19

The draft environmental impact statement for Extension of Operation with Once-Through Cooling for Indian Point Unit No. 2 that accompanied your memorandum of July 14, 1976, has been received by the National Marine Fisheries Service for review and comment.

The statement has been reviewed and the following comments are offered for your consideration.

General Comments

The proposal under consideration would serve to allow the applicant a period of two additional years to operate Indian Point Unit 2 in a once-through cooling mode. Of the several factors used to assess the impact of such a decision, the most notable expounded by the Nuclear Regulatory Commission (NRC) is the claim of no anticipated irreversible impact. Irreversible impact, however, is not the primary criterion in the decision-making process under Council of Environmental Quality guidelines nor the National Environmental Policy Act. What is of significance in the analyses presented by NRC is that delaying on-line operation of a closed-cycle cooling system for two additional years will result in impingement of more than two million fishes of screenable size, and that many more million larval and early juvenile stages of the same species will be entrained. While such impacts may not be irreversible, the ability to avoid them through closed-cycle operations, already required by the license, would be a significant factor in denying the time extension. We believe the species impacted by power plant operation on the Hudson River are similar to species impacted at other sites along the northeast coast due to once-through cooling. That closed-cycle cooling would significantly reduce the impacts under consideration, as well as those cumulatively impacting the resources of the region, is to us an issue not requiring further debate.

Specific Comments

Section 2.1.2.2 Aquatic Biota

Page 2-4, 4th and last paragraphs. We are not aware of conclusive evidence which demonstrates the species in question are not farther ranging than stated. A major point for debate remains relative to the striped bass and its contribution to the Atlantic fishery. Further, alewives, blueback herring, and American shad range far at sea, being distributed along the continental shelf.

Section 2.2.2.3 Closed-Cycle Cooling Systems

Page 2-7. It is our understanding that Indian Point Unit 1 will no longer be used for commercial operation. If so, 709 cubic feet per second (cfs) should be subtracted from the total flow of 969 cfs under conditions of Units 2 and 3 in a closed-cycle mode. In effect, once-through cooling for Units 2 and 3 would require 3876 cfs, while closed-cycle operations for these units would reduce the volume of cooling water withdrawn from the river to only 260 cfs (approximately 93.3% reduction), according to the data presented. In view of the substantial difference between the alternative modes of operation, certainly the magnitude of impingement and entrainment would be substantially reduced through the use of a closed-cycle cooling system.

Section 3.2 AQUATIC ECOSYSTEM

3.2.1 Introduction

Page 3-1, 2nd and last paragraphs. We suggest that a contradiction exists. The last sentence, penultimate paragraph, states that "...no measurable indirect effect on the fish populations dependent upon these lower trophic levels for food would be anticipated." The following paragraph indicates a local reduction of Neomysis standing crop could occur depending upon the position of the salt front, and "...could result in reduced growth and survival of striped bass and white perch young-of-the-year and of other fish species in this region of the river if alternative foods are not available in sufficient abundance." Neomysis is a dominant organism in the region of the Indian Point complex. If the species is impacted through entrainment the likelihood of an alternative, equally abundant food source being available seems remote. There could, therefore, be a resultant direct and/or indirect effect.

Section 3.2.4 Comparison of the 1973 and 1974 Data on Distribution and Abundance of Young-of-the-year Life Stages of Striped Bass and Other Fish Species in the Hudson River Estuary

Page 3-7, 1st paragraph. As stated, justification for the ongoing study program seems questionable. If, in fact, the decision to order closed-cycle

cooling was based upon data already available, and the ongoing studies will not provide the basis for a "quantum jump" in ability to forecast the impact of plant operation, why, then, delay closed-cycle cooling in order to complete ongoing studies? When the statements made in the paragraph referred to are compared with those in the last paragraph of the section on page 3-8, the positions appear to be wholly contradictory.

Section 4.1.1 Benefit of Preserving Options

Page 4-1, last paragraph. We question the argument that the two-year extension will allow the Environmental Protection Agency (EPA) time to arrive at a decision following hearings on the subject of closed-cycle cooling. The argument suggests to us that the NRC's decision is not binding, nor does it have relevance to the issue. Is the EPA the final decision-maker in this instance? Which agency would make the final determination in the hypothetical case of the NRC not agreeing with an EPA decision or vice versa? Both the NRC and the EPA have determined closed-cycle cooling is the preferred mode of operation on environmental grounds. If each agency were to withhold a final decision to allow the other to continue to explore issues, we envision that an endless process of review could result.

Section 4.2 COSTS

Page 4-2. We do not agree that impingement and entrainment of millions of aquatic organisms relates to a small cost. Furthermore, we anticipate the cost of constructing a closed-cycle cooling system two years after the date scheduled will be considerably more expensive in terms of today's dollars. Inasmuch as the power industry's arguments for plant construction frequently cite the increased cost of building if delayed, we believe similar arguments are applicable in this case of postponing construction for two years.

Section 5 ALTERNATIVES

5.2 GREATER OR LESSER EXTENSIONS OF TIME

Page 5-1. We suggest that the statements contained in this section represent the best argument against a time extension. Completion of studies "...would provide but one more data point...", nor will the studies "...further substantially improve the biological data base available to the Commission or any other parties." Why, then, is completion of studies, among other things, used for justification of the two-year extension? It seems that the statements contained in the penultimate paragraph of section 5.2 are contrary to those made in the last paragraph, section 3.2.5.1, page 3-8, already alluded to.

Section 6 EVALUATION

6.1 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

See comments above for section 4.2 COSTS.



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Rockville, Md. 20852

6.3 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

See comments above for section 4.2 COSTS.

Section 6.4 BENEFIT-COST BALANCE

6.4.1 Benefits

Page 6-1. This section implies that as long as the applicant believes future data will be favorable to its position, extensions of time will be forthcoming. Furthermore, the economic benefit of the proposed action should be stated.

Section 6.4.2 Costs

We believe the increased costs of constructing closed-cycle cooling facilities two years later than scheduled should be stated.

We appreciate the opportunity provided to review the DEIS and trust our comments will be helpful to the issue under consideration. We would like six copies of the final EIS, when issued.

Date: August 3, 1976

Reply to
Attn of: CZ6

Subject: DEIS 7607.19 - Indian Point Unit #2

AUG 5 1976

To: William Aron
EE

The Office of Coastal Zone Management did not find evidence that the document had been made available to the State of New York office responsible for development of the Coastal Zone Management Program, nor does it reflect an awareness of the Coastal Zone Management Program.

We suggest steps be taken to obtain New York State Office of Planning's memo and include a discussion of the relationship of the program to the State's developing coastal zone management program.

Robert R. Kifer
OCZM



DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
NEW YORK AREA OFFICE
666 FIFTH AVENUE
NEW YORK, NEW YORK 10019

REGION II
26 Federal Plaza
New York, New York 10007

AUG 18 1976

IN REPLY REFER TO:
2.135

George W. Knighton, Chief
Environmental Projects Branch No. 1
Division of Site Safety and
Environmental Analysis
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555



50-247

Dear Mr. Knighton:

Subject: Draft Environmental Impact Statement
U. S. Nuclear Regulatory Commission
Indian Point Nuclear Generating Unit No. 2
(Facility License Amendment)

We have reviewed subject statement and we have no comments to make about the subject Draft Environmental Impact Statement on the facility license amendment for the extension of operation with once-through cooling for Indian Point Unit No. 2 for a period of two years, commencing May 1, 1979.

The opportunity for this office to review the draft environmental statement is appreciated.

Sincerely,

Joseph Monticciolo
Director
New York Area Office

cc:
Council on Environmental
Quality (5)

8570



United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

PEP ER-76/664

AUG 26 1976

Dear Mr. Knighton:

Thank you for your letter of July 8, 1976, transmitting the Nuclear Regulatory Commission's draft environmental statement for extension of operation with once-through cooling for Indian Point Unit No. 2, Westchester County, New York.

We have reviewed the subject project and have the following comment.

The draft statement does not provide sufficient reason for alteration of our previous comments on the draft environmental statement on the Selection of the Preferred Closed Cycle Cooling System at Indian Point Unit No. 2 of April 26, 1976 regarding fish and wildlife resources. A copy of this letter is enclosed.

We are concerned that the welfare of the fishery resources of the Hudson River may be jeopardized by this further delay in the termination of once-through cooling.

We hope these comments will be helpful to you.

Sincerely yours,

Ronald M. Coleman

Assistant Secretary of the Interior

Mr. George W. Knighton, Chief
Environmental Projects Branch No. 1
Division of Site Safety and Environmental
Analysis
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Enclosure



8991



United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

PEP ER-76/177

APR 26 1976

Dear Mr. Knighton:

Thank you for your letter of February 23, 1976, requesting our comments on the draft environmental statement on the Selection of the Preferred Closed Cycle Cooling System at Indian Point Unit No. 2, Westchester County, New York.

Our comments are submitted according to the format of the statement or by subject.

Selection of Cooling Tower Design

An excellent review has been made of the relative merits of different cooling tower designs by the NRC staff which leads to the general conclusion that any of the systems could achieve the cooling function satisfactorily but with different costs, design requirements, and aesthetic impacts. Although the NRC staff has concurred in the applicant's selection of the NDCT as the preferred cooling tower design, the draft statement appears to lack a clear cut summary of reasons why the NDCT is the design of preference for the NRC staff as well as the applicant. The section on Evaluation of Program Activities, page 7-1, could appropriately be expanded in the final statement to summarize the reasons why the NDCT is preferred.

On page 3-14, the NRC staff notes that smaller sizes of natural draft towers could be possible for the site. This possibility is not evaluated further in the statement but would seem to merit further consideration if the visual impacts could be lessened through this means.

The NRC has made a commendable effort to project the future viewscape with the cooling towers in operation, through photographic exhibits. Although the draft statement indicates that local viewpoints have been solicited, we believe the review process will be enhanced if all local parties having a prime concern in the aesthetic



Save Energy and You Serve America!



impact of the cooling towers have had the benefit of these projected views. It would seem appropriate for the final statement to indicate to what extent these views have been made available for local comment.

Cooling Tower Impacts on Parks, Recreation Areas, and Historic Sites

Since various recreation facilities, parks, and historic sites are located within fifteen miles of the cooling towers, the impacts could best be discussed by proceeding radially outward from the cooling towers and identifying each park, recreation area, or historic site with an evaluation of visual impacts in each case. This would provide a better appraisal of the aesthetic impact of the cooling towers on recreational areas and historic sites than is now evident from the draft statement.

Parks at Plant Site

Page 5-39 mentions plans for a natural park area at the plant site and notes that the cooling towers will impact on the 80 acres designated for this purpose. If these plans had been discussed in another environmental statement, this should be referenced. Otherwise, the proposed park should be discussed in more depth, describing the facilities to be offered (parking, restrooms, picnicking), who could use it, and when it would be opened.

Cultural Resources

No mention is made in the draft statement to indicate that cultural resources at the construction site have been considered. The final statement on Indian Point Unit No. 3 indicated that contact had been established with the State Historic Preservation Officer and the National Advisory Council on Historic Preservation. The final statement for the closed cycle cooling system on Unit No. 2 should indicate what measures were taken as a result of these contacts and whether the previous arrangements adequately cover cultural resources in the cooling tower area for Unit No. 2.

To assure that the archeological potential in the area to be excavated is properly appraised, we recommend contact with the State Archeologist, Dr. Robert Funk, New York State Museum and Science Service, Albany, New York 12224.

Disposal of Excavated Materials

Construction of the proposed cooling system would require excavation of approximately 700,00 cubic yards of rock and unconsolidated material (page 3-4, paragraph 3.3). The only information on disposal of the excavated material is the statement that "the beach of Lent's Cove could also be used for delivery and disposal of material" (page 3-9, paragraph 1). However, no information is provided on the ultimate disposal site proposed for the excavated material, or on related environmental impacts. The present use of the beach at Lent's Cove is not discussed. The final statement should adequately address these matters.

Ground Water

Locations of the wells (page 5-68) should be shown on one of the maps, and typical magnitudes of rates of infiltration in areas of ground-water use should be provided. An indication of relations between the rate of water-table change and precipitation or other evidence of infiltration potential is needed for full impact evaluation.

Fish and Wildlife

Although we generally support the conclusions and recommendations contained in the environmental documentation, we are concerned that the differences in evaluation made by the NRC staff and the applicant could cause delays in the licensing process and interfere with the established schedule which requires termination of once-through cooling by 1979. The welfare of the fishery resources of the Hudson River should not be jeopardized by any delays which could be avoided. The final statement should give assurance that this schedule will be maintained.

Specific comments according to section and page are as follows:

Section 3.4.3, page 3-10: Asbestos fibers have been found to be carcinogenic to fish and humans. In view of recent adjudicatory hearings which have highlighted the potential hazards of Hudson River polychlorinated biphenyls (PCB's) to human health, we recommend that NRC require the use of wooden or plastic components (rather than asbestos-cement) in cooling towers at Indian Point.

Section 3.5.1, page 3-13: We support the staff's recommendation that the applicant use amertap balls, rather than chlorine, to clean the tubes in the condenser. This would greatly reduce the adverse effects of residual chlorine discharges on Hudson River biota, especially egg, larval, and juvenile fishes.

Section 5.1.3.3, pages 5-8 to 5-27: We commend the staff on its application of the ORFAD drift model to the Indian Point Unit No. 2 situation. The staff's modified ORFAD model represents a substantial improvement over the applicant's model. However, the credibility of staff conclusions is limited by the availability of only one year of on-site meteorological data. The staff should make additional model runs using more recent data, as they become available. These should include observations of on-site fog and cloud cover. Additional runs will enable the staff to better define the variability of local meteorological conditions and refine its predictions concerning salt deposition and botanical damage.

Figures 5-4 and 5-19 should be improved in the final statement for the following reasons:

1. It is unclear what scale (units) was used to denote radial distances from the cooling towers.
2. It is very difficult to read and properly interpret the estimated rates (salt deposition, fog, ice) in the immediate vicinity of the cooling towers.
3. The use of the index from one to five to indicate decreasing rates (salt deposition, fog, ice) is potentially confusing. Index values should increase as the estimated rates increase.

Section 5.5.2, pages 5-28 to 5-38: The staff has pointed out that the applicant's experimentally determined threshold for salt deposition (on hemlock, dogwood, and ash) may be in serious error (i.e., too low) for at least two reasons:

1. The possibility that trees in experimental chambers may have been affected by two pathways--gravitational deposition on leaf surfaces and entry of salt particles into stomata.

