50-286

DETAILED COMMENTS BY THE ATTORNEY GENERAL ON THE

DRAFT ENVIRONMENTAL STATEMENT BY THE DIRECTORATE OF LICENSING UNITED STATES ATOMIC ENERGY COMMISSION RELATED TO OPERATION OF INDIAN POINT NUCLEAR GENERATING PLANT UNIT NO. 3 FOR

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

Docket No. 50-286

December 17, 1973

LOUIS J. LEFKOWITZ
Attorney General of the
State of New York
Office & P. O. Address
Two World Trade Center
New York, New York 10047
Tel. (212) 488 - 5123

JAMES P. CORCORAN
Assistant Attorney General

PETER SKINNER
Environmental Engineer

I. General Comments

A. Introduction

In the past few years, Congress has enacted the National Environmental Policy Act of 1969, 42 USC § 4321, the Clean Air Act Amendments of 1970, 42 USC 1857-18571, the Federal Water Pollution Control Act Amendments of 1972, 33 USC 1251-1376, and several other important pieces of legislation designed to preserve and protect the quality of our natural environment. This recent awakening was for the most part due to a realization that our natural resources were being despoiled and exhausted, and that the public interest required an end to such destruction. The Atomic Energy Commission, in its environmental statements and ultimately in its licensing decisions, must conform to the mandate of these laws.

In general, the State of New York agrees with the recommendations and conclusions of the Staff as contained in its Draft Environmental Statement. The Staff recognized that operation of Indian Point 3 with once-through-cooling would cause unacceptable levels of mortality of aquatic organisms through impingement, entrainment, and thermal pollution

(summarized in DES V-105-108). Almost identical calculations of the effects of Indian Point 2 prompted the Atomic Safety & Licensing Board to order Consolidated Edison to install a cooling tower for that facility. Thus, except for the specific comments contained herein, the State of New York supports the recommendations and conclusions of the Staff's Statement.

B. The Limitations of Modeling

The Staff and the Applicant have attempted to determine the behavior and abundance of organisms in the Hudson River and to predict the adverse effects that the plants' intrusion will have on the Hudson River ecosystem.

The problem with the Staff's modeling approach is that it is limited to predicting only the direct effects of nuclear power plant operation on aquatic biota in the Hudson ecosystem. As for the indirect adverse effects, the models offer little imformation. The long-term effects of temperature changes, possible shifts in the demographic patterns of the estuary, the effects on one organism resulting from the decimation of other organisms, are examples of

unquantifiable indirect effects. Very little data exists on the indirect effects, and because of the necessity for measuring the nature of these effects over the long-term, it would be impossible to calculate them in the time available. Moreover, if long-term studies were undertaken, there would still be unpredictable effects due to the limitations of our present knowledge.

Because of the impossibility of measuring all of the possible indirect adverse effects that this huge project may have upon the Hudson ecosystem, the Attorney General urges the Staff to recognize the limits of its ability to predict the totality of environmental damage through modeling and to point out in its FES that any model predictions of adverse environmental inpact from Indian Point 3 must of necessity be underestimations.

II. Comments on AEC Staff Analysis of Multi-Plant Impact

A. Introduction

The Attorney General supports the inclusion of the multi-plant analysis in the Indian Point 3 DES. However, we believe that the analysis was imcomplete in that it ignored many existing facilities which affect the Hudson River ecosystem. More important

still was the Staff's exclusion of the effects of future facilities on the Hudson which will be operating during the life-span of Indian Point 3.

The applicant opposed consideration of the multi-plant analysis for Indian Point 3 as late as March of 1973, although its consultant Dr. Lawler thought it important to consider the effects of the Lovett and Danskammer plants in his October 30, 1972 testimony (Page 3) "Effect of Entrainment and Impingement, etc." concerning Indian Point 2. This mode of analysis was later expanded by the Indian Point 2 Licensing Board (TR 10010-10023) to include the Bowline and Roseton power plants, both of which were in the process of construction at that time. Multi-plant analysis is necessary, as Dr. Lawler states, "to develop an analytical means to evaluate the potential for direct loss from both entrainment and impingement of eggs, larvae, and juveniles, and also the potential impact of that loss on the adult population of striped bass in the river." (ibid. 2)

In the Indian Point 2 proceedings a mathematical model was developed to predict "...quantitatively the number or percentage of organisms in any stage that may be removed from the river system each

year, and secondly and more importantly, the ultimate, long-term impact of this removal on the river fishery population" (ibid., 76). On the basis of these simulations of reality, decisions could then be made about the one modifiable parameter, power plant operations.

The Staff's report fails to account for the effects upon the estuary of Con Edison's Cornwall Pumped Storage Project (Storm King) recently licensed by the FPC and under construction some 13 miles upstream from Indian Point 3. The Storm King project is a prime example of how the Staff's multi-plant analysis should be augmented to include other industrial and municipal facilities that will be operational during the useful life of Indian Point 3. Moreover, enough data already exists on the estuarine effects of Storm King to allow the Attorney General to provide an example of how the multi-plant analysis can be expanded. The following discussion points up the severity of Storm King's impact on those same species that will be adversely affected by operations at Indian Point 3. The impact from Indian Point 3's once-through-cooling system will obviously be rendered even more severe if the Hudson River fisheries are being decimated by other sources.

