UNITED STATES OF AMERICA

ATOMIC ENERGY COMMISSION

DOCKETED USAEC JAN 2 1974 Office of the Secretary Public Proceedings Branch

In the Matter of	)	
Consolidated Edison Company of New York, Inc. (Indian Point Nuclear Generating Unit 3)	))))	Docket No. 50-286

INTERROGATORIES TO
Applicant from Hudson River
Fishermen's Association and Save our Stripers

Pursuant to 10 C.F.R. §2.740, §2.740b and §2.741 (1973), and to the schedule for interrogatories agreed to by the parties, the Hudson River Fishermen's Association ("HRFA") and Save Our Stripers ("SOS") propound the following written interrogatories to the Consolidated Edison Company of New York ("Con Edison"), Applicant.

HRFA and SOS request responses by such officers or agents of Applicant Con Edison as have personal knowledge of the matters here inquired into in accordance with 10 C.F.R. §2.740b (1973). Where Con Edison lacks the information sought, HRFA and SOS request Con Edison so state in response to any specific interrogatory.

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10. What was the total number of eggs obtained?

11. What was the total number of fertile eggs obtained?

12. What number of eggs were hatched out?

13. Provide a description of the rearing method from the egg stage to the size at which fish would be stocked in the Hudson indicating at what (a) size and (b) age the organisms underwent any of the following changes: (i) change in salinity of water (indicate in each case what the change in salinity was); (ii) change in type and quantity of food supply, (indicate in each case what the change in type and quantity of food supply was); (iii) change in water temperature (indicate in each case what the change in water temperature was); (iv) change in physical rearing situation (indicate in each case what the change in physical rearing situation was and how the change was accomplished, e.g., transportation by truck or air).

14. With regard to each change, set out in response to the question I. 13, indicate (a) how many organisms were alive immediately before the change occurred, (b) how many organisms were alive immediately after the change occurred, (c) how many were alive (i) 24 hours, (ii) 72 hours after the change occurred?

15. At what (a) size and (b) age were the fish stocked in the Hudson?

16. How many fish were stocked in the Hudson?

17. How many fish from these experiments were stocked in places other than the Hudson? If such non-Hudson stocking was done, what is the reason for it? If such non-Hudson stocking was done pursuant to contract or agreement, please produce a copy of the contract or agreement.

18. Exactly where and how were fish stocked in the Hudson?

19. Describe any tagging or marking of fish stocked in the Hudson.

20. Were any measurements of the survival of the fish stocked in the Hudson made? If so, indicate (a) how such measurements were made, (b) what period of survival was measured, (c) what numbers (both in absolute and percentage terms) survived for each period measured.

21. If future measurements of the survival of fish stocked in the Hudson are planned, indicate how and when those measurements of survival will be made.

22. What was the cost of raising each fish stocked in the Hudson to the size at which it was stocked?

23. If any experiments involving artificial propagation of a fish species or other aquatic biota has been undertaken by Con Edison's employees or consultants or is available to Con Edison through the New York Power Coordinating Committee, please answer questions I.1 - I.22 with respect to each such experiment, providing a complete and separate answer for each experiment.

sample. If the striped bass eggs, larvae and juveniles taken were categorized as to condition (e.g., alive, dead, stunned) indicate the number in each sample in each condition category.

10. For each condition category set out in response to Question II.9, give the definition of the category and indicate the basis on which organisms were determined to belong to each category.

11. With regard to all research conducted by Con Edison's employees or consultants or available to Con Edison through the New York Power Coordinating Committee which involves the determination of the abundance and/or distribution of any other Hudson River fish species or aquatic biota in the vicinity of Indian Point, please answer questions II.1 - II.10, providing complete and separate responses for each program of research and each biota form.

III. With regard to all field research conducted by Con Edison's employees or consultants or available to Con Edison through the New York Power Coordinating Committee which involves the determination of the mortality or survival of striped bass organisms during passage through the cooling system of a steam electric plant, please answer the following questions, providing complete and separate answers for each program of research.

