Docket File

MAR 5 1973

Docket No: 50-286

Mr. William J. Cahill, Jr
Vice-President
Consolidated Edison Company
of New York, Inc.
4 Irving Place
New York, New York 10003

Dear Mr. Cahill:

We appreciate the opportunity that you provided the AEC team and representatives to discuss environmental matters with your staff during our site visit to the Indian Point Unit No. 3 on February 21-22, 1973.

While some of the agenda items identified in my letter of February 9, 1973, to you were disposed of by observations and receipt of clarifying information at the site, additional information would be required to continue our review of the subject facility. Accordingly, please submit the information requested based on the questions in the enclosure which have been grouped by sections that correspond to the relevant sections of the Environmental Statement. Your reply should consist of three signed originals and 297 additional copies as a sequentially numbered supplement to your Environmental Report.

In order to maintain our licensing review schedule, we will need a completely adequate response to all enclosed questions by March 15, 1973. Please inform us within 7 days after receipt of this letter of your confirmation of the schedule date or the date you will be able to meet. If you cannot meet our specified date or if your reply is not fully responsive to our request, it is highly likely that the overall schedule for completing the licensing review for the project will have to be extended. Since reassignment of the staff's efforts will require completion of the new assignment prior to returning to this project, the extent of the extension will most likely be greater than the delay in your response.

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Please feel free to contact Dr. M. J. Oestmann, Environmental Project Manager at area code 301-973-7370 if you have any questions.

Sincerely,

Original signed by
R. S. Cleveland

George W. Knighton, Chief
Environmental Projects Branch No. 1
Directorate of Licensing

Enclosure:
Request for
Additional Information

cc: Arvin E. Upton, Esq.
LeBoeuf, Lamb, Leiby & McRae
1821 Jefferson Street, N.W.
Washington, D. C. 20036

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Form AEC-318 (Rev. 9-53) AECM 0240

REQUEST FOR ADDITIONAL INFORMATION
INDIAN POINT UNIT NO. 3
DOCKET NO. 50-286

I. INTRODUCTION

A. Permits

1. The Federal Water Pollution Control Act was amended in 1972. The status of any water quality certification granted to the applicant from New York State should be presented in view of this new amendment.

2. Based on experience of fish kill problems at the intake structures at Indian Point Units Nos. 1 and 2, the status of any agreements made with the New York Department of Environmental Conservation regarding modifications of the intake structures should be described.

3. If available, the permit from the NYS Department of Environmental Conservation to discharge effluents through the discharge structure should also be provided.

II. THE SITE AND ENVIRONS

A. Terrestrial Ecology of the Area

1. A vegetation survey listing species composition and relative abundance of major plant species within a 2-mile radius of the plant is required. All croplands, pasture areas, gardens, etc., occurring within a 5-mile radius of the plant site should be included. In addition, the approximate composition (species-%) of the proposed 80-acre natural area on the site should be provided.

2. A survey of faunal composition including specific information relative to population densities and numbers of mammalian and avian species occurring within a 2-mile radius of the plant site is required. Information should include best estimates of occurrence of transient species, as well as information regarding any unusual habitat preferences which may be ascribed to the species mentioned.

3. A recent aerial photograph (scale approximately 1 inch equals 1000 ft) showing the site area and vegetation within a 2-mile radius of the plant site should be supplied. If possible, this should be at a time of full foliar development.

4. A large contour map of the area within a 10-mile radius of the Indian Point site showing site location, all other generating facilities (steam plants and hydro stations), improved and unimproved roadways, railroad rights-of-way, transmission line corridors, ecological and meteorological sampling stations, locations of substations and switching assemblies, population centers and airports should be supplied.

B. Water Chemistry

1. Monthly maximum, minimum, and average values of salinity and total dissolved solids for one recent calendar year for the Hudson River at a point and depth representative for the Indian Point Unit No. 3 intake should be supplied.

2. Concentration levels of ammonia nitrogen, total organic carbon and copper already present in the Hudson River averaged over a monthly period for one year should be reported.