2. The importance of dose rates as opposed to total dose has not been conclusively demonstrated to be the critical factor causing damage.

In view of these potential errors and the importance of establishing accurate values for damage thresholds, and the dependency of overall environmental impact assessment on these thresholds, we recommend that NRC require the applicant to conduct more extensive and technically sound experiments designed to resolve the potential errors mentioned above. Unless these problems are resolved, there will continue to be a difference of opinion as to whether the botanical impacts are of primary concern or whether the aesthetic impacts are more important.

We hope these comments are helpful to you.

Sincerely yours,



Deputy Assistant Secretary of the Interior

Mr. George W. Knighton, Chief
Environmental Projects Branch No. 1
Division of Site Safety and
Environmental Analysis
Nuclear Regulatory Commission
Washington, D. C. 20555



UNITED STATES
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
WASHINGTON, D.C. 20545

SEP 14 1976

50-247

Mr. George W. Knighton, Chief
Environmental Projects Branch No. 1
Division of Site Safety and
Environmental Analysis
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555



Dear Mr. Knighton:

This is in response to your transmittal dated July 8, 1976, inviting the U.S. Energy Research and Development Administration (ERDA) to review and comment on the Commission's draft environmental statement for the facility license amendment for extension of operation with once-through cooling for Indian Point Unit No. 2.

We have reviewed the statement and have determined that the proposed action will not conflict with current or known future ERDA programs and, therefore, have no comments to offer.

Thank you for the opportunity to review this statement.

Sincerely,

W. H. Pennington
W. H. Pennington, Director
Office of NEPA Coordination

cc: CEQ (5)

FEDERAL POWER COMMISSION
WASHINGTON, D.C. 20426

IN REPLY REFER TO:

August 9, 1976

50-247

Director, Division of Site Safety
and Environmental Analysis
U. S. Nuclear Regulatory Commission
Washington, D. C. 20444



Dear Sir:

I am replying to your request for comments on the Draft Environmental Impact Statement for a two-year extension of operation with once-through cooling for Indian Point Unit No. 2.

Our review concentrated basically on those areas of the electric power and natural gas industries for which the Federal Power Commission has jurisdiction by law, or where the staff has special expertise in evaluating environmental impacts involved with the proposed action. It does not appear that there would be any significant impacts in our areas of concern nor serious conflicts with Federal Power Commission responsibilities should this action be undertaken.

Thank you for the opportunity to review this statement.

Sincerely,

A. Stewart Holmes

A. Stewart Holmes
Acting Advisor on
Environmental Quality



81



Peter A. A. Berle
Commissioner



-2-

September 30, 1976

United States Nuclear
Regulatory Commission
Washington, D.C. 20555

Attention: Director, Division of Site Safety
and Environmental Analysis

Dear Sir:

The State of New York has completed its review of the U.S. Nuclear Regulatory Commission "Draft Environmental Statement for Facility License Amendment for Extension of Operation With Once-Through Cooling for Indian Point Unit No. 2", issued in July 1976. In preparing the comments, we have taken into consideration the views of interested State agencies including the attached views of the NYS Public Service Commission (PSC).

The State considers the DES inadequate to justify a two year extension for operating with once-through cooling at Indian Point 2.

1. The central issue is whether or not

"empirical data collected during this interim operation justifies an extension of the interim period or such other relief... The filing...in and of itself shall not warrant an extension..."
[Section 1.2.(1).(c)]

The central issue of the DES is not whether the Hudson River will be protected from any significant adverse impacts during an extension period (although this is a critical consideration).

The DES does not offer anything but generalities (3.2.5.1) in concluding that

"the applicant's research program may provide additional relevant results".

Any appraisal of the justification for an extension should be based on the specifics of what data or analyses of high level relevancy to the central issue would become available during an extension period, not obtainable prior to an extension period. No such case is made in the DES. Moreover, the statement in 5.2 that

"more data of the type collected from 1973 through 1975 will not substantially improve the biological data base available to the Commission or any other parties"

seem to be a refutation of the value of any extension even though that statement was offered in discussing viability of an alternative of extension beyond the two years proposed.

In Section 1.4, the DES states that the applicant

"believes a substantial possibility exists that the completed research study program and report (on or about January 1977) will provide a sufficiently improved data base that reanalysis will demonstrate that a closed cycle cooling system will not be required for Indian Point Unit 2..."

In 3.2.5.1 there is reference to several studies by other utilities, Department of Environmental Conservation, Power Authority of the State of New York and Inter-Utility Coordinating Committee to the effect that a first year's extension will allow completion of such research studies

"aimed at providing a more complete and sound scientific basis for a reasoned decision than was available at the end of 1974".

The DES fails, however, to specify how new data to be generated or how analyses of new or old data have direct relevancy to the focal issue of whether or not the established decision that closed cycle cooling is required might be set aside.

In summary, in failing to show what biological information, with relevancy, would become available as a result of an extension, there is failure to justify an extension for the purpose of introducing new biological evidence.

10096

- The State concurs with the DES that applicant's analyses of compensation (3.2.23) had not removed concern for the long-term consequences of protracted and uncontrolled density-independent mortality.

Moreover, the State has previously expressed concern about the quality of the data base and methodology used in the applicant's analyses of compensation. Further examination of both aspects should be made by staff prior to acceptance of the magnitude of compensation and of subsequent use in population analyses.

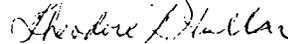
- The State recognizes Paragraph 2.E.(b) of Amendment No. 6, May 6, 1974, is clear in specifying that postponement of the May 1, 1979 date will occur, should the applicant, after due diligence in seeking all governmental approvals, not have obtained such approvals by December 1, 1975 (1.2).

The problems with respect to obtaining required governmental approvals in relationship to key time schedule deadlines are not clearly defined and should be. No explanation is given as to the sources or reasons for delays that justified postponing the May 1, 1979 date for six months or why a probable further extension for three more months (4.1.1) is anticipated. Further, no substantive evidence is presented to allow estimations of prospects, durations and consequences of still further delays.

This problem should be discussed and put into a time frame reflecting various possibilities and contingencies. One such consequence that should be addressed in any event is the effect of any change in the May 1, 1979 deadline for cessation of once-through cooling on Indian Point 2 on the May 1, 1980 deadline for Indian Point 3.

Thank you for providing the State the opportunity to comment on this Draft Environmental Statement.

Sincerely yours,



Theodore L. Hullar, Ph.D.
Deputy Commissioner for
Programs and Research

cc: C. Simian
A. Kahn, PSC

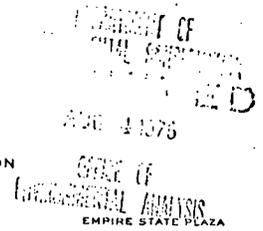
Attachment



STATE OF NEW YORK
PUBLIC SERVICE COMMISSION
ALBANY

ALFRED E. KAHN
CHAIRMAN

August 3, 1976



Dear Mr. Curran:

The staff of the Public Service Department has completed its review of the "Draft Environmental Statement for Facility License Amendment for Extension of Operation with Once-Through Cooling for Indian Point No. 2" (Docket No. 50-247). I send you our comments, as requested by Dr. Seymour's memorandum of July 20. I assume they will be incorporated into a consolidated New York State Atomic Energy Council position, which you will transmit to the NRC.

We support the position that a two-year extension of once-through cooling (until May 1, 1981) is the best of the courses of action being considered, because we agree with the conclusion in the Draft Environmental Statement that "the incremental long-term impact on the Hudson River ecosystem, the striped bass and other fish populations in particular, due to a two-year extension of operation with once-through cooling for Indian Point Unit No. 2 is not expected to be large and has essentially no risk of being irreversible."

We suggest that the impact analysis portion of the DES be expanded to include the following two items of evidence, which support this conclusion:

- The improvement of the water quality in the upper Hudson River has already enhanced the reproductive potential of important fish species. Monitoring at the Albany Steam Station, for example, demonstrates that the size and diversity of the fish population has increased significantly in recent years. This increase

Mr. Terrence P. Curran -2- August 3, 1976

in the density and range of various fish species in the Hudson reduces the proportional impact of impingement and entrainment of fish at the Indian Point facility on the overall Hudson River ecosystem.

2. Since there has been only a limited relaxation of the recent prohibition of commercial and sport fishing in the Hudson River by DEC, because of PCB contamination, the population of many fish species is expected to increase; this will serve to offset any losses associated with once-through operation at Indian Point No. 2.

We suggest also that the discussion of the striped bass models in the DES would benefit from a more comprehensive explanation of the models in question -- e.g. an explanation of the differences between the NRC and Con Edison models, and of the analytical consequences of these differences. Also, we note that the DES has avoided putting monetary values on the striped bass losses that will be experienced absent the installation of cooling towers in 1979. We strongly urge the NRC staff and the applicant to review a report "Power Plants and Estuaries at Crystal River, Florida: An Energy Evaluation of the System of Power Plants, Estuarine Ecology, and Alternatives for Management," by Howard T. Odum et al, May 1975, prepared at the University of Florida for the Florida Power Corporation and various governmental agencies concerned with the question of retrofitting cooling towers at Crystal River, Florida. The report provides a method that might be useful in objectively calculating the costs and benefits associated with the alternative courses of action offered at Indian Point 2. We particularly recommend Appendix B - "Energy Cost-Benefit Approach to Evaluating Power Alternatives."

If you have any questions on these comments, please address them to Alfred F. Meyer, of our Office of Environmental Planning.

Sincerely,
Alfred E. Kahn
Alfred E. Kahn

Mr. Terrence P. Curran, Director
Office of Environmental Analysis
NYS Dept. of Environmental
Conservation
50 Wolf Road
Albany, New York
cc: Dr. William E. Seymour



STATE OF NEW YORK
EXECUTIVE DEPARTMENT
DIVISION OF THE BUDGET
ALBANY 12224

PAUL J. ELSTON
DEPUTY DIRECTOR

Regulatory Docket File

July 16, 1976

Mr. George W. Knighton, Chief
Environmental Projects Branch No. 1
Division of Site Safety
and Environmental Analysis
Nuclear Regulatory Commission
Washington, D. C. 20555

Re: Docket No. 50-247

Dear Mr. Knighton:



A draft environmental statement related to the facility license amendment for the extension of once-through cooling for the Indian Point Nuclear Generating Unit No. 2 of Consolidated Edison Company of New York has been referred to the Division of the Budget. After careful review, we found that the abovementioned project does not significantly affect State finances, has no appreciable affect on State Administration, and that this office lacks the technical expertise to make a valid recommendation on the impact statement.

In addition, we note that the Energy Research and Development Administration, the State Historic Preservation Officer, and the Department of Environmental Conservation have also been asked to comment on this statement. We believe their comments will more adequately present New York State's position.

We therefore have no further comment on the draft statement.

Sincerely,
Paul J. Elston

6323

COMMENTS BY THE NEW YORK STATE
ATTORNEY GENERAL ON THE

DRAFT ENVIRONMENTAL STATEMENT
for Facility License Amendment

FOR

EXTENSION OF OPERATION WITH
ONCE-THROUGH COOLING FOR
INDIAN POINT UNIT NO. 2

by the

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

Docket No. 50-247

September 30, 1976

LOUIS J. LEFKOWITZ
Attorney General of the
State of New York
Two World Trade Center
New York, New York 10047
Tel. (212) 488-3474

PAUL S. SHEMIN
Assistant Attorney General

PETER SKINNER
Environmental Engineer

10108



The Attorney General of the State of New York does not believe that the Commission should grant Con Edison's request for a facility license amendment extending the operation of Indian Point 2 with once through cooling.

The Attorney General's opinion is based on an examination of the details of Con Edison's submission in support of its application, and on the nature of the information submitted by the Company. Despite Con Edison's constant references to the ALAB-188 opinion as finding Con Edison's model right and the AEC Staff model wrong, the hearings on Con Edison's original application made it clear that, but for the dispute over compensation and "f" factors, the fishery damage predicted by Con Edison and by everyone else would be of the same general magnitude.

Thus, in giving Con Edison the right to come back in the future with new evidence, all the Licensing Board and the Appeal Board were talking about was new evidence as to the significant issues in dispute. In considering Con Edison's current request for an extension, therefore, the crucial question to be asked is what will the remainder of Con Edison's study program tell us about compensation and "f" factors?

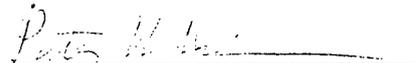
Our analysis leads us to conclude that Con Edison will not be able to develop any new data regarding these two issues during the remainder of its never-ending study program.

Indeed, its multi-plant report for 1975 presented data in support of its compensation argument which was previously available to the Company, but was never offered in evidence.

Nowhere in its papers in support of its application on Edison explain how the extension will permit it to or analyze new data for the purpose of resolving the compensation and "f" factor disputes. In the absence of any such information, we believe the Commission should not look any further. Data for data's sake, at the expense of Con Edison's ratepayers, has been the name of the game for the Company and its consultants. The Attorney General believes that Con Edison should be required to explain in detail exactly how it hopes to use its new data and analysis to support its compensation and "f" factor arguments.



PAUL S. SHEMIN
Assistant Attorney General



PETER N. SKINNER, P.E.
Environmental Engineer

Natural Resources Defense Council, Inc.

15 WEST 44TH STREET
NEW YORK, N.Y. 10036

212 869-0150

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DOCKET NUMBER

PROD. & UTIL. REG. 50-28

RELATED CORRESPONDENCE

August 27, 1976

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917 15TH STREET, N.W.
WASHINGTON, D.C. 20005
202 737-5000

Western Office
2345 YALE STREET
PALO ALTO, CALIF. 94306
415 327-1080

U. S. Nuclear Regulatory Commission
Attn: Director, Division of Site Safety
and Environmental Analysis
Washington, D.C. 20555

Dear Sir:

Enclosed are three copies of Comments of the Hudson River Fishermen's Association on the Draft Environmental Statement for Facility License Amendment for Extension of Operation with Once-Through Cooling for Indian Point Unit No. 2.

Yours sincerely,

Sarah Chasis
Sarah Chasis, Esq.

SC:ps

Encs.