II. With regard to all research conducted by Con Edison's employees or its consultants or available to Con Edison through the New York Power Coordinating Committee which involves the determination of the abundance and/or distribution of striped bass in the vicinity of Indian Point, please answer the following questions, providing complete and separate responses for each program of research.

1. Indicate the stations at which sampling was done, indicating the depth of the water at each station.

2. Indicate for each sample the depth at which it was taken.

3. Indicate for each sample the date and time at which it was taken.

4. Indicate for each sample the size and mesh of the net with which it was taken.

5. Indicate for each sample the volume of water which passed through the net.

6. Indicate for each sample the velocity at which the water passed through the net.

7. Indicate for each sample the tidal conditions in which the sample was taken.

8. Indicate for each sample the temperature of the water at which it was taken.

9. Indicate for each sample the number of (a) striped bass eggs, (b) striped bass larvae, (c) striped bass juveniles that were taken, providing for each sample the size of the striped bass larvae or juveniles taken in such

I. With regard to each experiment involving the artificial propagation of striped bass undertaken by Con Edison's employees or consultants or available to Con Edison through the New York Power Coordinating Committee, (discussed at Tr. 9526 et seq.of I.P.2 proceeding Docket 50-247.), please answer the following questions, providing a complete and separate answer for each experiment.

1. How many (a) males, (b) females were obtained as brood stock?

2. What was the average weight of (a) males, (b) females in the brood stock?

3. What was the average age of (a) males, (b) females in the brood stock?

4. How many females were successfully ovulated?

5. How was the brood stock obtained?

6. From where was the brood stock obtained?

7. When was the brood stock obtained? Reply both in terms of calendar time and in terms of ripeness of females.

8. How long did the members of the brood stock survive? Distinguish between (a) males, (b) females successfully ovulated, and (c) females unsuccessfully ovulated.

9. Among the females that were successfully ovulated (a) what was the average total number of eggs obtained per female, (b) what was the average total number of fertile eggs obtained per female?

1. Indicate the steam electric plants at which research was conducted.

2. With regard to each plant identified in Question III.1, provide a scale plan of the plant showing the passage of the organism from the river into the intakes, through the cooling and discharge system and back to the river.

3. On each plan provided in response to Question III.2, indicate (a) any screening devices, giving size of mesh, (b) any weir or other obstruction to the passage of water, (c) the depth of the water throughout the intake and discharge systems, (d) the depth of the water for 100 yards around the intake and discharge structure, (e) the depth at which the water is removed from the river for cooling, and (f) the depth at which the water is discharged to the river.

4. Indicate the velocity at which the water passes through the screens of the intake system.

5. Indicate the velocity at which the water passes through the discharge canal or discharge piping system.

6. Indicate the velocity and pressure at which the water leaves the discharge system and enters the river.

7. Indicate on each plan provided in response to Question III.2 the stations at which samples of striped bass organisms were taken.

8. Indicate the dwell time of organisms between leaving the condensor tubes and (a) reaching each sampling station, (b) entering the river.

9. Indicate for each sample the depth at which it was taken.

10. Indicate for each sample the date and time at which it was taken.

11. Indicate for each sample the size and mesh of the net with which it was taken.

12. Indicate for each sample the volume of water which passed through the net.

13. Indicate for each sample the velocity at which the water passed through the net.

14. Indicate for each sample the tidal conditions in which the sample was taken.

15. Indicate for each sample the period during which the net was in the water while the sample was being taken.

16. Indicate for each sample the temperature of the river in the vicinity of the intake at the time the sample was taken.

17. Indicate for each sample the ΔT across the condensors at the time the sample was taken.

18. Indicate for each sample the number of (a) striped bass eggs, (b) striped bass larvae, (c) striped bass juveniles that were taken, providing for each sample the size of the striped bass larvae or juveniles taken in

such sample. If the striped bass eggs, larvae and juveniles taken were categorized as to condition (e.g., alive, dead, or stunned) indicate the number in each sample in each condition category.