C. Meteorology

1. With reference to Table 3.1.1 of the Benefit-Cost section in Supplement 2 to the Environmental Report, information on the frequencies (number of hours annually) of fog naturally occurring in all of the specified sectors is needed.

2. One recent year's on-site data (or data from a nearby station along with sufficient correlative information to allow for estimating percentage of error associated with applying this data to the Indian Point site) should be supplied regarding:

   a. monthly frequency distributions of saturation deficit versus time (percent)

   b. monthly correlations of wind speed and direction with saturation deficit

3. Information concerning vertical distance(s) at which prevailing regional wind direction patterns assume dominance over Hudson Valley regime should be provided.

III. THE STATION HYDRAULICS, THERMAL AND CHEMICAL DISCHARGES

A. Hydraulics of the Station

1. For Indian Point Unit No. 1 a schematic flow diagram (or equivalent description) for the steam and condensate systems and for the cooling and service water systems, showing flowrates and temperatures should be provided. Arrangement and flowrates in the deicing system should be indicated.

2. A block diagram of water usage with approximate inventory of water in the cooling and service water systems of each unit is required.

3. For Units Nos. 1, 2 and 3, the dimensions should be provided of the cooling and service water conduits and canals and water velocities as required to estimate the water residence times in the various portions of the systems. Data on the recirculation capabilities which allow these units to pump water at reduced capacities should also be described.

4. The surface area for the steam turbine condenser tubes, and the expected corrosion rates in Units Nos. 1, 2 and 3 should be described. Other major materials of construction in the cooling and service water systems, and the typical pressures, temperatures and water velocities they are exposed to should be provided.

5. Reference is made on page 9-6 and in Figure 18 of Supplement 3 to the Environmental Report to a possible common intake structure for fixed fine screens for Units Nos. 1, 2 and 3. The firm plans for use of the common intake screens should be presented.

B. Thermal Discharges

1. In Supplement 3 of the Environmental Report, on page 9-14 it is stated that "The feasibility of developing a more effective effluent discharge scheme, such as a submerged thermal diffuser, will be explored." The results and conclusions drawn from the exploration should be provided.

2. Any additional field or model data that have been developed since preparation of the Environmental Report on Indian Point Unit No. 3, and Supplements 1 through 3 thereto, should also be furnished, that would add to the knowledge of dilution flows, degree of vertical mixing, thermal stratification factors, dispersion coefficients, etc., in the Hudson River at Indian Point.

3. For each of the capacity levels (1) rated and (2) design (stretch) for Units Nos. 1, 2 and 3, give: reactor thermal output, net electrical output, gross electrical generation, thermal heat rejection to environment, circulating water flowrates and temperatures rise through the condensers; for the service water system give heat rejection, water flowrates and temperature rises through the systems.

C. Chemical and Other Discharges

1. The details on the usage of the flash evaporator to distill river water for make-up need clarification. The average volume of water distilled, the concentration factor and the estimated average amount of $H_2SO_4$ used should be presented.

2. The method for determining the residual chlorine discharge should be discussed. A description of the different forms of chlorine included in the term "residual" should be provided. Methods used to reduce the amount of chlorine used and discharged should also be considered.

3. If the filter beds in the sewage system are overloaded and chlorination becomes necessary, the amount of chlorine to be used should be estimated and the method to be used for monitoring the chlorinated effluent as well as the point of discharge into the river should be presented.

4. The source of potable water and its treatment, volume, etc., should be described.

5. Details on the primary system demineralizers such as the maximum amount of NaOH to be used, amount of water flow, etc., should be provided. This should also include the amounts of NaOH used for each ion exchange regeneration cycle.

6. Details on the type of monitoring to be carried out for the heavy metal ions in the effluent, including type of analysis, sensitivity, etc., should be presented.

7. The chemicals, quantities and disposal of all degreasing and cleaning solutions used prior to start-up should be indicated.