COMMENTS OF THE

HUDSON RIVER FISHERMEN'S ASSOCIATION

On The

DRAFT ENVIRONMENTAL STATEMENT

FOR FACILITY LICENSE AMENDMENT

For

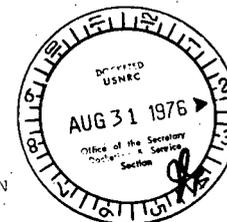
EXTENSION OF OPERATION

WITH ONCE-THROUGH COOLING FOR

INDIAN POINT UNIT NO. 2

UNITED STATES NUCLEAR REGULATORY COMMISSION

By: SARAH CHASIS, ESQ.
(Natural Resources Defense
Council, Inc.)
15 West 44th Street
New York, New York 10036



August 27, 1976

Introduction

The Hudson River Fishermen's Association is a non-profit association composed of approximately 750 members who actively fish the Hudson River, its tributaries and the coastal waters whose fisheries are dependent on the Hudson River's breeding and nursery ground. The purpose of the Association is to foster intelligent use of these waters and to protect and enhance the fishery resources. To this end, HRFA has been an intervenor in the licensing proceedings for both Indian Point 2 & 3 and has successfully sought and obtained license terms requiring closed-cycle cooling at both units. HRFA is also an intervenor in the license amendment proceeding for extension of operation of Indian Point Unit No. 2 with once-through cooling.

HRFA is deeply disturbed by the NRC Staff's recommendation that the applicant's proposed license amendment be granted, giving Con Edison a two-year extension until May, 1981 for operation of Indian Point Unit No. 2 with once-through cooling. The May 1, 1979 date for cessation of once-through cooling, as required by the present license for Indian Point Unit No. 2, was finally established after years of litigation and unsuccessful attempts by Con Edison to justify the exact same date the NRC Staff now propose accepting, i.e., May 1, 1981. The biological information presented by Con Edison in

support of its application no more justifies the 1981 date than the information that existed prior to the issuance of the license for Indian Point Unit No. 2. Nor is the information to be compiled by Con Edison in the future likely to provide conclusive answers to the major issues concerning the impact of once-through cooling, according to the NRC Staff itself. There is, therefore, no scientific justification for granting the extension.

Con Edison's rationale for the two-year extension is that data relevant to the need for closed-cycle cooling may be forthcoming. It must be remembered that Con Edison has had eleven years, since the Hudson River Fisheries Investigation was initiated in 1965, to collect data and present proof in support of its argument that closed-cycle cooling is not required at Indian Point 2. The licensee has been unable to make its case to date and still cannot do so.

It is time to put an end to the licensee's strategy of endless delay aimed ultimately at complete elimination of the closed-cycle cooling requirement. It is this agency's responsibility to uphold the license condition it imposed in the public interest and pursuant to the mandate of the National Environmental Policy Act.

The Draft Environmental Statement issued in support of the amendment is shockingly deficient. It provides no good rationale for granting the requested extension. The principal reason for the extension appears to be the NRC Staff's desire to let EPA take responsibility for insuring that closed-cycle cooling is required at Indian Point 2. This rationale is unacceptable. The NRC has its own duties under NEPA, separate from EPA's under the Federal Water Pollution Control Act Amendments. It may not shirk its responsibility. The DES is inadequate in that there is no analysis of the effect of the two-year deferral on the date for cessation of once-through cooling at Indian Point Unit No. 3, although such an impact would clearly result from the granting of the extension. Furthermore, the DES has limited itself to an analysis of only the "irreversible" impacts on the environment flowing from the two-year extension, though NEPA requires disclosure and consideration of all impacts, whether irreversible or not. There is no attempt to quantify the extent of the harm to the environment, either short-term or long-term.

Perhaps most distressing is the overall tone and quality of the DES. It is an embarrassment to the NRC, which has previously produced the highest quality EIS' related to Indian Point 2 & 3. The low priority this DES very clearly

received is inexcusable in view of the NRC's extensive commitment of time and resources over the last five or six years to analysis and mitigation of the significant environmental impacts resulting from operation of the Indian Point plants. In HRFA's opinion, this DES must be drastically revised in order to comply with NEPA.

History

After extensive proceedings, the U. S. Nuclear Regulatory Commission, acting pursuant to its mandate under the National Environmental Policy Act and the Atomic Energy Act, ordered that the existing Indian Point Unit No. 2 generating station could not operate after May 1, 1979 with a once-through cooling system. NRC Facility Operation License No. DPR-26, Amendment No. 6, issued on May 6, 1974.

The basis for the license amendment was the extensive record supporting the conclusion that the Indian Point plants pose an unacceptable environmental risk to the life and fishery of the Hudson River. The plants' three units withdraw for cooling purpose more than two million gallons of Hudson River water per minute. Such withdraws have disastrous impacts upon the River. At least one million fish a year are impinged upon the screens in front of the intake structures.

Worse, millions of eggs and larvae are entrained into the plant where they are affected by sudden pressure temperature and chemical changes, and mechanical abrasion. The Indian Point plants, along with other power plants along the lower Hudson River could potentially kill from 34% to 50% of young-of-the-year of the striped bass population.

Massive withdrawals of water can be eliminated by installation of a closed-cycle cooling system. Installing closed-cycle cooling at Indian Point Unit No. 2 alone will reduce the single unit's withdrawal of water from 870,000 gallons per minute to 30,000 gallons per minute. Based upon such evidence the NRC ordered the cessation of once-through cooling at Indian Point Unit No. 2 by May 1, 1979 and installation of a closed-cycle system.

Throughout the licensing proceeding for Indian Point 2, Con Edison repeatedly argued for a May, 1981 date for cessation of once-through cooling on the grounds that such a date would give the utility an opportunity to complete its research program. This position was thrice rejected by the NRC.

In its proposed findings of fact to the Licensing Board, Con Edison requested that 1981 be set as the date for cessation of operation with once-through cooling. The Licensing Board denied this request and set May 1, 1978 as the

date. On its appeal from the Licensing Board's decision, the Company again requested the same relief. The Appeal Board modified some of the critical findings of the Licensing Board,* but found that even under facts more favorable to Con Edison, once-through cooling must cease by May 1, 1979, a date which did not allow for completion of the research program prior to initiation of construction of a closed-cycle cooling system. Con Edison again sought to have this date modified in its petition for rehearing of the Appeal Board's decision. This was denied.

Thus Con Edison has had three bites at the apple. The rationale for its present application has been fully litigated before. On a record such as this, it must be demonstrated to obtain the requested amendment that there is:

- new data which leads to findings different from those found by the Appeal Board.
- these findings compel a different resolution as to the appropriate cessation date.

*The full Commission subsequently found that the criticisms raised by the Appeal Board had been adequately dealt with in the PES for Indian Point Unit No. 3. In re Consolidated Edison (Indian Point Unit Nuclear Generating Station, No. 3), Docket No. 50-286 (Dec. 2, 1975).

Neither the Applicant's submissions nor the DES support such a conclusion. Where as here the issue has already been determined once with finality, the question of the appropriate cessation date should not be reopened without new and persuasive evidence. The DES in fact makes clear that it considers this not to be the case.

Specific Comments

Improvements in Biological Evaluation. According to the applicant, the chief benefit to be derived from the two-year extension is the achievement of a substantial improvement in the biological data base through completion of its research program. See Con Edison's Environmental Report to Accompany Application for Facility License Amendment, Sections 1.2 and 4.1.1, pp. 1-3 and 4-1 to 4-6. The DES concludes that, at least a one-year extension is justified to obtain improvement in the biological evaluation. DES, Section 4.1.5, p. 4.2.

While additional data and analyses may be relevant, in order to justify a two-year extension, it must be shown that these data and analyses will provide answers to questions critical to the determination of once-through versus closed-cycle cooling. The DES, however, openly admits that such a consequence is unlikely to be the case. The NRC Staff quotes approvingly its earlier conclusion in the FES for Indian Point Unit No. 3:

"If there is to be a quantum jump in ability to forecast the impact of plant operation on the Hudson River ecosystem (and on the striped bass young-of-the-year population in particular), as a result of the extensive TI, NYU, and QLM environmental studies presently scheduled to be completed by January 1, 1977 (Fig. V-19), that quantum jump will be based primarily on the 1973-74 cycle of data and analysis. (FES, IP-3, p. V-209)." DES, Section 5.2, p. 5-1.

These 1973 and 1974 data which have already been presented to the NRC staff in support of the extension, have led to the following significant conclusions:

"The Staff has found no new information in the applicant's Environmental Report for a two-year extension that requires changes in the Staff's young-of-the-year striped bass model as applied to the 1973 data." Section 3.2.2, p. 3-2.

"However, the applicant's analyses [of compensation] do not remove the Staff's concern for the long-term consequences of protracted and uncontrolled density-independent mortality, such as the cropping imposed by power plants, since the range of cropping rates which could be offset by compensatory responses, and the degree of offset, are not known." Id.*

* Nor will the further studies of Con Edison to be completed by Jan., 1977, provide answers to these critical questions. As the NRC Staff itself indicated in the FES, IP-3, p. V-143, Con Edison has not and will not be able to quantify the degree of natural compensation.

"The Staff emphasizes, however, that the 1974 data [on distribution and abundance of young-of-the-year life stages of striped bass and other fish species] do not provide and the 1975 data will not provide the basis for a quantum jump in ability to forecast the impact of plant operation on the Hudson River ecosystem or fish populations.
Section 3.2.4, p. 3-7. (emphasis supplied).

The above quotes dramatically underline the fact that after over eleven years of research, the applicant has been unable to come up with any evidence to alter the conclusions reached by the NRC Staff with respect to both Indian Points 2 & 3, namely that the existing water withdrawal systems would result in significant irreversible impacts on the valuable Hudson River fishery. The critical 1973-74 data is already before the agency and does not justify elimination of the requirement for closed-cycle cooling.

The NRC Staff states that completion of Con Edison's research program may provide additional relevant results, and that completion of the other studies (which a one-year extension would permit) mentioned on p. 3-8, will add to a more complete and sound scientific basis for a reasoned decision. This may always be said of additional research. However, the fact is that the Staff has consistently taken the position, nowhere refuted in the DES, that the applicant's research effort is unlikely to conclusively demonstrate that operation of Indian Point Units 2 & 3 with once-through cooling will not have an

unacceptable adverse impact on the Hudson River fisheries. See, e.g., FES, IP-3, pp. V-199 to 2130. The NRC Staff therein makes the following comment:

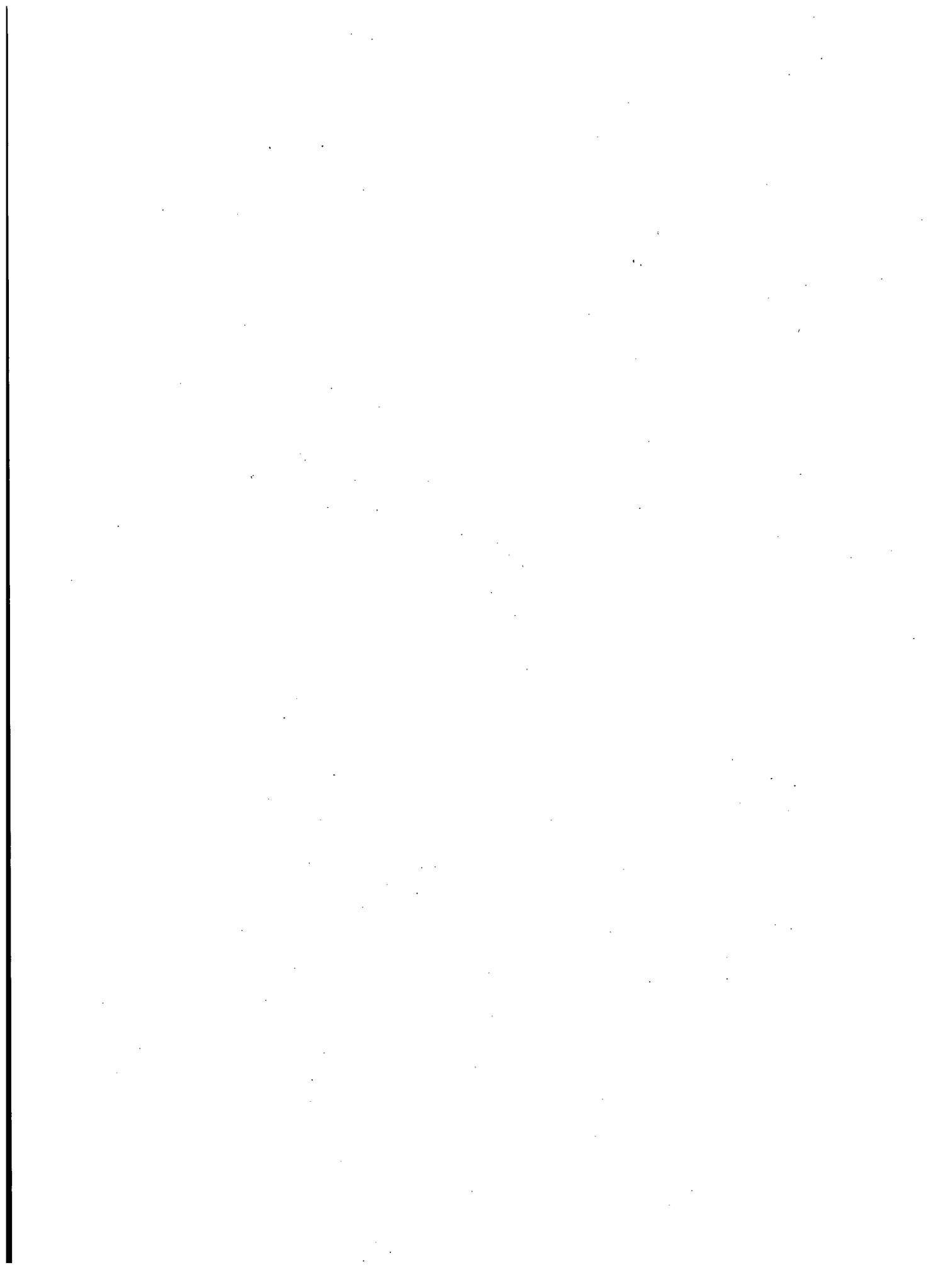
"The difficulties in obtaining adequate data on major issues in controversy cast serious doubt on the applicant's claim that a final conclusion with respect to the date for closed-cycle cooling at Indian Point Unit No. 3 should await collection of further 'empirical' data."
FES, IP-3, p. V-209.

One and one-half years have passed since the issuance of the FES for Indian Point 3 and the data and analyses collected in the interim, admitted by the Staff to be the most relevant years for data collection, have produced nothing to alter the ultimate conclusions. Nor is the remaining information to be submitted in January, 1977, as the Staff again admits, likely to do so.

Thus, no sound rationale exists for deferring the closed-cycle cooling requirement because of biological data and evaluations which may be forthcoming. There has been no new evidence which could materially alter the original conclusion and the remaining studies will not produce the answers concerning long-term impact. There is, therefore, no reason for deferral. Certainly, no justification for a two-year extension on this basis exists.