19. For each condition category set out in response to Question III.18, give the definition of the category and indicate the basis on which organisms were determined to belong to each category.

20. Indicate for each sample how long the organisms were held after the sample was taken, and under what conditions the sample was held (e.g., temperature, food supply).

21. Indicate for each sample any changes in the condition of the organisms observed while the sample was being held after being taken; provide the time after taking at which the change of condition was observed.

22. Describe with particularity any experiment in which eggs, larvae or juveniles were marked, tagged or dyed and then introduced into the intake system and collected in the discharge system. Indicate (a) number of organisms introduced into intake system, (b) number of organisms collected in discharge system, (c) condition of organisms introduced and collected including any indications of mangling or mutilation of organisms during passage through cooling system, (d) ΔT across condensors during experiment,

(e) age and size of organisms used in experiment, (f) plant at which experiment was conducted, (g) location of the stations at which samples were collected, (h) size and mesh of net used in collection, (i) velocity at which water passed through collecting nets, (j) period during which collecting nets were kept in water at collecting station, (k) method of marking, tagging or dying used.

23. Describe with particularity any research which confirms or contradicts the findings of the Hudson River Fisheries Investigation 1965-1968 as follows:

> North of Peekskill, striped bass eggs generally were more abundant near the bottom in the deeper part of a cross section sampled. At that location they were concentrated in the strata 15 to 30 feet off the bottom. ...
>
> The concentrations of eggs off the bottom at Peekskill suggested that the increased density of the water there, combined with turbulence, prevented the eggs from sinking closer to the bottom as at upstream locations. HRFI at 17-20.

24. With regard to all field research conducted by Con Edison's employees or consultants or available to Con Edison through the New York Power Coordinating Committee which involves the determination of the mortality or survival of any Hudson fish species or other aquatic biota during passage through the cooling system of a steam electric plant, please

answer Questions III.1-22, providing complete and separate answers for each species of biota and for each program of research.

IV. With regard to all laboratory research conducted by Con Edison's employees or consultants or available to Con Edison through the New York Power Coordinating Committee which involves the determination of the mortality or survival of striped bass organisms during passage through the cooling system of a steam electric plant, please answer the following questions, providing complete and separate answers for each program of research.

1. Describe the equipment with which each piece of research was undertaken.

2. For each piece of research indicate (a) the number of organisms involved, (b) the size of the organisms, (c) the age of the organisms, (d) the condition of the organisms before the research was conducted (giving numbers in each condition category established in connection with the research experiment), (e) the condition of the organisms immediately after the research experiment was completed (giving numbers in each condition category established in connection with the research experiment), and (g) the period for which the organisms were held on completion of the experiment and under what conditions such organisms were held.

3. Describe with particularity for each piece of research the changes in (a) pressure, (b) temperature, (c) turbulence, (d) sheer forces, and (e) exposure to chemical substances, to which the organisms were exposed during the research experiment. Indicate in each case whether the organisms were exposed to simultaneous changes of the indicated parameters or to seriatim changes in the indicated parameters.

4. For each condition category set out in response to Question IV.2, give the definition of the category and indicate the basis on which organisms were determined to belong to each category.

5. For each piece of research, indicate any changes in the condition of the organisms observed while the organisms were being held after the research experiment was completed; provide the time after the completion of the research experiment at which the change of condition was observed.

6. With regard to all laboratory research conducted by Con Edison's employees or consultants or available to Con Edison through the New York Power Coordinating Committee which involves the determination of the mortality or survival of any Hudson fish species or other aquatic biota during passage through the cooling system of a steam electric plant, please answer Questions IV.1 - 5, providing complete and separate answers for each species of biota and for each program of research.