8. The methods of disposal of oil and grease leakage from the various components should also be presented.

9. The Environmental Report for Indian Point Unit No. 3 gives the total boron discharged as 900 lbs/day from all 3 units with Unit No. 3 discharging 300 lbs/day. The ER for Unit No. 2 cites 600 lbs/day discharged from each Unit No. 1 and Unit No. 2. The apparent discrepancy needs explanation.

10. The apparent differences in usage (lbs/day) and concentrations of hydrazine, morpholine and cyclohexamine discharged from each of the 3 Units should be explained.

11. In regards to Unit No. 1, information is needed on the frequency and amounts of chemical additions to and discharges from the different water systems and on where they are introduced and discharged. Include the chemical analysis of the boiler blowdown.

12. Details of the chemical treatment of plant service water should be supplied.

13. Information regarding the expected dilution of chemical discharges in the Hudson River should be supplied. Dilution contours for factors of 10 extending 1000 ft from the discharge point at high and low tides are desired. Data on concentration of chlorine along the length of the discharge canal and out into the plume and how this curve changes with time following chlorination should be provided.

14. Information regarding gaseous and liquid non-radioactive discharges from nearby plants (within a 1.5-mi radius of the plant site) and possible synergistic effects with discharges from the plant should be supplied.

## IV. ENVIRONMENTAL IMPACTS OF PLANT OPERATION

### A. Impact of Transmission Facilities

1. Any information available regarding the purchase of additional rights-of-way for transmission lines to Millwood or Sprain Brook should be provided.

2. Plans for clearing vegetation and maintenance of right-of-ways should be described.

### B. Radiological Impact

1. Insufficient information is presented in the Environmental Report or Supplements to reproduce the dose rates on biota. Specifically, a table of biological accumulation factors

should be provided as well as the necessary information to reproduce the dose rates given in Table 14-3 in Supplement 2.

2. In addition, a discussion of any direct exposure that may be incurred by the off-site population from on-site radioactivity is also lacking.

3. In addition, the distances from the point of release of gaseous effluent to the nearest milk cow and site boundary in each of the 16 sectors are required. Also, the distances from the point of release of gaseous effluents to the nearest residences in the different sectors surrounding the site particularly along the east bank of the Hudson River are needed.

4. In determining doses from plant accidents, the detailed assumptions used in calculating the consequences of each class of accidents are required. Details of the meteorology used in determining the estimates of doses at the site boundary and the integrated man-rem dose to 50 miles are needed.

C. Biological Impact (Aquatic)

1. The location of sampling points 5 and 6 in Fig. 1 in the February 5, 1973 testimony, "Effect of Indian Point Units 1 and 2 Operation on Hudson River Dissolved Oxygen Concentrations" (J. P. Lawler) should be provided.

2. A methodology for predicting impingement at the intake to Unit No. 3, including consideration of a loss factor for fish impinged but not collected and consideration of local reduction in stock should be provided.

3. A figure comparable to Fig. V-3, page V-29 of the FES for Unit No. 2, including least-squares curve, the regression model used, $r^2$, and a tabulation of the impingement and velocity values in the figure should be provided.

4. A tabulation should be provided of the data corresponding to the histogram in Fig. 2, page 6 of the February 5, 1973 testimony, "Effects of Entrainment on Morone sp. (striped bass and white perch) eggs and larvae at Indian Point" (G. J. Lauer).

5. The $\Delta T$ values (T at station D2 or discharge ports minus T at intake) and residence times to stations D1, D2, and the discharge ports should be provided for the following 7 combinations of Units at 60% flow and at 100% flow: each Unit alone, Unit Nos. 1 and 2, Units Nos. 1 and 3, Units Nos. 2 and 3, and

Units Nos. 1, 2, and 3. See testimony of February 5, 1973, "Effects of Entrainment on Morone sp. (striped bass and white perch) eggs and larvae at Indian Point" (G. J. Lauer) for location of stations D1 and D2. How were these residence times calculated and what assumptions were made?