Other Alleged Benefits Associated with Deferral

The DES points to two other bases for its recommendation that the requested deferral be granted: 1) not to delay the start of construction would foreclose possible selection



of a different type of closed-cycle cooling system in the NRC proceeding to designate the preferred closed-cycle cooling system; 2) delay would permit the EPA proceedings to proceed without requiring Con Edison to begin construction prior to EPA's final decision. Neither of these rationales is justifiable.

The question of whether deferral of the 1979 date should occur because of the NRC's failure to date to finally designate the preferred closed-cycle cooling system is an issue appropriate to the proceeding for the designation of such system, not to this proceeding. That determination must be tied to consideration of whether Con Edison has sought with due diligence all approvals necessary for construction of a closed-cycle cooling system, whether all such approvals have been received, and the effect of failure to obtain timely approvals on the May 1, 1979 date. Those issues will be raised in that proceeding and should not be the basis of this two-year extension. Furthermore, were such a rationale to be relied on herein, the DES should have analyzed such issues, prior to deciding that additional time was warranted.

Awaiting EPA's decision is particularly unjustified. There is absolutely no assurance that EPA will finally act within two years. Under the DES' rationale, even if it were several years before EPA completed its proceedings and reached a final decision, the NRC would agree to defer. This kind of open-ended rationale is entirely unsatisfactory. Second, by granting the two-year deferral to 1981 the NRC undercuts EPA's permit requirement for Indian Point 2 which requires cessation of closed-cycle

cooling by May 1, 1979. Con Edison can use the NRC's action to whipsaw EPA into a deferral as well. Third and most important, the NRC has its own mandate under NEPA which is completely separate and distinct from EPA's mandate under the Federal Water Pollution Control Act Amendments of 1972. The NRC has a statutory responsibility to meet the demands of NEPA and may not avoid these demands by deferral to another agency for decision. This is effectively what the DES recommends doing.

Harm to the Fishery

The CEQ Guidelines 1500.8 on the content of environmental statements requires the assessment of probable impacts on the environment. The NRC's regulations implementing NEPA, 10 C.F.R. Part 51, require quantification of impacts and benefits, to the fullest extent practicable. Section 51.23. Neither of these requirements has been met.

The EIS perverts NEPA's purposes by looking only to whether or not any irreversible impacts will flow from the two-year extension. However, NEPA requires consideration of all adverse impacts, not just those which are irreversible. A significant short-term loss in young-of-the-year recruitment to the fishery represents a very real loss. Even if the population is likely to recover over time, the loss in yield during the

interim is irretrievable. For a fisherman, the immediate short-term impacts of such loss can be very significant. By concentrating only on the incremental, long-term impact and the irreversibility of that impact, the NEPA process is perverted. Further, the loss which will occur as a result of two additional years of entrainment and impingement is never quantified. See Section 6.4.2, p. 6-1.

Finally, even using the criteria of irreversibility, it is never made clear that there will be no irreversible harm if and only if the closed-cycle cooling requirement is maintained and no extension beyond 1981 is granted. A very possible scenario is that Con Edison will come in at the end of its research program and request the license term requiring closed-cycle cooling be eliminated. The DES has failed to discuss the possibility of the potential for further delay resulting from such an application and the resulting impacts of a further extension.

Indian Point 3

One of the most serious and blatant failings of the EIS is its failure to discuss the impact of a two-year deferral on Indian Point Unit No. 3, scheduled to cease operation with once-through cooling in September, 1980.* The schedules for installation of closed-cycle cooling at Indian Point Units No. 2 & 3 are inextricably linked and any deferral in the schedule for Unit 2 affects the schedule for Unit 3. The environmental

*There has been a one-year slippage to September, 1981 because of the fact that the unit was not fully operational in the spawning season, 1975.

consequences of a deferral for Unit 3 must be disclosed and considered in the DES and instead it has been totally ignored. This failing alone is sufficient to render the DES inadequate. It is absolutely unconscionable that this has not been considered in light of the NRC's own recognition of the overlap and the intervenor's repeated statement of concern on this subject.

CONCLUSION

HRFA is deeply concerned about the gross inadequacies of the DES, its overall tone and attitude. It contains sloppy and incomplete analyses and insufficient justifications for the proposed action. The DES should be revised. The proposed license amendment should be rejected.

Aug. 29, 1976

page 2, August. 29, 1976
Docket No. 50-247

U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attn: Director Division of Site Safety and
Environmental Analysis

Re: Docket No. 50-247 (Indian Point)

Dear Sir:

We urge that the "Draft Environmental Statement" be rejected and
no extension of time be granted for the reasons outlined below.

1. 1974 was the first year of full operation of Indian Point
No. 2. Concomitant with this was the drastic reduction in the
survival of striped bass at the juvenal stage. (Table B-1, 1973
and Table B-4, 1974, appendix B)

Year	Ichthyoplankton Gear	Beach Seine
1973	15,880,690	8,245,255
1974	4,053,956	2,415,500

This indicates approximately 75% reduction in survival of juvenals.
There is no information given that would indicate any other environmental
changes to account for the drop.

2. Staff's curve (Fig. 3-1) of "Relative Yield" confirms the drastic
drop in survival. It further indicates that even after cessation
of once through cooling the decline will continue. This indicates
to us an irreversible process.

It appears that once through cooling should be stopped at the
earliest possible time before the bass population is decimated.

3. On page 5-1 under "Alternatives", in the last paragraph, there
are two questionable statements:

(a) "----the higher cost of power from oil fired plants as
compared to nuclear plants." This certainly is not an established
fact. The N. Y. State Public Service Commission is currently
holding extended hearings on this very subject (Case 25974).

(b) "It would also be difficult to replace this power -----."
This is nonsense. Con Ed in their present rate case is asking
for a rate increase, in part, due to a drop in demand due to
transfer of part of their load to the Power Authority of the State
of New York and because of failure of load to grow as anticipated.



Also Orange and Rockland Utilities, with whom Con Ed has a
direct tie, has 250 MW of excess Capacity. Further, the N. Y.
Power Pool has a gross Reserve Margin of 34.3% above anticipated
peak demand.

Considering the above, we see little support for the Staff's
"Evaluation". Particularly section 6.3. Despite their
allegation to the contrary, there is no reasonable proof that
the decline in the striped bass population will be reversible.
Under Section 6.4, if as it is stated there is little likelihood
that closed cycle cooling will not be required, then the benefits,
if any, likewise must be very small.

Cooling tower technology is over 50 years old. Three years of
study should be ample time to determine which type of cooling
tower to use.

Very truly yours,

Walter L. Fleisher, Jr.
Walter L. Fleisher, Jr.
Vice-president.

8853

Mayor
GEORGE V. BEGANY



Trustees:
WILLIAM DURR
JAMES EDGAR
JACK LOEBER
WILLIAM MCNALLY

Village of Buchanan

MUNICIPAL BUILDING, BUCHANAN, N. Y. 10511

PHONE: (914) 737-1033-4

Clerk & Treasurer
FRANK R. COLACINI

Village Attorney
CARL D'ALVIA

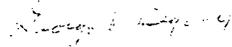
Village Consulting Engineer
HUGH GREGORY

Building & Plumbing Inspector
CHARLES WHITE

N. R. C.
8-27-76
Page 2

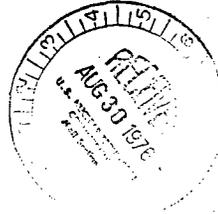
I trust that these comments and the report of PCB's will be of use to the N.R.C. in the final decision, finding the Con Edison request being granted.

Sincerely,


George V. Begany
MAYOR

August 27, 1976

Re: Draft Environmental Statement for
Facility License Amendment for Ex-
tension of Operation with Once-Through
Cooling for Indian Point Unit #2.
Docket No. 50-247 (Published July 1976)



U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attn: Dr. Robert P. Geckler
Environmental Project Engineer

GVB/psm
Enclosures (3)

cc: Gordon Cameron, Mgr., Village of Croton-on-Hudson
Muriel Morabito, Supervisor, Town of Cortlandt
John Walsh, Mgr., City of Peekskill

Gentlemen:

The Village of Buchanan is very much in favor for extension of operation with once-through cooling for Con Edison's Indian Point Unit No. 2.

Enclosed is a resolution passed unanimously on Monday, August 23, 1976, by our Board of Trustees and myself, in full support of this extension.

In support of Con Edison's request for the extension, I am enclosing comments of Hugh S. Gregory, Village Consulting Engineer, and a report by William W. Shuster, D.Ch.E., Rensselaer Poly Institute, Troy, New York, on the presence of PCB's (polychlorinated biphenyls) in the Hudson River. It should be called to your attention that there is a ten-year ban on the catching of striped bass in the Hudson River because of the presence of PCB's.

5778

A-36

RESOLUTION

At a regular meeting of the Board of Trustees of the Village of Buchanan, New York, Held at the Municipal Building, Tate Avenue, Buchanan, New York on the 23rd day of August, 1976, at 8:00 o'clock P.M., prevailing time.

Present: Mayor George V. Begany, Trustees Jack Loeber, William Durr, James P. Edgar and William McNally.

Absent: None.

On motion of Mr. William Durr, seconded by Mr. Jack Loeber, the following Resolution was unanimously adopted:

WHEREAS Consolidated Edison has filed a petition with the Nuclear Regulatory Commission requesting an extension of time that the licensee, Consolidated Edison be allowed to operate Indian Point Unit # 2 with the present mode of once-through cooling system from May 1st, 1979 to May 1st, 1981; and

WHEREAS it is opposed to the closed-cycle cooling system which has been ordered by the Nuclear Regulatory Commission at Indian Point Unit # 2; and

WHEREAS the Mayor and Board of Trustees have studied this matter and have received professional opinion concerning this

NOW, THEREFORE, BE IT RESOLVED, that the Village of Buchanan, New York strongly recommends and favors that the Nuclear Regulatory Commission grant the extension of time which would allow Consolidated Edison to operate Indian Point Unit # 2 with the present mode of once-through cooling system from May 1st, 1979 to May 1st, 1981 since in the Village's opinion, it would be to the best interests of the inhabitants of the Village; and

BE IT FURTHER RESOLVED, that the Mayor and Board of Trustees go on record opposing any closed-cycle cooling system for Indian Point Unit # 2 since it would be injurious to the health, welfare and well-being of the inhabitants of the Village of Buchanan and its surrounding communities.

The vote on the foregoing Resolution was as follows:

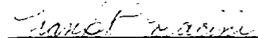
Ayes: Mayor George V. Begany, Trustees Jack Loeber, William Durr, James P. Edgar and William McNally.

Nays: None.

Absent: None.

I, FRANK R. COLACINI, Village Clerk of the Village of Buchanan, New York, DO HEREBY CERTIFY that the foregoing is a true and accurate copy of the proceedings at a meeting of the Board of Trustees of the Village of Buchanan, New York, duly called, held and conducted on the 23rd day of August, 1976, and of the Resolution adopted at such meeting.

WITNESSETH my hand and seal of said Village this 24th day of August, 1976.


Frank R. Colacini, Village Clerk
Village of Buchanan, New York

Mayor
GEORGE V. BEGANY

Trustees:
WILLIAM DURR
JAMES EDGAR
JACK LOEBER
WILLIAM MCNALLY



Village of Buchanan

MUNICIPAL BUILDING, BUCHANAN, N. Y. 10511

PHONE: (914) 737-1033-4

Clerk & Treasurer
FRANK R. COLACINI
Village Attorney
CARL D'ALVIA
Village Consulting Engineer
HUGH GREGORY
Building & Plumbing Inspector
CHARLES WHITE

26 August 1976

U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention of Dr. Robert P. Geckler
Environmental Project Manager

Dear Dr. Geckler:

Reference is made to the Draft Environmental Statement for the license amendment for the extension of operation of Indian Point Unit No. 2 with once-through cooling; Docket No. 50-247, published July 1976.

Due to the extreme pressure of duties in connection with construction activities in the Village, I have been unable to spend as much time in reviewing this statement as I would have preferred. Without question the Village fully supports the amendment providing for a two year interim period of operation with once-through cooling.

Our present thinking on the various provisions of the Statement is set forth below.

Certainly there can be no question that the two year delay will be beneficial as to operational costs. However, it is entirely possible that the terrestrial impacts of the closed cycle system could be major rather than minor. My opinion is that the condition must be made that if and when the tower is built, there must be an immediate discontinuance of operation if the terrestrial effects are significant. It is added that we are fearful lest the influence

-1-

26 August 1976

of the powerful opposition forces be sufficient to invoke action to advance the termination date by the presentation of exaggerated adverse effects on the aquatic biota.

In this regard, we commend to your strict enforcement the responsibility of the Federal Government to "assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings." We are, at this stage, unconvinced and extremely doubtful that this responsibility can be fulfilled by permitting the enormous closed cycle tower to become a feature of our landscape, and its emissions to affect our safety and health.

Your attention is directed to the requirement in the present operating license for a plan of procedures "to minimize detrimental effects on aquatic biota in the Hudson River to a practicable minimum" during the interim period. We are unaware of such procedures or of their extent or effectiveness. It seems apparent that improvement in intake and discharge areas and arrangements would be effective. We are uninformed of any such measures undertaken.

The site description, while factual, is not reflective of the true condition. The one-mile radius is, unfortunately, not logical for this situation. Actually, the entire population of 2200 Village inhabitants, in addition to some 500 outside the Village limits, reside within a radius of 1.2 miles of the station. It is also to be noted that the nearest dwelling is about 2000 feet from the center of Unit No. 1.

It is stated that ND Cooling Towers were a staff selection as the preferred closed cycle system. The fact is that the evaluation submitted by Con Edison concluded that the ND system was preferred, in which opinion the staff concurred. As noted, we insist that there must be further study and review regarding a different type of closed cycle system.

It is likewise apparent that there has been insufficient research to produce definite opinions and findings of the effects of the OT system on the aquatic biota. It is noted that "the actual vulnerability of juvenile striped bass to either entrainment or impingement is unresolved." Also unresolved are the factors of compensation by nature, and the movement into shoals and shore zones, and into deeper water. The two year extension is imperative to permit the Con Edison research program to provide additional factual data.

-2-

26 August 1976

The staff conclusion that the long term impact of such two year extension is not expected to be large, and has essentially no risk of being irreversible, adds to its essentiality.