V. 1. Describe any changes made in the hydraulic portions of the QL&M model of the life cycle of Hudson striped bass since the conclusion of the Indian Point 2 hearings, giving both the mathematical formulation of the change and a description of the change.

2. Produce the results of any sensitivity analysis made indicating the sensitivity of the QL&M model of the life cycle of Hudson striped bass to changes made in the hydraulic portions of the model.

VI. 1. Describe each research or analysis effort undertaken by Con Edison's employees or its consultants or available to Con Edison through the New York Power Coordinating Committee which involves the determination of the natural mortality rate of Hudson-spawned striped bass.

2. With regard to each research or analysis effort set forth in response to Question VI.1, indicate (a) the duration of each striped bass life stage employed, (b) the mortality rates associated with each life stage, (c) the instantaneous mortality rates through each life stage, and (d) the empirical basis from which the natural mortality rates were derived.

3. Describe each research or analysis effort undertaken by Con Edison's employees or its consultants or available to Con Edison through the New York Power Coordinating Committee which involves the determination of changes in the mortality rates of striped bass in one life

stage caused by or associated with changes in the mortality rates of striped bass in another life stage.

4. With regard to each research or analysis effort set forth in response to Question VI.3, indicate the precise mechanism which produces the changes in the mortality rate.

5. With regard to each research or analysis effort undertaken by Con Edison's employees or its consultants or available to Con Edison through the New York Power Coordinating Committee which involves the determination of the mortality rates of any Hudson fish species or other aquatic biota, please answer questions VI.1-4, providing complete and separate answers for each species of biota and for each research or analysis effort.

VII. Describe with particularity any research conducted by Con Edison's employees or its consultants or available to it through the New York Power Coordinating Committee which involves the determination of the contribution of Hudson-spawned striped bass to the Atlantic coastal stock of striped bass.

VIII. 1. Please produce all records on fish impingement at Indian Point 1, 2 or 3 not already produced in the Indian Point 2 proceeding. For each period between counts of impinged fish included in such records, indicate (a) ambient temperature of the water in the vicinity of Indian Point,

(b) water temperature at the relevant intakes, (c) the power level at which the relevant plant was operating, (d) the ΔT across the condensors of the relevant plant, (e) the number of pumps in operation, (f) the rate at which each pump was pumping, (g) the position of the screens at the intake of the relevant plant, (h) the mode of operation of the air bubbler system, or any other system intended to prevent the impingement of fish, and (i) the velocity of the water passing through each set of screens. For each count of impinged fish, indicate (a) the number and size of each species taken, (b) the method by which the count of impinged fish was made.

2. Please produce the preliminary design and hydraulic modelling noted on p. 66 of the Con Edison response to HRFA Interrogatories dated November 30, 1973.

3. Provide the results of the investigation of the eight systems for reducing impingement set out at pp.66-68 of the Con Edison Responses to HRFA Interrogatories dated November 30,1973; indicating in regard to each system (a) the exact physical method by which it would operate, (b) its cost, (c) the time necessary for its construction, (d) the absolute and relative amount by which it would be expected to reduce impingement and the empirical bases for these estimates, (e) any experiments (with the results of such experiments) undertaken to test the effectiveness of the system,and (f) any reports on the operation and effectiveness of the system at any other site.

IX.

Set forth actual demand for and use of electricity in (a) the Con Edison system and (b) the New York Power Pool for October, November and December 1973.

1. What units were in operation to meet this demand in (a) the Con Edison system; (b) the New York Power Pool.

2. What MW and percentage of operative system capacity did each such unit represent in (a) the Con Edison system, (b) the New York Power Pool.

3. What percentage reduction from predicted demand actually occurred in October, November and December 1973 in (a) the Con Edison system, (b) the New York Power Pool.

4. If similar reductions were to occur in each month during the year, set forth the adjusted peak load demand for table VI-4-1 and the adjusted maximum one-hour system load monthly in table 8.1 of applicant's responses to interrogatories from HRFA and SOS dated November 30, 1973.