6. Velocity contours should be provided at station D2 for all three units operating at 100% and at 60% flow and for Unit No. 1 alone operating at 100% and 60% flow. How would residence time of a passive particle vary depending upon lateral and vertical position in the effluent stream?

7. A tabulation should be presented of the daily temperature data (minimum, maximum and mean) corresponding to the values plotted in Fig. 2 and Fig. 3 of the February 5, 1973 testimony, "Expected Water Temperature at Indian Point During Entrainment Period" (J. P. Lawler).

8. Data and analysis should be supplied from the study on the growth rate (both length and weight) of white perch during the past nine years.

9. Monthly estimates of the number of striped bass migrating past Indian Point between October and May should be provided.

10. Data on the number, size distribution and stomach contents of the white catfish in the discharge canal should be presented.

11. Copies of all Texas Instrument reports since April 1972 and continuing for the duration of the Indian Point Unit No. 3 evaluation should be supplied.

12. An estimate of the monthly ranking by number and by biomass of the top ten fish species in the Indian Point area from January 1970 to December 1972 should be presented. Include absolute and relative (i.e., percentages) number and biomass values.

13. Concentration levels of dissolved oxygen concentration in the thermal plume should be predicted with Units Nos. 1, 2, and 3 operating at 100% flow at slack low tide and an ambient river temperature of 80°F under the following conditions:

a) with and without the bubblers in operation on Units Nos. 1 and 2

b) day versus night

Assumptions and model parameters used in making the predictions should be provided.

14. An explanation should be provided for the dissolved oxygen deficit of the intake water alluded to in testimony of February 5, 1973, "Effect of Indian Point Units 1 and 2 Operation on Hudson River Dissolved Oxygen Concentrations" (J. P. Lawler).

15. Data on impingement should be provided as a function of diurnal cycle and of tidal cycle for the four periods December - February, March - May, June - August, and September - November.

16. Is the distribution of impinged fish on the fine screens of Units Nos. 1 and 2 positively correlated with the velocity distribution at the fine screens? How is the velocity distribution altered by the bubble screen?

17. Icthyoplankton data obtained from intake and discharge canal sampling should be provided as related to: a) survival with and without bubble curtain; b) estimates of % survival of the entrainable stages of striped bass, white perch, tomcod and any other commonly entrained species.

18. Any data available and model predictions relating to the possibility that impingement may be reduced during the winter due to warmer than ambient water temperatures at the intakes should be supplied.

19. A comparison of faunal collections (invertebrates and vertebrates) in the discharge canal during the day versus night and during chlorination versus no chlorination should be presented.

20. Any bioassay data available on fish eggs and larvae collected at the plant site including: a) organism and life stage, b) size and origin, c) physical data (temperature, DO, salinity, pH), d) duration of test, and e) conclusions and logic should be provided.

21. With reference to Tables 2 and 3 in testimony of February 5, 1973, "Effects of Indian Point Units 1 and 2 on Hudson River Fish Populations" (J. T. McFadden), the error mean square for each of the 16 regression analyses and the 95% confidence interval about each of the values in these two tables should be provided. What is the logic involved in extrapolation from the data and analyses used to generate Tables 2 and 3 to cause-effect conclusions concerning compensatory growth?

V. COMMITMENT OF RESOURCES

1. What are your plans for use of the site when operation of the nuclear plant finally terminates? The structures that will be removed should be identified. Other action that will be taken to clear the site should be described. Any licensable quantities of radioactive materials that would be stored on site, the term of such storage, and arrangements for custodial care should also be identified. Estimate the cost of decommissioning on the basis of the present economy. If decisions on these measures have not yet been made, provide this information for each alternative that you believe to be practicable.

2. For components in the primary coolant system, radioactive waste treatment system, reactor shielding, and other systems that are expected to be sufficiently radioactive at the termination of operation (and terminal decontamination) that use or possession would require a specific AEC license:

   a. Each type of component should be identified.

   b. Any material constitutents and quantities in metric units (Identification of metals by specific alloy type is preferable) should be presented. Quantities less than 100 metric tons of steel not containing materials on the list of strategic and critical materials, 37F.R.4123, February 26, 1972, should be neglected.

   c. State whether it is expected that each type of component could be decontaminated.