My final comment reiterates my past report conclusions, namely:

1. The ND cooling system will be detrimental to the safety, health, and happiness of the Village residents, and esthetically offensive.
2. Additional research, comprising extended intake and discharge systems, is imperative prior to the abandonment of the OT system.
3. Additional research is likewise imperative in the matter of the aquatic biota.
4. Most emphatically, if the closed cycle type cooling is finally proved necessary, extended research is required to determine the most desirable type.

Yours very truly,

Hugh S. Gregory
Village Consulting Engineer

HSG/ag

-3-

WILLIAM W. SHUSTER, D. Ch. E.
ENVIRONMENTAL ENGINEERING CONSULTANT

RENSSELAER POLYTECHNIC INSTITUTE
TROY, NEW YORK 12181
518-270-6363

May 20, 1976

Mayor and Board of Trustees
Village of Buchanan
218 Westchester Avenue
Municipal Building
Buchanan, New York 10511

Gentlemen:

On Saturday, May 8, 1976, a meeting was held at the Buchanan Verplanck School to discuss problems associated with the impact of cooling towers on the Village of Buchanan and surrounding areas. In attendance were representatives from various municipalities, county governments, and other interested and concerned officials and citizens.

During the discussion, I suggested that the presence of PCB's (polychlorinated biphenyls) in the Hudson River water proposed for use in cooling towers might pose a hazard to surrounding areas through the transfer of this material from water to air. It was suggested that I look into this matter and report to you on my findings. This I have done and I would like to transmit to you the results of this study.

During the past 40 to 50 years, a class of chemical compounds called polychlorinated biphenyls (hereafter designated as PCBs) have found increased use in a variety of industrial applications which include use in the manufacture of sealants, chlorinated rubber, adhesives, printing inks, paints, insecticides, lacquers, varnishes, pigments and waxes. Because of excellent insulating and heat resisting properties, they have found extensive use in transformers and capacitors. PCBs have been accumulating in the environment through vaporization from products containing them and from industrial discharges.

Little concern was expressed about PCBs until about 1968 when it was reported from Japan that a considerable number of people who had eaten rice oil contaminated with PCBs were seriously affected. This led to an immediate ban on almost all PCBs in Japan. Since that time much attention has been directed to the occurrence and the effects of PCBs in relation to life forms. Because of growing concern about the safety of PCBs, their use has been markedly restricted. While the long term effects of PCBs on humans is not fully understood, it is recognized that exposure causes such symptoms as vomiting, skin lesions, eye problems, and palsy. It has been reported in Time Magazine (May 10, 1976) that PCBs have been found to cause cancer in laboratory animals.

-2-

Concern about these materials has led the American Conference of Government Hygienists to establish exposure limits, expressed as the maximum allowable concentration for an eight-hour working day. These limits are stated as 0.01 milligram of the lower chlorinated compounds per cubic meter of air, and half that or 0.005 milligrams per cubic meter for the more highly chlorinated compounds.

In New York State, authorities have closed the Hudson River to commercial fishing for striped bass, eels and other species because of high levels found in these fish. The importance of PCBs from an environmental point of view, which has led to this action, is their omnipresence, persistence, toxicity and their bioconcentration effect. The latter effect has resulted in the buildup of concentrations in some fish to levels as high as 350 ppm (parts per million) although levels of about 15 ppm are more typical as reported by the New York State Department of Environmental Conservation for the lower Hudson River. PCBs in striped bass near Indian Point have been found to be as high as 38.5 ppm. It might be noted that recent tolerance limits have been set by FDA of 5 ppm in edible fish tissue. The Environmental Protection Agency has issued environmental guidelines that limit PCBs in rivers and lakes to no more than 10 ppt (parts per trillion) and are considering a limit of 1 ppt as a national goal.

In a recent report (March 1976) the New York State Department of Environmental Conservation has reported on PCB levels in Hudson River fish, sediments and water. Noting that PCBs have only a limited solubility in water, nevertheless a wide range of concentrations in water were reported. This was considered to be due in part to the tendency of PCBs to accumulate on suspended sediments. Values in the range of 1.0 to 3.0 ppb (parts per billion) were noted in the upper parts of the Hudson and somewhat lower values in the lower Hudson. It was also reported that concentrations of PCBs on sediments were as high as 11 ppm at Waterford and 3.6 ppm at Poughkeepsie.

Based upon the information discussed above, one can begin to visualize the effect of using Hudson River water in a natural draft cooling tower. For purposes of illustration, let us assume that the concentration of PCBs in the Hudson River water is about 1 ppb (parts per billion) in the vicinity of Indian Point. Note that this is a very conservative value and does not include the considerable quantities which might be included on suspended sediments at various times. It will also be assumed that the quantity of drift predicted by the U.S. Nuclear Regulatory Commission will be valid, namely, 15 gallons per minute. This again is a conservative estimate. Based upon these values, the quantity of PCBs which will be discharged to the atmosphere will be about 2450 milligrams per month. If we accept the tolerance limit established by the American Conference of Government Hygienists of 0.005 milligrams per cubic meter, the quantity of 2450 mg/month would contaminate a total of 490,000 cubic meters or 17,300,000 cubic feet of air each month. In this calculation, we have not included the PCBs that could be volatilized from the water evaporated in the cooling towers because of uncertain vapor pressure data. Since the water evaporated is about 15,000 gallons per minute, or 1000 times the amount of drift, we perhaps might expect as much as 1000 times the amount of PCBs predicted above. Also, during times when the Hudson River water is turbid and contains suspended sediments (quite often), the concentration of PCBs will be considerably higher than predicted above.

While one may argue about absolute values of PCBs discharged, the really important point to note is that the use of Hudson River water for cooling towers will result in the transfer of a highly suspect and controversial substance from the river where it is at least confined, to the atmosphere where it will be widely distributed and can affect a great number of people.

Again it is important to point out that the particular problem of PCBs in the cooling water is peculiar to the situation at Indian Point and might not be found elsewhere. The plant at Indian Point will use Hudson River water which contains one of the biggest concentrations of PCBs in the country, and the drift from the towers will effect an area of high population concentration. These facts support the position that the use of cooling towers at Indian Point is highly undesirable.

I trust this analysis will be of use to you in deliberations relative to the impact of cooling towers on the Village of Buchanan.

Yours truly,



Dr. William W. Shuster, P.E.
Director of Environmental Programs
Rensselaer Polytechnic Institute

WWS/lm

THOMAS F. KEANE, JR.
CHAIRMAN

ELMER J. MALONEY
CLERK

9

COUNTY OF WESTCHESTER
COUNTY BOARD OF LEGISLATORS
803 COUNTY OFFICE BUILDING
WHITE PLAINS, N. Y. 10601

August 10, 1976

PROJECT NUMBER
PROD. & UTIL. EAR 30-3,347,286

Division of Site Safety & Environmental Analysis
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington D.C. 20555

Dear Sir:

At the request of the Honorable Edward M. Gibbs,
County Legislator representing the 1st County Legislative
District I am forwarding you a certified copy of Resolu-
tion#164-1976.

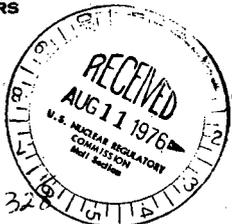
Said Resolution, concerning the Cooling Towers
at the Indian Point Plant, was adopted by the Westchester
County Board of Legislators on August 9, 1976.

Very truly yours,

Elmer J. Maloney
Elmer J. Maloney, Clerk of the
Westchester County Board of Legislators

EJM:bb
Attachments:

cc: Hon. Edward M. Gibbs



*Division of Site Safety & Environmental Analysis
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Comm.
Washington D.C. 20555*

3B

RESOLUTION NO.164-1976

TO THE COUNTY BOARD OF LEGISLATORS
OF THE COUNTY OF WESTCHESTER, NEW YORK



WHEREAS, the Westchester County Board of Legislators
has, by unanimous resolution, opposed construction of the
proposed cooling towers at the Indian Point Nuclear Plant
site, and

WHEREAS, technical studies of various alternatives
for protecting the fish in the Hudson River are in the process
of being carried out, and

WHEREAS, it has been indicated that results of such
studies may obviate the necessity of building cooling
towers, and

WHEREAS, the staff of the federal Nuclear Regulatory
Commission recommends that construction of such towers be
delayed until 1981 so that other alternatives to such
construction may be fully explored, therefore be it

RESOLVED, that the Westchester County Board of Legislators
supports this recommendation and calls on the Nuclear Regula-
tory Commission to delay construction of the cooling towers
at Indian Point Plants 2 and 3 until 1981.

Dated: August 9, 1976
White Plains, New York

*Edward M. Gibbs
Robert A. ...
Andrew A. ...
Arthur ...*

FEDERATED CONSERVATIONISTS OF WESTCHESTER COUNTY, INC.

Dedicated to environmental planning and education for the preservation of our natural resources.

Mercy College, Dobbs Ferry, New York 10522 (914) 693-5902



September 24, 1976

STATE OF NEW YORK)
County of Westchester)

COMMENTS ON THE DRAFT ENVIRONMENTAL STATEMENT FOR FACILITY LICENSE AMENDMENT FOR EXTENSION OF OPERATION WITH ONCE-THROUGH COOLING FOR INDIAN POINT UNIT NO. 2, DOCKET NO. 50-247, PUBLISHED JULY, 1976.

I HEREBY CERTIFY that I have compared the foregoing Resolution No. 164-1976 with the original on file in my office, and that the same is a correct transcript therefrom and of the whole of the said original resolution which was duly adopted by the County Board of Legislators of said County on AUGUST 9, 1976.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the Corporate Seal of said County Board of Legislators.
AUGUST 10, 1976.

(SEAL)


CLERK
COUNTY BOARD OF LEGISLATORS

We thank you for the opportunity to comment on the Draft Environmental Statement for Facility License Amendment for Extension of Operation with Once-through cooling for Indian Point No. 2.

We note that the NRC has previously rejected Consolidated Edison's requested date of 1981. We note also that since the 1981 date is subject to the attainment of all necessary governmental approvals, and that these approvals have not yet been secured despite the passage of roughly 9 months, Consolidated Edison has in effect already a delay in preparation of once-through cooling systems of, in all probability, a year. We note further the statement on page 6-1 of the DES under Benefits, that the proposed delay for termination will permit further evaluation of results of the applicant's research program but that "the staff believes that the probability is low that such evaluation would reveal that closed cycle cooling is not required."

It appears to us in light of the above that there is insufficient evidence to justify any further delay in the 1979 deadline established by NRC.

The DES also states that an extension will permit additional public discussion of alternatives to the Natural Draft Cooling System selected as the preferred system by Consolidated Edison, a choice which the NRC staff has supported.

However, since this public discussion has now been scheduled for a hearing in the immediate future, i.e. October 5th, an extension for that purpose does not appear necessary.

We are sensitive to and share the local concerns which relate to visual impact, salt drift, etc. We trust that these issues will be fully addressed at the hearings. We believe, however, that this can be accomplished within the present time frame and that unless your Board finds, contrary to the statements of the NRC staff, that further time will produce a more acceptable solution than the present Natural Draft Cooling Towers or that further evaluation of the studies will indicate that closed cycle cooling is not necessary, the extension is unjustified.

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FEDERATED CONSERVATIONISTS OF WESTCHESTER COUNTY, INC.

Dedicated to environmental planning and education for the preservation of our natural resources.

Mercy College, Dobbs Ferry, New York 10522 (914) 693-5902



August 27, 1976

DIRECTORS
JOY SIMPKINS
President
GEORGE RAYMOND
1st Vice President
RICHARD R. KNABEL
2nd Vice President
BERNA WEISSMAN
Secretary
MARY-LOUISE BRICCIOTTI
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LAURANCE ROCKEFELLER
ROBERT SCHOFIELD
DAVID SEYMOUR
ABBOTT STILLMAN
JAMES UTTER
EXECUTIVE DIRECTOR
ANNE L. DONALDSON

Dr. Robert P. Geckler
NRC Environmental Project Manager
Draft Environmental Statement - Docket No. 50-247
Division of Site Safety and Environmental Analysis
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Dr. Geckler:

We understand that you have requested comments on the Draft Environmental Statement for Facility License Amendment for Extension of Operation With Once-Through Cooling for Indian Point Unit No. 2, Docket No. 50-247, published July, 1976.

Although we are listed as one of the organizations from whom comment was requested, we did not receive a copy of the document. We have only today obtained a copy and ask for an extension of time of one week to review and prepare any comments which we may make.

Sincerely yours,

Anne L. Donaldson
Executive Director, FCWC

ALD:ag

8915

FEDERATED CONSERVATIONISTS OF WESTCHESTER COUNTY, INC.

Dedicated to environmental planning and education for the preservation of our natural resources.

Mercy College, Dobbs Ferry, New York 10522 (914) 693-5902

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DAVID SEYMOUR
ABBOTT STILLMAN
JAMES UTTER

EXECUTIVE DIRECTOR
ANNE L. DONALDSON

September 1, 1976

Dr. Robert P. Geckler
NRC Environmental Project Manager
Draft Environmental Statement - Docket No. 50-247
Division of Site Safety and Environmental Analysis
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Dr. Geckler:

On August 27, 1976, we wrote to you asking for an extension of time to review and prepare any comments which we may make on the Draft Environmental Statement for Facility License Amendment for Extension of Operation With Once-Through Cooling for Indian Point Unit No. 2, Docket No. 50-247, published July, 1976.

At this time we would like to request a further extension until after our next board meeting, which will be held September 14, 1976.

Thank you very much.

Sincerely yours,

Anne L. Donaldson
Executive Director, FCWC

ALD:ag





CITY OF PEEKSKILL
CITY HALL
PEEKSKILL, N. Y. 10566

August 27, 1976



Mr. George W. Knighton, Chief
Environmental Projects Branch No. 1
Division of Site Safety & Environmental Analysis
U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulations
Washington, D.C. 20555

Re: Draft Environmental Statement for Facility License
Amendment for Extension of Operation with Once-through
Cooling for Indian Point Unit No. 2 - Docket No. 50-247

Dear Mr. Knighton:

We are in receipt of the above-referenced document and have reviewed same. As detailed in our letter to you of April 19, 1976, we are opposed to cooling towers being constructed as outlined in that report for Indian Point No. 2 (see attached). However we are wholeheartedly in support of the two-year extension.

Our support of this extension is based primarily on the fact that it will permit more expansive research to be done on the proposed cooling system. We believe that more detailed research will yield the most adequate and desirable solution to the problem. During this period of research the services of the City of Peekskill will be available to the Consolidated Edison Company of New York and to all other interested parties.