X. For the years from 1961 to 1973 set forth the actual Operating Reserve requirement for each member of the New York Power Pool and for the largest and second largest units actually in service in each such member system in terms of actual peak loads.

1. What such actual Operating Reserve requirement existed for June and July of 1970, 1971, 1972 and 1973?

XI. Set forth the MW amount required for (a) the average anticipated pumping function, (b) the maximum pumping function at the Cornwall Pump Storage Unit (Storm King).

1. What percentage of total system capacity do these MW functions represent for the years 1980, 1981, 1982.

2.(a) When during a given week in (i) summer, (ii) winter, will these MW demands for the pumping function be required? (b) What will monthly MW hour demand be in (i) summer, (ii) winter?

3.(a) Will the MW demand vary from month-to-month in (i) summer, (ii) winter, and (b) if so,why?

4. If the answer to XI. 3 (a)(1) is yes, what MW demand is predicted for May, June and July of 1980, 1981 and 1982?

5.(a). Will the Cornwall (Storm King) pumping function be drawn from any units in particular? (b) If so, which and for what reasons were they so designated?

XII. Set forth in MW amounts the Metropolitan Transportation Authority load demand for the years from 1961 to 1982.

1. What percentage of total system capacity does each such MW amount represent in each year of this period.

2. Would the PASNY base load plant be designed to supply the entire MTA load?

3. How soon could this plant be operative?

4. What is the excess capacity (between the MTA peak load coincident with the Con Edison summer peak load and the MTA independent peak load) which Con Edison would be required to purchase from this PASNY base load plant for 1980, 1981 and 1982, or as soon as the PASNY base load plant is operative, whichever is sooner?

5. What is the projected MTA peak load coincident with the Con Edison summer peak load for the same period in question XII. 4?

6. What is the projected MTA independent peak load for the same period in question XII. 4?

7. What total MW capacity is projected for the PASNY base load plant?

8. What MW amount and percentage of total MW capacity of the PASNY base load plant would be available to Con Edison for purchase?

9.(a) In table 8.1 and the response to question 9 of applicant's responses to interrogatories from HRFA and SOS dated November 30, 1973, is the PASNY base plant included? (b) If so, how? (c) If not, how should those responses be modified to reflect the PASNY plant?

XIII. Elaborate with particularity the response to question 7 (p.21) in applicant's responses to interrogatories from HRFA and SOS dated November 30, 1973 with respect to why cycling operation is more difficult for Indian Point 3 than for Indian Point 2.

1. Under what circumstances would the chemical volume control system be capable of cycling the Unit 3 on a daily basis?

XIV. Reproduce the figure 10.1 from applicant's responses to interrogatories from HRFA and SOS dated November 30, 1973 in a size larger than 8 1/2 x 11" since it is in part illegible when reduced to 8 1/2 x 11."

1. Provide a schedule of definitions for each abbreviation used on Table 10.1.

2. Provide a schedule of maintenance for Indian Point 3, and other outages predictable between 1974 and 1982. Why were these time periods chosen? Are they subject to change due to unpredictable repairs or other causes? If so, how?

XV. Give cost estimates for replacement power per KW hr. both day time and nighttime for the months of June, July and December for 1975, 1977 and 1980, indicating the amounts and types of fuel needed to produce the replacement power.

XVI. Set forth for June, July and December for each year from 1974 to 1982 the estimated quantity of electricity available to Con Edison through firm purchases indicating which purchases will be available at which months.

XVII. Set forth and explain with particularity Con Edison's comparative efficiencies basis for the dispatch of generation.

1. Explain how this basis is adjusted for localized or system conditions and set forth those conditions.

2. Set forth what direction or guidance is given to the computer-driven controller to accomplish such adjustments automatically.

3. Describe with particularity the computer-driven controller.

4. What adjustments are made when a unit undergoes maintenance as set forth in aforesaid Figure 10-1?

5. What variations exist in such direction or guidance as between the months of December, June, July and August in any given year?