3. The quantities (in Kg) for Unit No. 3 of the following materials that will be utilized during the term of the operating license for initial and replacement loadings of the reactor core should be estimated.

a. Fuel input to the reactor in the form of the initial and replacement core loadings should be described as follows:

1. U - The quantity of contained uranium at each enrichment introduced in new fuel elements and the assumed reloading schedule should be presented.

2. Pu - The quantity and isotopic composition of contained fissionable plutonium and other fissile and fertile materials introduced in new fuel elements and the assumed loading schedule should be estimated.

b. Fuel recycle - The assumed fuel burnup at time of discharge, in megawatt-days per metric ton of initially contained fissile and fertile material, for each type of fuel is needed. For each type of new fuel, the quantities of each fissile or fertile isotope recoverable from the spent fuel removed from the reactors should be estimated.

VI. NEED FOR POWER

1. The dates and duration of emergency load reductions, percent installed reserves, and date of peak load day for calendar year 1968 through 1972 should be provided.

2. The following table for the individual generating station capability for your total system should be completed.

| Unit Name | Location | Type | Date Installed | Dependable Capacity (KW) Summer | Winter |
|---|---|---|---|---|---|

3. A generation and capacity forecast for the years 1972 through 1981 should be supplied by completing the following table:

| | Addition (or retirement)[a] | | | Total | Installed generation reserve | | |
|---|---|---|---|---|---|---|---|
| Year | Net Unit load (MW) | Date | Unit Net capacity[b] (MW) | generating capacity (MW) | Megawatts | Percent | Percent without IP-3 |

[a] Include firm power purchases.

[b] Based on summer capability.

4. The attached table entitled "Values for Peak Demand Hour" should be completed.

_____

(Applicant)

VALUES FOR PEAK DEMAND HOUR

| YEAR | HYDRO CAPACITY | FOSSIL CAPACITY | GAS TURBINE CAPACITY | OTHER CAPACITY | NUCLEAR CAPAICTY | NET PURCHASES | TOTAL SYSTEM CAPACITY | PEAK LOAD DEMAND | ORNL PREDICTED DEMAND | APPLICANT PREDICTED DEMAND | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1961 | | | | | | | | | | | |
| 1962 | | | | | | | | | | | |
| 1963 | | | | | | | | | | | |
| 1964 | | | | | | | | | | | |
| 1965 | | | | | | | | | | | |
| 1966 | | | | | | | | | | | |
| 1967 | | | | | | | | | | | |
| 1968 | | | | | | | | | | | |
| 1969 | | | | | | | | | | | |
| 1970 | | | | | | | | | | | |
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| 1978 | | | | | | | | | | | |
| 1979 | | | | | | | | | | | |
| 1980 | | | | | | | | | | | |

5. A tabulation of consumption of electricity in the applicant's service area by user classification (residential, commercial and industrial, other) for 1960 and 1970 plus projections for 1975 and 1980 should be provided.

6. A map showing the applicant's generation and transmission facilities including interconnections with adjacent utilities should be supplied.

7. Actual quantities of load shed on September 22, 1970 should be provided.

8. What will be the impact of Indian Point Units Nos. 2 and 3 on Con Edison's spinning reserve obligations to the New York Power Pool?

9. Major suppliers of oil to Con Edison and major contract quantities of oil per year should be identified.

10. What percentage of this oil comes initially from foreign sources?

11. In general terms, what is the oil availability to Con Edison for the decade of the 1970's and, if possible, the decade of the 1980's?

12. What is a typical current supply of oil on hand in days of generation supply? Also include days of generation supply from oil in transit.

13. Major transmission projects currently authorized with a description of delays, permits, or public hearings that contributed to the delay of the project should be listed.

14. A general description of Con Edison's ability to import major amounts of bulk power from 1973 until after Indian Point Unit No. 3 is in service should be presented.