Very truly yours,

Fred J. Bianco, Jr.
Mayor

Attach.

cc: John E. Walsh, City Manager
E. Ziegler, Chairman, Planning Commission
William Wasserstrom, Director, Planning & Development

8985



CITY OF PEEKSKILL
CITY HALL
PEEKSKILL, N. Y. 10566

April 19, 1976

U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, D.C. 20555

Attention: Director, Division of Site Safety and Environmental Analysis

Re: Draft Environmental Statement for Selection of the
Preferred Closed Cycle Cooling System at Indian Point
Unit No. 2, Docket No. 50-247

Gentlemen:

The City of Peekskill, located directly north of the Consolidated Edison Nuclear Power Plant at Indian Point, is a small urban center with a population of 20,000. In recent years the City has made a concerted effort to reverse a trend towards deterioration and blight common to many older cities, especially along the Hudson River Valley. We are very proud of the progress we have made in this direction. Today, with the assistance of 30 million dollars in Federal and State funding and the resulting private investments this public money has encouraged in our community, there are few, if any, lingering signs of blight in Peekskill and new development, showing confidence in the future, is evident throughout our 4½ square miles. This job is far from done however, and there remain many new developments which the City is attempting to attract to expand its economic base and housing inventory.

Of course, much of this progress is a result of the support given to Peekskill by the Federal and State governments as well as our own goals and efforts to rebuild our community. However, of equal importance has been the physical setting with which Peekskill is gifted. We are located approximately 45 miles north of New York City with excellent road and rail connections to Manhattan. We are also located on the eastern shore of the Hudson River with a picturesque panorama of the Palisades Interstate Park system located opposite the Peekskill Bay and with a varied topography offering many advantageous views. Many parcels for which development interest has been shown are strategically located in our upland and waterfront areas offering exciting views of the Hudson River Valley. We have found such locations have attracted many prime developers interested in constructing new residential and related development designed to take full advantage of the scenic setting possible from these sites.

Without these scenic attributes, Peekskill would probably be just another small urban center and in a much less competitive situation to attract developers. We, therefore, are in great fear of the construction of a closed-cycle cooling system using natural draft cooling towers for Indian Point Unit No. 2. The scale and drift of this proposed tower will have a disastrous impact upon the beauty of this valley, a quality which Peekskill has been able to and hopes to continue to be able to take full advantage of, to improve the quality of life for our community and to build a stronger economic base for the future. Many new developments have been constructed and, as stated before, many more are planned. This trend has been most exciting for Peekskill; however, if the attribute of our scenic location in the Hudson Valley is negated, we foresee that this positive growth will be reversed.

Of special import to the future of the City of Peekskill is its waterfront which is largely City-owned and for which we have planned ambitious and exciting projects. This development is mentioned briefly in the Draft Environmental Statement, Docket #50-247 (6-29, 32, 35, 36, 52). We are a landlocked community with no possible options for expansion and therefore must make full and complete use of our limited land area. The cooling tower being proposed for Indian Point Unit No. 2 would seriously detract from this area and therefore curtail our options for future growth.

Much of our interest in the waterfront area is directed to those parcels in private ownership which we anticipated would be upgraded as a result of public improvement in the Bay area. There is sufficient land in proximity to the waterfront to attract private dollars for new residential/commercial development. Of special note in this area has been the future of the land now owned and used by Standard Brands/Fleischmann Products, Inc. should, in the long term, their operation be reduced or removed from its present site (the Fleischmann Brewery has already moved its Peekskill facility to a New Jersey plant and many structures on the site have been demolished and cleared). Serious consideration is being given in our long range planning proposals for the waterfront area to the redevelopment of this land for luxury residential/marina development use due to its strategic location and setting. With the construction of the proposed cooling tower at Indian Point, directly adjacent to the Standard Brands property, this option for development would be seriously limited or even cancelled.

Therefore, as a result of the proposed construction of a cooling tower, we are being forced to redirect much of our upcoming planning efforts, funded with a 701 Comprehensive Planning Assistance grant, to step back-wards and reconsider alternate and less desirable uses for the Peekskill waterfront and upland areas, because of the anticipated impact of the scale and drift of these cooling towers.

I would also like to make note of the impact that such a tower would probably have upon the residents of my community. The scale proposed for the tower is unknown in northern Westchester County and being a part of a nuclear power

generating plant, the safety of which has been seriously questioned as of late (geological as well as nuclear safety concerns), would stigmatize our community as being near a possible "doomsday machine" and thereby have serious psychological effect on our residents both present and future. This, of course, is in addition to the drift from this tower which would be a saline mist unlike that from other existing cooling towers. The drift, aside from having an effect on the physical environment and its biota as mentioned in your report, would, in addition, add to the humidity which is already intense during the summer months, perhaps endangering the health of those people with asthmatic or respiratory ailments. I would like to here add that Peekskill has just finished completion of approximately 300 housing units for Senior Citizens which have been designed to take advantage of the views of the River so that the effect on these people would be compounded.

I realize that the findings of this report state that said effect would be minimal or even negligible, however I also realize that your request for a monitoring program (p. iv) to determine the significance of drift and salt disposition, after construction of said tower, indicates that you question the possible validity of the findings of this report which are hypothetical projections. Our concerns about the proposed cooling towers are both many and, in our estimation, quite serious, with imminent impact upon the City's future. Our plight becomes even more serious if we project to the future and realize that, if the proposed cooling tower for Indian Point Unit No. 2 is constructed, a similar system will probably be installed for the other two reactors located at this site, therefore, further compounding its impact on our community.

With a national prohibition of open cooling systems by the Nuclear Regulatory Commission, what happens at Indian Point will also decide the future fate of many other nuclear power plants and their neighboring communities. I strongly feel that the serious questions being raised at Indian Point, as well as the importance of nuclear power to the future of our country, warrants considerable attention. We should move quickly and use our nation's sophisticated inventory of technological talent to explore "new" means of dealing with the problem of surplus waste heat from nuclear power production, rather than just itemizing the cost benefits of older and perhaps now outdated methods of treating this problem, as was done in the Draft Environmental Statement, Docket No. 50-247. We, in the City of Peekskill, with a grant from the National Endowment for the Arts, have undertaken an exploratory study in this area and have found that many imaginative options are available and many more could be realized if a concerted effort were directed toward this topic. I therefore urge the Nuclear Regulatory Commission to support efforts toward the formulation of new and productive methods of dealing with the problem of waste heat. In our energy conscious times this by-product of nuclear power production should not be interpreted as a problem or a waste production, but instead as a recyclable source of energy allowing us to make better and more efficient use of our natural resources.

4/19/76

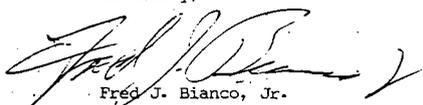
Concerning the short term problem at hand, I question the cursory discussion given to spray ponds and canals as a means of dissipating this waste heat in a closed system. The report states that there is not sufficient land area in proximity to Indian Point for this system to be implemented. My staff, in exploring this statement, has informed me that there exists a large tract of land to the south of the nuclear reactors which is in ownership by Con Edison and which would accommodate spray ponds. In our layman opinion, spray ponds would more than fulfill the requirements for a closed cooling system yet would engender far fewer negative impacts upon the environment and our community.

I also question the dismissal of wet/dry mechanical draft towers or the circular mechanical draft towers as a possible solution. These, with the possible exception of noise, would impinge less upon our City than the recommended natural draft tower and we feel modifications could be made in the tower design to reduce this noise factor allowing for a system which might be able to stand as a compromise solution to this serious problem. Of course, the expense involved in this particular solution would be perhaps higher than that of the draft cooling towers preferred by Con Edison, however, considering the negative external economy created by this tower and borne by our community, as well as the national interest in power production, this seems over the long run to be a justifiable investment as would the aforementioned research concerning alternate new means of dealing with this "waste heat".

I therefore urge you to reconsider the findings of your report and your recommendation to support Con Edison's suggested solution of a natural draft cooling tower(s) as we feel proper consideration has not been given to the many people who live in adjacent communities. I also welcome you to visit us in Peekskill to discuss this problem in greater detail.

I thank you for your attention in this matter and look forward to your response to the aforementioned points.

Sincerely,



Fred J. Bianco, Jr.
Mayor



PLANNING COMMISSION
CITY OF PEEKSKILL
CITY HALL
PEEKSKILL, N. Y. 10566
August 30, 1976



U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Director, Division of Sight Safety and Environmental Analysis

Re: Draft Environmental Statement for Facility License Amendment for
Extension of Operation with Once-Through Cooling for Indian Point
Unit No. 2 Docket No. 50-247

Gentlemen:

In our letter of April 14, 1976 the Planning Commission of the City of Peekskill expressed our opposition to the construction at Indian Point of any of the closed cycle cooling systems necessitating the construction and use of cooling towers because of the aesthetic and economic impact of these towers on the City of Peekskill and its neighboring communities. In addition the Commission suggested that the Indian Point power plants be permitted to continue to operate with the existing once-through cooling system.

In line with our previous position, it is strongly recommended that Con Edison's present request for an extension of the period of time for once-through cooling be approved. It will permit the applicant to complete their environmental studies and provide an opportunity for the review and evaluation of these data and all other available information.

As noted in your Draft Environmental Statement such evaluation may reveal that a closed-cycle cooling system is not required at all. To require the start of construction of such a monstrous and costly system prior to completion of all relevant studies would appear to be neither good planning nor in the interest of the public in general and the people of Peekskill and its neighboring communities in particular.

Sincerely,



Edwin I. Ziegler, Chairman

8035

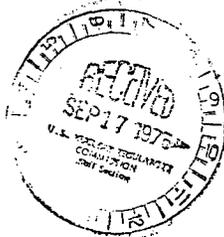
Town of Cortlandt

MUNICIPAL BUILDING
CROTON-ON-HUDSON, N.Y. 10520

September 10, 1976

50-247

HARRIET L. BOYLE
Town Clerk
Croton 1-5122
PEEKSKILL 9-3522



United States Nuclear Regulatory Commission
Washington, D. C. 20555

ATT: Dr. Robert P. Geckler
Environmental Project Engineer

Dear Dr. Geckler:

Enclosed herewith find duly certified copy of Resolution Number 268-76 adopted by the Town Board of the Town of Cortlandt, New York at their regular meeting conducted on September 7, 1976.

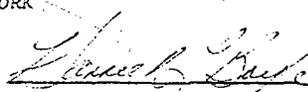
As the resolution indicates, the Town of Cortlandt supports Consolidated Edison's request, made by petition to your agency, for permission to operate Indian Point Unit #2 with the present mode of once-through cooling system and that extension of time for such operation be granted from May 1, 1979 to May 1, 1981.

I trust that this resolution will be considered in the Nuclear Regulatory Commission's final decision, and the Consolidated Edison request be granted.

BY ORDER OF:

TOWN BOARD
TOWN OF CORTLANDT, NEW YORK

9453


Harriet L. Boyle,
Town Clerk

Cc: G. V. Begany, Mayor, Village of Buchanan, New York

RESOLUTION NO. 268-76

WHEREAS, Consolidated Edison has filed a petition with the Nuclear Regulatory Commission requesting an extension of time that the licensee, Consolidated Edison be allowed to operate Indian Point Unit #2 with the present mode of once-through cooling system from May 1st, 1979 to May 1st, 1981; and

WHEREAS, it is opposed to the closed-cycle cooling system which has been ordered by the Nuclear Regulatory Commission at Indian Point Unit #2, and

WHEREAS, the Supervisor and Town Board of the Town of Cortlandt have studied this matter and have received professional opinion concerning this,

NOW, THEREFORE, be it

RESOLVED, that the Town of Cortlandt, New York strongly recommends and favors that the Nuclear Regulatory Commission grant the extension of time which would allow Consolidated Edison to operate Indian Point Unit #2 with the present mode of once-through cooling system from May 1st, 1979 to May 1st, 1981 since in the Town's opinion, it would be to the best interests of the inhabitants of the Town, and be it further

RESOLVED, that the Supervisor and Town Board go on record opposing any closed cycle cooling system for Indian Point Unit #2 since it would be injurious to the health, welfare and well-being of the inhabitants of the Town of Cortlandt and its surrounding communities.

Dated: September 7, 1976
Croton-on-Hudson, New York

Certified Copy
Date
Town Clerk and
Registrar

APPENDIX B

SUMMARY AND DISCUSSION OF 1973 AND 1974 DATA ON ABUNDANCE AND DISTRIBUTION OF EARLY LIFE STAGES OF STRIPED BASS, WHITE PERCH, AND TOMCOD IN THE HUDSON RIVER ESTUARY

INTRODUCTION

The material in this appendix has been excerpted directly from Texas Instruments, Inc., "First Annual Report for the Multiplant Impact Study of the Hudson River Estuary," July 1975. The pages quoted, with the exception of Tables B-1 to B-6, constitute the Discussion section from Chapter VI entitled, "Vulnerability Assessment." The staff has excerpted this material because it provides an informative summary of the major findings and discusses the similarities and differences between the 1973 and 1974 data on the distribution and abundance of early life stages of striped bass, white perch and tomcod in the Hudson River Estuary.

BEGINNING OF EXCERPT

DISCUSSION

The general trends in the abundance and distribution patterns of the early life stages (egg through juvenile) of striped bass, white perch, and Atlantic tomcod in the Hudson River estuary during 1973 and 1974 [Tables B-1 to B-6] reveal several similarities as well as differences -- many of which represent real differences. Some differences, however, are likely the result of improvements in the longitudinal river ichthyoplankton-sampling program initiated in 1974. The two major improvements were increased sampling effort in the shoals stratum and night only sampling beginning during the period 12-17 June (for details, refer to Section III). Consequently, standing-crop differences of life stages for some species cannot be directly compared between years.