6. How will Indian Point 3 be treated in said basis?

XVIII. Describe with particularity what effect the current 3% voltage reduction ordered by the N.Y.S. Public Service Commission has on (a) Con Edison, including its ability to meet energy demand, and (b) Con Edison's customers including performance of residential, municipal and industrial uses.

1. What effect would a 5% voltage reduction have?

2. What effect would a 7% voltage have?

XIX. Describe with particularity the Applicant's energy conservation alternatives now under study, setting forth estimated MW and percentage of total capacity which each such alternative would realize.

1. Is there a ranking as to desirability among such alternatives?

2. If so, what is such ranking and why is each alternative so ranked?

3. Which alternatives has Con Edison analyzed, evaluated or studied and for how long?

4. Attach any memoranda or reports containing such analysis, evaluation or study.

5. Which such alternatives, such as the "Save-a-Watt" campaign have been implemented? What reduction in MW demand can be attributed to such alternatives?

6. What action has Con Edison taken to comply with F.P.C. Order No. 495 (November 13, 1973) on conservation of energy?

XX. Describe with particularity the all possible sources of electricity available for purchases for the months of June and July for the period from 1974 to 1982.

1. What is the MW capacity estimated to be available for purchase from each such source?

2. What factors such as weather, forced outages, etc., affect this availability?

3. Given these factors, what is the minimum electricity capacity estimated to be available in the period set forth in question XX.?

XXI. Set forth (a) the actual predicted demand, (b) reserve requirements, (c) capability report results, (d) actual demand which occurred, (e) purchases of supplementary power to cover any deficits in capability for the month of June in 1972 and 1973, and (f) sources of such purchases, all for the month of June in 1972 and 1973.

XXII. Set forth with particularity what Con Edison has undertaken presently and plans to undertake between 1973 and 1982 to strengthen and/or expand its transmission system.

1. At what times will transmission capacity increase and by what MW amount each time?

XXIII. What is Con Edison's present gas turbine capacity and what increases in that capacity are estimated between 1974 and 1982?

1. What plans does Con Edison have for installation of truncated combined cycle facilities?

2. When will such facilities be available and what MW capacity will be added to the system?

3. If the entire steam capacity of such facilities were utilized, what MW amount would be released for electrical generation (a) in a given year and (b) in December and (c) in June and July?

4. Has Con Edison any plans for installation of combined cycle facilities? If so, when will they be installed and in what MW capacity?

5. If Con Edison has no plans for (a) increased gas turbine facilities, (b) truncated combined cycle facilities, or (c) combined cycle facilities, why not?

XXIV. Set forth the MW amounts and sources of power purchased for the months of June, July and December 1970, 1971, 1972 and 1973.

1. Which purchases were firm purchases and which were not?

XXV. Set forth alternatively the acceptability of reserve capacity for a summer peak load in any given year at 10%, 15%, 20%, 25% and 30%, and the reasons therefore with particularity.

1. What was the actual reserve capacity in 1971, 1972 and 1973 for (a) summer peak load, (b) June and (c) July?

2. What purchases did Con Edison make from the New York Power Pool's reserve during each period in XXV.1?

3. What purchases did the other members of the New York Power Pool make on the Power Pool's reserve during each period in XXV.1?

XXVI. With regard to the installation and operation of a closed cycle cooling system for IP #3, please answer the following questions with respect to both natural draft and mechanical draft (wet) cooling towers,

1. Provide a financial statement for the life of the plant indicating from year to year the capitalization of assets, the incurring of direct and indirect expenses, the costs of operation and the schedule of depreciation related to the construction and operation of the closed cyclc cooling system.

2. What is Con Edison's capital expenditure schedule for the closed cycle cooling system, i.e. what direct and indirect expenditures are expected to be incurred initially

and over the life of the project. Give a year by year breakdown of such schedule with details on what the expenditures are for. (The Environmental Report, Supplement 2 at 17-37, Table -17-4, does not provide sufficient detail in this regard).