15. What were the predicted peak load demands for the years 1961 through 1972?

16. During which years were the actual peak loads reduced by employing voltage reductions?

17. How much emergency power has Con Edison supplied to members of the New York Power Pool in recent years? Please list by year and note whether transfers occurred during summer or winter.

18. If available, any seasonal diversity exchange agreements with other utilities should be listed.

## VII. ALTERNATIVES

1. If available, the cooling tower proposed as an alternate cooling method for Unit No. 2 should be described, including the following design data: type of tower, state whether counterflow or cross-flow, location, water flowrate, cooling range, approach temperature, design wet bulb temperature, tower dimensions, exit area, exit velocity, direct capital cost of tower and of piping and appurtenances, blowdown rate, blowdown concentration, chlorination rate, any other chemical additions, water inventory in tower basin, and dilution rate planned for tower blowdown before discharge into the river.

2. If available, indicate for the cooling tower proposed as an alternate cooling system how the exit air temperature and velocity varies with ambient air relative humidity, and wet bulb temperature.

3. If an alternate natural draft cooling tower arrangement for Units Nos. 2 and 3 were utilized, the maximum salt concentration in the circulating cooling water should be estimated.

4. Information on the approximate rates of natural salt deposition over the site area in lb/acre/year is required.

5. Information on the increase in noise level at various distances from the plant site during the operation of Unit No. 3 as proposed and with alternate cooling methods is required.

6. The possible effects of discharges from the cooling tower proposed as an alternate cooling system on the air quality in the lower Hudson Valley should be supplied. Possible interactions with discharges from nearby fossil-fuel power plants and the expected damage to vegetation as a result of plume interaction with atmospheric oxidants should be discussed.

## VIII. BENEFIT-COST ANALYSIS

1. The size of the operating force expected for Unit No. 3 should be estimated.

2. The expected total annual salary that will be paid to the Unit No. 3 operating personnel should be provided.

3. A breakdown of expenditures to date on Unit No. 3 should also be furnished.

4. Has a standard 40-hour work week been used during construction work to date?

5. What escalation rate(s) has been used during construction?

6. The exact date when the nuclear steam supply was ordered should be stated.

7. What cost of land was assumed in arriving at the total capital cost for Unit No. 3?

8. A new page B.1.4-1 in the Benefit-Cost Analysis should be furnished.

9. On p. B.2.1-1, line 9 of the Benefit-Cost Analysis, the applicant used a discount rate of 9.75%. In order to achieve consistency of treatment in environmental statements, a discount rate of 8.75% is to be employed.

10. On page 1.1-2 and associated text, the total weight of fish lost should be that of the number of adult fish. This procedure is stipulated in the AEC cost-benefit guide of May 1972. The resulting changes in the values given in Tables 1.1-1 and in 1.1-2 would be in orders of magnitude. These values thus need to be reevaluated. Even though total survival will not occur in nature, it should be possible to make a reasonable estimate of what the actual loss will be in terms of harvestable fish.

11. On page 1.1-2, based on the weight of other species in the table provided ranging from 1/20 to 1/5 of an ounce, the number of fish impinged becomes 55,000 to 220,000 fish rather than the 10,813 cited. This should be clarified. In reference to page 1.2-2, documentation for the method of extrapolating the weight of food organisms to the weight of fish is needed. Based on conversion factors between tropic levels of 1/10 which is normally used rather than 1/1000, the loss of fish calculated from loss of food organisms could be at least one order of magnitude greater than the applicant's estimate. This discrepancy needs clarification.

12. On page 1.2-3.4-5 although entrainment losses of juvenile and larval fish are discussed, no estimates of what the losses would be. This information is required because of the importance of this environmental cost of the facility. In addition there should also be information concerning losses of fish eggs.

13. On page 1.3-9 section of fish migration the applicant's allegations of no impairment to fish migration needs far more support than presented here. Details for each significant species along with illustrative maps or diagrams should be presented.