Table B-1

Summary of Distribution and Abundance Data for Early Life Stages of Striped Bass in Hudson River Estuary [RM 12-152 (km 19-243)] during 1973

Distribution and Abundance Summary		Juveniles				
		Eggs	Yolk-Sac Larvae	Post Yolk-Sac Larvae	Ichthyoplankton Gear	Beach Seines
First Collection	Date (Interval)	Apr 29-May 12*	Apr 29-May 12*	May 13-26	Jun 24-Jul 7	Jun 17-30
	Location	RM 34-140 (km 54-224); most from RM 47-85 (km 75-136)	RM 34-140 (km 54-224); most from RM 34-106 (km 54-170)	RM 14-85 (km 22-136); most from RM 14-23 (km 22-37)	RM 34-106 (km 54-170); most from RM 47-61 (km 75-98)	RM 12-23 (km 19-37) and RM 39-46 (km 62-74)
Peak Collection	Date (Interval)	May 13-26	Jun 10-23; early, smaller peak between May 27 and June 9	Jun 24-Jul 7	Two peaks: Jul 8-21 and Aug 5-18	Sep 9-22
	Location	RM 34-85 (km 54-136)	RM 34-85 (km 54-136) and RM 62-85 (km 99-136) for early smaller peak	RM 14-85 (km 22-136)	RM 62-106 (km 99-170) and RM 14-46 (km 22-74)	RM 24-38 (km 38-61)
	Total Standing-Crop Estimate	270,068,964	96,123,346; 81,332,444 (smaller peak)	171,531,454	15,880,690 and 15,411,550	8,243,258
Last Collection	Date (Interval)	Jun 10-23	Jun 10-23	Jul 22-Aug 4	Aug 5-18**	Dec 2-15†
	Location	RM 34-85 (km 54-136) and RM 107-140 (km 171-224)	RM 14-106 (km 22-170)	RM 14-140 (km 22-224)	RM 14-85 (km 22-136)	RM 12-55 (km 19-88)
Range of Longitudinal Distribution		RM 14-140 (km 22-224)	RM 14-140 (km 22-224)	RM 14-140 (km 22-224)	RM 14-140 (km 22-224)	RM 12-152 (km 19-243)

*First sampling period, some may have been present earlier.

**Represents only the last longitudinal river ichthyoplankton-sampling run, not the last date juveniles were present in the river.

†Sampling after December 15 limited to only the Indian Point region where no juveniles were collected.

Table B-2

Summary of Distribution and Abundance Data for Early Life Stages of White Perch in Hudson River Estuary [RM 12-152 (km 19-243)] during 1973

Distribution and Abundance Summary		Eggs	Yolk-Sac Larvae	Juveniles		
				Post Yolk-Sac Larvae	Ichthyoplankton Gear	Beach Seines
First Collection	Date (Interval)	Apr 29-May 5*	Apr 29-May 5*	Apr 29-May 5*	Jul 8-21	Jul 1-14
	Location	RM 47-140 (km 75-224)	RM 62-140 (km 99-224)	RM 86-140 (km 137-224)	RM 34-106 (km 54-170)	RM 62-140 (km 99-224)
Peak Collection	Date (Interval)	May 27-Jun 9	Jun 10-23	Jun 24-Jul 7	Aug 5-18**	Sep 23-Oct 6
	Location	RM 86-140 (km 137-224)	RM 86-106 (km 137-170)	RM 14-85 (km 22-136)	RM 14-33 (km 22-53)	RM 24-38 (km 38-61)
	Total Standing-Crop Estimate	9,967,115	13,435,945	50,093,143	2,899,915	7,348,505
Last Collection	Date (Interval)	Jun 10-23	Jun 24-Jul 7	Jul 22-Aug 4	Aug 5-18**	Dec 2-15†
	Location	RM 34-61 (km 54-98)	RM 62-85 (km 99-136)	RM 62-85 (km 99-136)	RM 14-106 (km 22-170)	RM 14-23 (km 22-37)
		RM 86-140 (km 138-224)	RM 107-140 (km 171-224)			RM 47-55 (km 75-88)
Range of Longitudinal Distribution	RM 34-140 (km 54-224)	RM 14-140 (km 22-224)	RM 14-140 (km 22-224)	RM 14-106 (km 22-170)	RM 14-140 (km 22-224)	

*First sampling period, some may have been present earlier

**Represents only the last longitudinal river ichthyoplankton-sampling run, not the peak period or last date juveniles were present in the river

†Sampling after December 15 limited to only the Indian Point region where an estimated standing crop of only about 1,800 juveniles occurred

Table B-3

Summary of Distribution and Abundance Data for Early Life Stages of Atlantic Tomcod in Hudson River Estuary [RM 12-152 (km 19-243)] during 1973

Distribution and Abundance Summary		Eggs*	Yolk-Sac* Larvae	Post Yolk-Sac Larvae	Juveniles	
					Ichthyoplankton Gear	Beach†† Seines
First Collection	Date (Interval)	-	-	Apr 29- May 12**	Apr 29- May 12**	Aug 12-25
	Location	-	-	RM 14-61 (km 22-98)	RM 14-106 (km 22-170)	RM 12-33 (km 19-53)
Peak Collection	Date (Interval)	-	-	Apr 29- May 12**	Apr 29- May 26	Aug 12-25
	Location	-	-	RM 14-46 (km 22-74)	RM 14-46 (km 22-74)	RM 24-33 (km 38-53)
	Total Standing-Crop Estimate	-	-	2,231,631	128,835,440 and 142,610,974	312,494
Last Collection	Date (Interval)	-	-	Apr 29- May 12	Aug 5-18†	Nov 4-17
	Location	-	-	RM 14-46 (km 22-74)	RM 14-85 (km 22-136)	RM 24-33 (km 38-53)
Range of Longitudinal Distribution		-	-	RM 14-46 (km 22-74)	RM 14-140 (km 22-224)	RM 12-33 (km 19-53)

*None collected

**During first sampling period, post yolk-sac larvae and juveniles were likely present in the river earlier in greater numbers

†Represents only the last longitudinal river ichthyoplankton-sampling run, not the last date juveniles were present in the river

††Because Atlantic tomcod are demersal fish, they are not readily accessible to beach-seine sampling in the shore-zone areas; therefore, standing-crop estimates based on beach-seine catches are undoubtedly biased low.

Table B-4

Summary of Distribution and Abundance Data for Early Life Stages of Striped Bass in Hudson River Estuary [RM 12-152 (km 19-243)] April through September 1974

Distribution and Abundance Summary		Eggs	Yolk-Sac Larvae	Juveniles		
				Post Yolk-Sac Larvae	Ichthyoplankton Gear	Beach Seines
First Collection	Date (Interval)	Apr 29-May 4	May 6-11	May 13-18	Jun 12-17	Jun 16-29
	Location	RM 47-61 (km 75-98)	RM 39-55 (km 62-88), RM 86-93 (km 137-149), RM 107-124 (km 171-198)	RM 39-46 (km 62-74)	RM 62-76 (km 99-122)	RM 34-38 (km 54-61) RM 47-61 (km 75-98)
Peak Collection	Date (Interval)	May 15-18	May 28-31	Jun 17-23	Jul 22-26	Aug 25-Sep 7
	Location	RM 39-55 (km 62-88)	RM 56-76 (km 89-122)	RM 39-76 (km 62-122)	RM 24-33 (km 38-53) and RM 56-61 (km 89-98)	RM 24-33 (km 38-53)
	Total Standing-Crop Estimate	348,933,700	157,649,098	326,445,620	4,053,956	2,415,500
Last Collection	Date (Interval)	Jun 24-27	Jul 1-5	Aug 5-9	Aug 12-15*	Sep 22-Oct 5*
	Location	RM 47-61 (km 75-98)	RM 39-46 (km 62-74)	RM 62-76 (km 99-122)	RM 24-33 (km 38-53), RM 56-61 (km 89-98), RM 86-93 (km 137-149), RM 107-124 (km 171-198)	RM 12-85 (km 19-136) RM 94-152 (km 150-243)
Range of Longitudinal Distribution		At least RM 24-140 (km 38-224)	RM 14-140 (km 22-224)	RM 14-140 (km 22-224)	RM 14-140 (km 22-224)	RM 12-152 (km 19-243)

*Represents only the last sampling period included in this report and not the last date juveniles were present in the river

Table B-5

Summary of Distribution and Abundance Data for Early Life Stages of White Perch in Hudson River Estuary [RM 12-152 (km 19-243) April through September 1974

Distribution and Abundance Summary		Eggs	Yolk-Sac Larvae	Post Yolk-Sac Larvae	Juveniles	
					Ichthyoplankton Gear	Beach Seines
First Collection	Date (Interval)	May 6-11	May 6-11	May 13-18	Jun 12-17	Jun 30-Jul 13
	Location	RM 24-33 (km 38-53) RM 62-76 (km 99-122)	RM 24-33 (km 38-53) RM 47-55 (km 75-122) RM 86-106 (km 138-170)	RM 14-38 (km 22-61) RM 47-76 (km 75-122)	RM 56-61 (km 89-98)	RM 47-55 (km 75-88) RM 62-124 (km 99-198)
Peak Collection	Date (Interval)	May 30-Jun 5	May 21-24	Jun 12-17	Jul 29-Aug 2	Aug 25-Sep 7
	Location	RM 24-38 (km 38-61)	RM 24-38 (km 38-61) RM 86-106 (km 138-170)	RM 39-106 (km 62-170)	RM 94-106 (km 150-170)	RM 94-124 (km 150-198)
	Total Standing-Crop Estimate	188,692,170	108,325,607	421,434,660	6,305,752	810,009 832,657
Last Collection	Date (Interval)	Jul 1-5	Jul 8-11	Aug 5-9	Aug 12-15*	Sep 22-Oct 5*
	Location	RM 34-46 (km 38-224) RM 62-76 (km 99-122)	RM 39-46 (km 62-74)	RM 56-85 (km 89-136)	RM 56-106 (km 89-170)	RM 12-152 (km 19-243)
Range of Longitudinal Distribution		RM 24-140 (km 38-224)	RM 14-140 (km 22-224)	RM 14-140 (km 22-224)	RM 24-140 (km 38-224)	RM 12-152 (km 19-243)

*Represents only the last sampling period included in this report and not the last date juveniles were present in the river.

Table B-6

Summary of Distribution and Abundance Data for Juvenile Atlantic Tomcod in Hudson River
Estuary [RM 12-152 (km 19-243)] April through September 1974

Distribution and Abundance Summary		Eggs*	Yolk-Sac* Larvae	Post Yolk-Sac* Larvae	Juveniles	
					Ichthyoplankton Gear	Beach†† Seines
First Collection	Date (Interval)	-	-	-	Apr 29-May 4**	May 5-18
	Location	-	-	-	RM 14-46 (km 22-74)	RM 12-33 (km 19-53)
Peak Collection	Date (Interval)	-	-	-	Apr 29-May 4**	Jun 30-Jul 17
	Location	-	-	-	RM 14-33 (km 22-53)	RM 24-33 (km 38-53)
	Total Standing- Crop Estimate	-	-	-	1, 214, 386, 640	2, 408, 666
Last Collection	Date (Interval)	-	-	-	Aug 12-15†	Sep 22-Oct 5
	Location	-	-	-	RM 14-93 (km 22-149)	RM 12-36 (km 19-58)
Range of Longitudinal Distribution		-	-	-	RM 14-140 (km 22-224)	RM 12-55 (km 19-88)

*None collected

**Represents first sample taken below Indian Point region, juveniles were probably present earlier

†Represents only the last sampling period included and not the last date juveniles were present in the river

††Because Atlantic tomcod are demersal fishes, they are not readily accessible to beach-seine sampling in the shore-zone areas; therefore, standing-crop estimates based on beach-seine catches are undoubtedly biased low

The beach-seine survey sampling designs were similar in 1973 and 1974; therefore, juvenile standing crops calculated from beach-seine catches in both years can be directly compared. This section presents identification and discussion of the real and nonreal differences in abundance and distribution in 1973 and 1974.

a. Striped Bass

The 1973 and 1974 longitudinal river ichthyoplankton-sampling programs were designed to collect striped bass early life stages, particularly eggs and yolk-sac larvae. Eggs and yolk-sac larvae were concentrated on the bottom and channel strata (Table B-7); they are pelagic and accessible to sampling gear that operates effectively near the bottom. Post yolk-sac larvae are also concentrated primarily in the bottom and channel strata but 10.9% of the estimated post yolk-sac larvae standing crops in 1974 occurred in the shoals stratum. Juveniles were almost evenly divided between the shoals and the bottom and channel strata. Therefore, the modified 1974 ichthyoplankton-sampling program which included more effort in the shoals stratum and shifted the sampling to the night hours in mid-June has provided insight on striped bass activity in the shoals and should have increased the efficiency of capturing the motile post yolk-sac larvae and juveniles.

Table B-7

Mean Percentage of All Standing-Crop Estimates of Key Species Early Life Stages Occurring in Shoals Stratum [<20 -ft (6-m) deep] by Ichthyoplankton Gear during 1974 (29 April-15 August)

Species	Life Stage			
	Eggs	Yolk-Sac Larvae	Post Yolk-Sac Larvae	Juveniles
Striped bass	5.3	4.7	10.9	44.3
White perch	28.6	20.6	7.9	11.1
Atlantic tomcod	*	*	*	15.5
*None collected				

Comparisons between 1973 and 1974 striped bass egg and yolk-sac larvae standing crops are the most valid comparisons of all the early life stages. Post yolk-sac larval and juvenile standing crops in 1973 were probably biased low because these life stages are more concentrated in the shoals than eggs or yolk-sac larvae. The increased shoal and night sampling in 1974 likely reduced gear avoidance and increased the catches of post yolk-sac larvae and juveniles.

Juvenile standing crops based on beach-seine catches are directly comparable between the two years; however, daytime catch estimates appeared to be underestimates of juvenile striped bass in the shore zone in 1974. Night beach-seine standing crops in four geographical regions (Croton Haverstraw, Indian Point, West Point, and Cornwall) were significantly higher (Wilcoxon Signed-Rank Test, $p < 0.01$) than daytime standing-crop estimates in these regions for the same time intervals (Figures D-23 and D-24).* The length-frequency distributions were similar (Tables D-175 and D-179)† indicating that gear avoidance was either nonexistent or comparable between day and night sampling. Juvenile striped bass apparently moved into the shore zone in greater numbers at night, at least after 4 August 1974, in the Croton/Haverstraw through Cornwall regions.

There were two basic differences in striped bass longitudinal distribution and abundance in 1973 and 1974. Peak egg abundance was similar in both years but the distribution extended further upstream through the Poughkeepsie-Hyde Park region in 1973. Egg abundance was relatively high in the Indian Point and West Point regions in both 1973 and 1974. Peak juvenile standing crops in 1974 were only about 25% as large as 1973 standing crops although the distribution patterns were similar. Because egg and larvae standing crops were basically similar in 1973 and 1974, the low juvenile abundance in 1974 suggests a decline in the population during the transition from the post yolk-sac larvae to juvenile life stages.

During 1974, peak yolk-sac larvae and post yolk-sac larvae standing crops occurred two and four weeks after the peak egg period, respectively, but further upstream. This apparent upriver displacement suggests a hydrologic transport mechanism(s); however, another explanation is plausible. Egg incubation time in early to mid-June should have been shortened by the near 20°C water temperatures. Consequently, several egg depositions could have occurred between the ichthyoplankton river runs and not be sampled. Life stage duration of yolk-sac larvae and post yolk-sac larvae at various temperatures are unknown but both stages are probably of longer duration than the eggs at water temperatures near 20°C.