3. What are the contingencies that Con Edison anticipates to justify the 20% contingencies cost figure used in its calculations?

3(a) What is the contingency figure Con Edison uses in calculating the cost of other projects? If this figure is different from the 20% used here, what is the basis for the difference?

4. What is the basis for the escalation figure quoted by Con Edison in its Environmental Report, Supp. 2 at 17-36, Table 17-3?

5. In that same table 17-3, electrical costs are escalated at the same rate as construction costs and contingency costs are figured on all direct capital costs, not only installation costs. What is the basis for utilizing such a procedure?

6. In calculating the cost of operation of IP 3 with a closed-cycle cooling system did Con Edison take into account the savings which will result from reduction in the power usage for the screening and mixing systems and the additional pumping now required with the present cooling system?

6(a) If not, why not?

6(b) What would such savings be?

7. What designs for piping has Con Edison considered other than the underground system described in the ER, Supp.2 at 17-33?

7(a) Has Con Edison explored the possibility of a system of above-ground rather than underground piping? If so, what has it found and what would be the expected cost savings from such an aboveground system?

7(b) To reduce the sizeable expenditures on piping, has Con Edison considered relocation of the tower(s) site (s)? If so, what has it found, e.g. what would be the problems involved and what would be the savings or increased expenditures associated with such a relocation?

8. How were the cost figures in ER Supp.2, p. 17-17, paragraph 3 computed?

8(a) Do the cost figures quoted there include the losses over and above the 45 MW loss associated with operation as presently designed?

8(b) What are the KW Hr. (1) peak cost figures, (2) off-peak cost figures, (3) peak demand average cost figures which have been utilized in making the cost determinations? Give the costs in cents per KW Hr.

9. Has Con Edison considered utilization of a cooling water storage facility? If so what has it found?

9(a) What savings in capital and operating costs would result from use of such a facility.

9(b) How would use of such a facility affect cooling tower design and operation?

10. On what basis does Con Edison calculate in Table 17-5, ER Supp. 2 at p.14-41 generating power losses resulting from operation with a closed cycle cooling system? How are back pressure losses accounted for?

XXVII. What is the feasibility of installing a common closed-cycle cooling system serving both IP 2 and 3?

1. What alternative designs exist for such a common cooling system?

1a. Where could such a combined system be sited?

2. What has Con Edison done and what is it planning to do to explore such a possibility?

3. What would be the cost breakdown of such a combined system?

4. How would installation of such a system affect the present schedule for installation of closed cycle cooling at IP 2?

XXVIII. What is the alternative closed-cycle cooling system preferred by Con Edison for Indian Point 3?

1. What are the reasons for this alternative being preferred over the other alternatives?

2. Where would such a system be sited?

XXIX. What kind ofshowing would Con Edison require to support installation of closed cycle cooling at IP 3 as well as IP 2.

XXX. What is the sound construction practice which Con Edison, responding to the interrogatories from HRFA and SOS, November 30, 1973, claims requires that construction of a closed-cycle cooling system for IP 3 should begin one year after the start of construction of the IP 2 cooling system?

XXXI. On what basis does Con Edison predict that the same time period (4 1/2 years) is necessary for installation of a closed-cycle cooling system at IP 3 as is necessary for IP 2?

1. Will not installation of closed-cycle cooling at IP 2 facilitate installation of such a system at IP 3? If so, how? If not, why not?

XXXII. Is the 4 1/2 year time estimate for installation an estimate for each of the alternative systems or only for one? If only for one, what are the time estimates for the other alternative systems?

XXXIII. With respect to each of the steps involved in preparation and actual installation of a closed-cycle cooling system which are outlined in Con Edison's response to the interrogatories from HRFA and SOS dated November 30, 1973, (Question 2.1), answer the following questions for both natural draft and mechanical draft cooling towers.