Between 1973 and 1974, the degree of exposure of the various life stages of striped bass to each of the five power plants also differed. Because the entire river was not sampled during the peak egg standing-crop period in 1974 (15-18 May), plant exposure indices were not calculated. However, eggs were apparently more concentrated in the Bowline, Indian Point, and Lovett plant regions in 1974 than in 1973. Striped bass eggs were most

*not reproduced for this appendix.

abundant in the channel and bottom strata; hence, vulnerability should be highest at Indian Point and Lovett because these plants are located near the channel. Egg vulnerability at Bowline, which withdraws cooling water from Bowline Pond, is reduced.

A higher percentage of the peak yolk-sac larvae and post yolk-sac larvae standing crop occurred within the five plant regions in 1974, mostly at Roseton and Danskammer, although exposure indices for post yolk-sac larvae were higher in 1974 at Bowline, Lovett, and Indian Point. Motility begins in the post yolk-sac larvae stage and movements from the less vulnerable bottom and channel strata to the shoals may occur. Post yolk-sac larvae vulnerability should be similar at all five plants. Since the motile post yolk-sac larvae are also reportedly positively phototropic (Doroshev, 1970), their vertical distributions are more dispersed through the water column at night (Texas Instruments, 1974c) and they become more vulnerable to plants entraining water from the surface layers.

Exposure indices for juveniles were reduced in 1974, particularly at the lower river plants - Bowline, Lovett, and Indian Point - because juvenile distribution was somewhat dispersed and less concentrated in the lower river than in 1973. Juveniles were bimodally distributed in 1974 with peaks in the Tappan Zee-Croton/Haverstraw and Cornwall regions. Exposure was still highest at the lower river plants, particularly Bowline, but the actual vulnerability of juvenile striped bass to either entrainment or impingement is unresolved. If they move into the shoals and shore zone, vulnerability to power plants is probably minimized unless they are attracted to the intake areas.

Striped bass juveniles in 1974 appeared to move into the shoal stratum after they metamorphosed from the post yolk-sac larvae stage. Only 10.9% of all standing-crop estimates of post yolk-sac larvae based on ichthyoplankton occurred in the shoal stratum, but the percentage of juveniles in the shoals increased to 44.3% (Table B-7). The shoals stratum represents only about 10% of the total river volume. During July, about 80% of the juvenile standing crops taken in ichthyoplankton gear came from the shoals stratum, about the same time that juvenile standing crops were increasing in the shore zone (Table D-143).^{*} Standing crops in the shore zone increased to a peak in late August concomitant with a decrease in the standing crops in the bottom, channel, and shoal areas (Figure B-1). These data support the hypothesis that striped bass young move from the channel to the shoals and shore zone after they transform into juveniles, but the movement is apparently gradual as the population moves downstream.

^{*}not reproduced for this appendix. B-10

Juvenile striped bass averaged 24 mm in total length (range 18-30 mm) when first taken in daytime beach seines in late June 1974 and 76 mm (range 34-119 mm) when peak shore-zone standing crops occurred in late August (Table D-175). * Entrainment studies by New York University at Indian

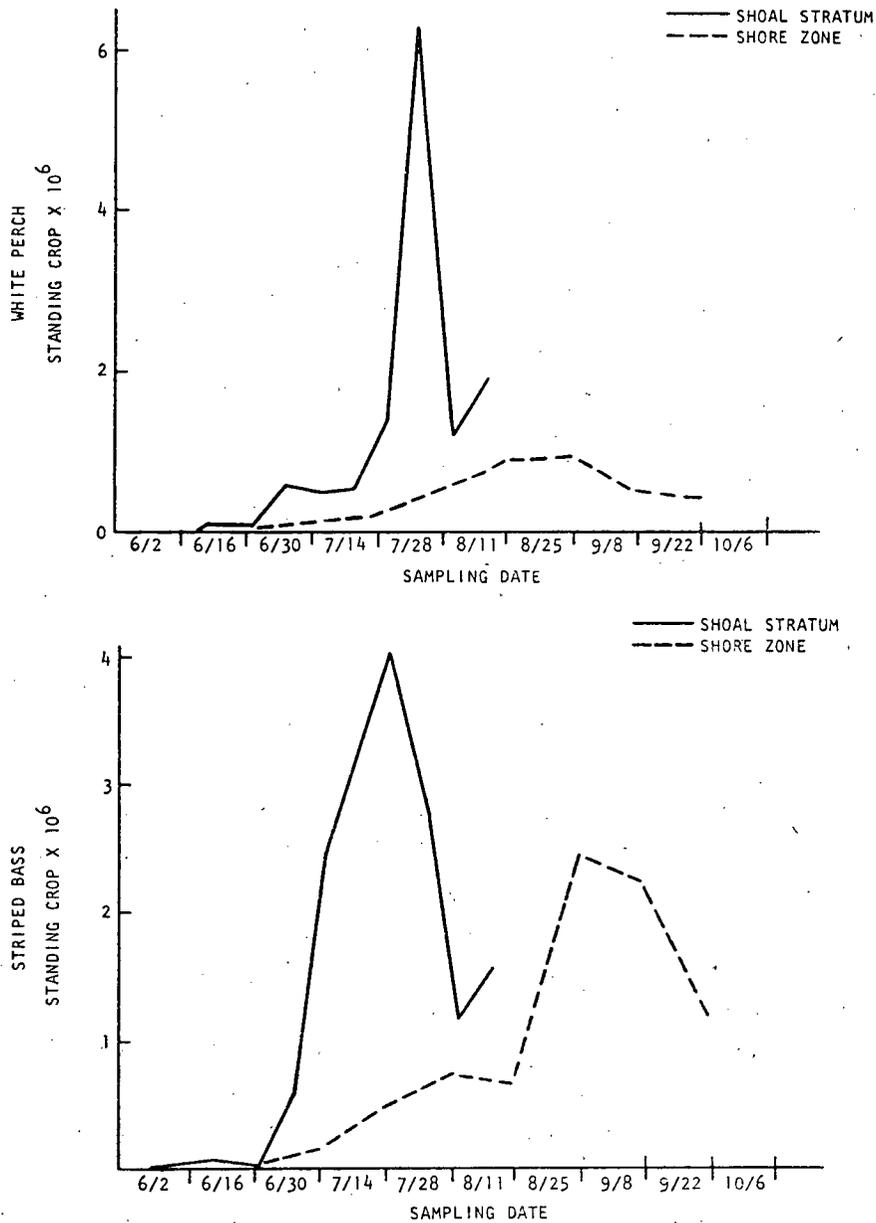


Figure B-1 Distribution of Juvenile Striped Bass and White Perch in Shoals and Shore Zone in 1974

*not reproduced for this appendix.

Point (NYU, unpublished data, 1973) indicated that the maximum entrainment of striped bass larvae occurs from 5-15 mm in length. Thus, it seems logical to conclude that striped bass are no longer entrainable when they move into the shoal and shore-zone areas at about 30-40 mm (total length). They should also be able to tolerate an intake velocity of 0.5 ft/sec (14.2 cm/sec) and avoid being impinged unless attraction to the intakes, parasites, diseases, or rapidly changing environmental conditions reduce their swimming abilities and increase their vulnerability to impingement.

b. White Perch

Neither the 1973 nor 1974 longitudinal river ichthyoplankton sampling programs were designed to adequately collect all early life stages of white perch. Major spawning sites for white perch in the Hudson River estuary have not been completely defined, but 1974 Texas Instruments sampling data and data from other estuaries (Mansueti, 1964) suggest that shoals and freshwater tributaries are important spawning areas. Even though no sampling was done in the tributaries in 1973 and 1974, the increased ichthyoplankton sampling effort in the shoals during 1974 probably explains most of the large increase in egg and larvae standing crops in 1974. White perch eggs are demersal and adhesive and difficult to sample with the gear used in this study. Standing-crop estimates and yolk-sac larvae for eggs in 1974 are surely low even if no spawning occurred in the freshwater tributaries. Standing-crop estimates for the more motile post yolk-sac larvae and juveniles during 1974 were probably also biased low but less so than for eggs and yolk-sac larvae. White perch standing-crop estimates based on ichthyoplankton sampling are therefore not highly comparable between 1973 and 1974.

Juvenile standing-crop estimates from nighttime beach-seine catches were significantly higher (Wilcoxon Signed-Rank Test, $p < 0.01$) than daytime estimates during the same time periods in the same regions (Figures D-35 and D-36).^{*} White perch juveniles exhibited the same diel pattern of shore-zone occupancy exhibited by striped bass juveniles - higher abundances at night.

There were four basic differences in white perch longitudinal distribution and abundance in 1973 and 1974. Peak egg standing crops were almost 20 times greater in 1974 and concentrated in the most upstream region (Albany) in mid-May and in the lower river in early June. During 1973, the small egg standing crops were restricted to the upper river. It is impossible to separate the differences between 1973 and 1974 into real population size differences and nonreal differences due to changes in the 1974 sampling program.

^{*}not reproduced for this appendix. B-12

However, because white perch eggs are demersal and adhesive, they are probably relatively invulnerable to power plants.

Peak larval standing crops were almost 10 times greater in 1974. Post yolk-sac larvae standing crops in both years greatly exceeded egg and yolk-sac larvae standing crops, suggesting that the relatively motile post yolk-sac larvae are more vulnerable to sampling gear than the egg and yolk-sac larvae stages. Most post yolk-sac larvae were taken in the bottom and channel areas (Table B-7) suggesting a movement of post yolk-sac larvae into the deeper bottom and channel areas or into the shallow shoal areas not sampled with the ichthyoplankton gear.

Juvenile standing-crop estimates in the shore zone in 1974 were only about 10% of the 1973 standing crops. Juveniles were concentrated in the lower river in 1973. However, in 1974, even though the post yolk-sac larvae were concentrated in the lower- and middle-river regions (Indian Point through Kingston), the juveniles were concentrated in the upper-river regions (Kingston and Saugerties), suggesting an upstream movement or poor survival of post yolk-sac larvae and/or early juveniles downriver.

Juveniles first appeared in the shore zone in 1974 during the period 7-13 July and averaged 21 mm in total length (range, 13-41 mm). The percent of the juvenile standing crop based on ichthyoplankton sampling in 1974 which occurred in the shoals stratum was 11.1%, a slight increase over 7.9% for post yolk-sac larvae. Ichthyoplankton standing crops reached a peak in late July and then decreased (Table D-144).^{*} Concomitantly, white perch juvenile standing crops increased in the shore zone (Figure B-1), suggesting a gradual movement of juveniles to the shoals and shore zone in late July-early August. Because white perch apparently spawn in the shoal areas of the Hudson River and presumably in the tributaries, juveniles may move directly to the shallow shoals and shore zone and spend almost no time in the regions where they would be susceptible to power plants.

Exposure of white perch life stages to power plants differed somewhat between 1973 and 1974. Exposure indices were much higher in 1974 for eggs and yolk-sac larvae, especially in the Bowline, Lovett, and Indian Point plant regions. Overall exposure of post yolk-sac larvae was similar in both years, but in 1974 exposure increased at Roseton and Danskammer and decreased at Bowline, Lovett, and Indian Point. Juvenile exposure indices were lower during 1974 at all power plants, reflecting the upper river concentration.

^{*}not reproduced for this appendix.

The white perch is a resident of the Hudson River estuary, so the cumulative degree of exposure to power plant across all life stages and age groups is much greater than for the anadromous striped bass and Atlantic tomcod. However, the eggs and yolk-sac larvae should be relatively invulnerable to power plants due to the adhesive, demersal characteristics of the egg, the apparent use of shoals and probable use of shore-zone and tributary areas as spawning sites. Juvenile movements to the shoals and shore zone should greatly reduce their vulnerability. Swimming-speed data suggest that juvenile white perch are generally able to maintain position in a plant-intake area with an approach velocity of 0.5 ft/sec (15.2 cm/sec) when they are 30-40 mm in length. Swimming-speed ability is influenced by several factors, including temperature, salinity, and condition of the fish; therefore, rapid changes in salinity during periods of low water temperature could decrease the ability of overwintering juvenile white perch to avoid impingement, a phenomenon which has been observed at Indian Point (Texas Instruments, 1974a). Post yolk-sac larvae appear to be the white perch early life stage most vulnerable to power plant-induced mortality via entrainment. Any use of tributary streams and shallow cove areas for spawning and nursery habitat would reduce the direct impact of the power plants on the total population even though segments of the population may be highly vulnerable.

c. Atlantic Tomcod

The 1973 and 1974 longitudinal river ichthyoplankton sampling program began in mid-late April in both years. Since Atlantic tomcod spawn from December through February in the Hudson River and egg development takes about a month, neither program was designed to collect tomcod eggs and larvae. Juveniles were collected in the first river runs during both years. Hence, conclusions regarding the peak standing crops are speculative.

Atlantic tomcod spawn in the shallow, shore zone of the Hudson River above the salt-fresh water interface (Booth, 1967). The eggs are demersal and perhaps adhesive, although the adhesive question is unresolved. Consequently, the egg and yolk-sac larvae stages were not collected in the 1973-74 studies and were relatively invulnerable to power-plant intakes. Post yolk-sac larvae are probably more vulnerable, but the abundance and distribution patterns for this life stage in the Hudson River during 1973 and 1974 are unknown.

The basic difference in Atlantic tomcod juvenile abundance and distribution between 1973 and 1974 was a peak standing crop about 1000 times greater in 1974. A part of this difference can be attributed to increased sampling effort in the shoals in 1974, since 15.5% of the 1974 juvenile standing crop estimates occurred in the shoal stratum (Table B-7). Juvenile tomcod were concentrated in the lower river in both years and appeared to restrict their distribution throughout the summer to those regions exposed to the salt front. Juvenile vulnerability to power-plant entrainment and impingement should be greatest at the plants located in the lower river - Bowline, Lovett, and Indian Point. Vulnerability should be highest at Lovett and Indian Point since Atlantic tomcod are demersal fishes, never abundant in the shore zone.

Adult tomcod are relatively small fish (180-250 mm) and should be highly vulnerable to impingement when they are spawning in the shoals from about river mile 39-76 (km 62-122). Swimming ability of the Atlantic tomcod is unknown, but because they are bottom-feeding fishes rather than pursuing predators like the striped bass, their capability to avoid impingement on plant intake screens, especially when laden with reproductive products, may be reduced.