1. What are the actual activities involved in each of these steps?

2. What is the time which should be allotted to each step?

3. What is the time overlap for these steps?

4. What further environmental studies would have to be done that are not already being done or have not been done in the past?

5. What agencies must review the environmental impact of the alternative closed-cycle cooling systems?

6. What is the estimate of the downtime of IP3 which will be necessary while the cooling system is connected?

6(a) What is the absolute minimum downtime necessary?

XXXIV. Please provide the missing page necessary for a complete response to Question 19.4 of the interrogatories from HRFA and SOS dated July 2, 1973.

XXXV. With respect to Question 19.5 propounded in the interrogatories from HRFA and SOS dated July 2, 1973, please answer the following.

1. Is the information on Lovett and Danskammer which is necessary to adequately answer the question, available to Con Edison through the New York Power Coordinating Committee? If so, what does that information show?

2. Assuming a range of probable efficiencies of turbine performance, what is the ΔT for both the Roseton and Lovett plants?

3. For Bowline 1 and 2, what are the ΔT's corresponding to the load levels presented in Table 19.6-3 contained in Con Edison's response to the interrogatories from HRFA and SOS dated November 30, 1973?

4. For each of the units what will the consequent water withdrawal rates be at the load levels set out in Table 19.6-3 for the units at Bowline, Roseton and Indian Point, and at the load levels Con Edison calculates for Lovett and Danskammer?

XXXVI. When the intake pumps are operating at the lowest practicable rate, what is the peak temperature rise of the water passing through the hottest of the condenser tubes in (a) I.P. 1 (b) I.P.2 (c) I.P.3?

1. What is the peak temperature rise for each of the three units when the intake pumps are operating under normal conditions?

XXXVII. What is the dwell time for a particle between entering the water box at I.P. 3 and leaving the plant (but not the discharge canal) at full and reduced flow?

XXXVIII. With respect to the environmental impacts of alternative closed cycle cooling systems, including icing, fogging, drift, blowdown, noise, please answer the following questions.

1. On the basis of the detailed meteorological, saline drift, noise and blowdown studies, which Con Edison is sponsoring in connection with I.P.2, has Con Edison found that the environmental impacts of any of the alternative closed-cycle cooling systems are greater than Con Edison had previously predicted? If so, what will these impacts be and what data support such conclusions.

1(a) Do the data from these studies support Con Edison's prior predictions on the environmental effects of closed-cycle cooling? If so, please set forth such supporting data. If not, please set forth the data which refute the prior Con Edison predictions.

2. During what times of year is fogging presently a problem along the Hudson River (HR) estuary at Indian Point?

2(a) During what periods of the day in those months is fogging a problem?

2(b) What is the present extent of the fog in times when fogging is a problem in the HR estuary at Indian Point, i.e. what is the geographical range of the fog across the estuary and up and down the estuary on either side of the Indian Point site?

2 (c) How many hours of fog in a given year are encountered (a) in a typical year and (b) in the worst year that may reasonably be anticipated?

3. What have the studies sponsored by Con Edison shown regarding the effects of saline drift is likely to have on plants and building materials?

3(a) What saline concentrations have been used and what effects do the differing concentrations have?

3(b) What has been the length and frequency of exposure of plants and building materials to the various saline concentrations?

3(c) What kinds of plants and building materials have been used in these studies? Where are these plants located?

XXXIXFor the period from 1973 to 1983 set forth the megawatt reserve and percentage of total system capacity reserve for each unit in the system other than Indian Point 3 (a) with each such unit and (b) without each such unit?

1. What MW and percentage does each such unit provide to meet the projected total system capacity from 1973 to 1983?

2. What MW and percentage does each such unit provide to meet the projected peak load demand from 1973 to 1983?

3. What MW and percentage does Indian Point 3 provide to meet the projected peak load demand from 1973 to 1983?