B. Description of the Storm King Plant

The applicant's pumped-storage generating plant at Storm King will withdraw from and return to the Hudson approximately 3.4 billion cubic feet of water per week, or four times more water than Indian Point's three power plants combined. At least 24 billion BTU/day will be discharged into the water while it is passing through the Storm King plant. Pressure within the system may vary between 30 and 560 psi, most of the change occurring at the turbine. Passage of organisms through the system will result in substantial mortality since no safeguards against impingement or entrainment have yet been specified for the Storm King facility.

C. Impingement at Storm King

Although no intake screening at Storm King has as yet been specified, it can be assumed that numbers of juvenile fish of various species will be impinged on whatever devices are utilized. If no screens are used, mortality will occur in the transportation of fish up to the reservoir and back down to the river.

One task for the Staff is to describe and quantify the mortality that Storm King will cause to juvenile fish. The Staff can use impingement data from the

Danskammer and Indian Point plants as guides for Storm King. Account must be taken of Storm King's intake portals which are adjacent to shoal areas in Newburgh Bay, areas which the applicant claims are attractive to juveniles. The resultant impingement figures for Storm King should be compared to standing crop estimates for species in that section of the river and factored into the multi-plant model of effects on striped bass and white perch. This will result in a reasonable prediction of fish available for impingement at Indian Point 3.

D. Entrainment at Storm King

Withdrawal of river water at Storm King will carry vast numbers of fish eggs and larvae, and other forms of aquatic biota, through the system. The turbulence and pressure changes should result in substantial mortalities for each age group of aquatic species. The Staff should attempt to quantify the level of mortality in the light of its discussion in the DES (V-42-66) succinctly stated at V-53: "It is quite possible that pressure changes may be a more important factor than temperature."

Of special interest here is the Carlson-McCann Report (HRFI) prepared in 1969 in reference to striped bass eggs, larvae, and young of the year. This report indicates that on a seasonal basis 12.2% (page 43) of the striped bass larvae and 4% (page 41) of the striped bass eggs in the Cornwall segment of the Hudson will be withdrawn daily. On the basis of this report the operation of the project in only two weeks will withdraw over 80% of the larvae and 40% of the eggs present in the segment. Similar effects can be predicted for other species.

The Staff should consider these data in the Hudson River striped bass model presented for Indian Point 3. If a significant mortality occurs upstream from Indian Point 3, the additional effects of Indian Point 3 must be considered even more unacceptable than indicated in the DES.

E. Thermal Effects at Storm King

The operation of the Storm King project will consume 3 kws of electricity for pumping while producing only 2 kws during generation. Most of this energy difference is released as heat to the

water, about 24 billion BTU/day, raising the temperature of the discharge 1.11° F. The Staff should include these data in the multi-plant thermal model to arrive at a more reasonable far-field thermal prediction.

Storm King should be given the same consideration as other power plants along the Hudson whose impact has already been assessed by the Staff in the DES. It would be irresponsible as well as totally irrational for the Staff to blind itself to the effects of one plant on the Hudson ecosystem while considering the effects of all other plants on that same ecosystem.

COMMENTS ON AEC STAFF ANALYSIS OF THERMAL EFFECTS

A. Introduction

The flow regime and mixing characteristics of the Hudson River at Indian Point are extremely complex. For example, during the twice-daily tidal floods, heated water from the plant discharge will tend to flow upstream with the tide. Since the tidal flow is more dense than the fresh-water flow, the upstream flow occurs predominately in the lower layer of the river. Discharges from the plant are principally in the upper-layer and travel predominately downstream. Overall, a temperature rise occurs upstream of the discharge canal, as well as downstream, as shown in the attached Q.L.M. model (Fig. 1). Similar patterns of temperature rises and downstream temperature decay gradients must exist for all point sources of thermal discharge in tidal mixing zones.

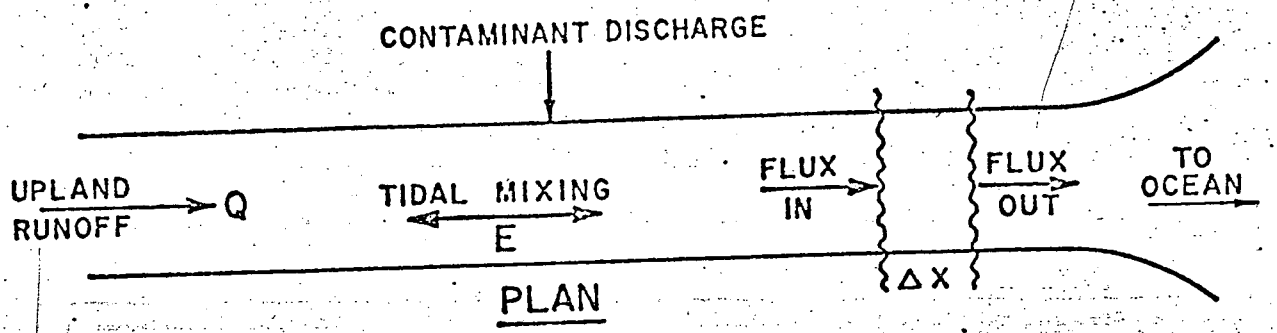
B. Federal and State Criteria

The Staff states (DES V-8, A-3) that the applicant must meet New York State Water Quality Criteria. The applicable State Regulation, 6 NYCRR 704.1(b)(4), defines those criteria in terms of 3 standards:

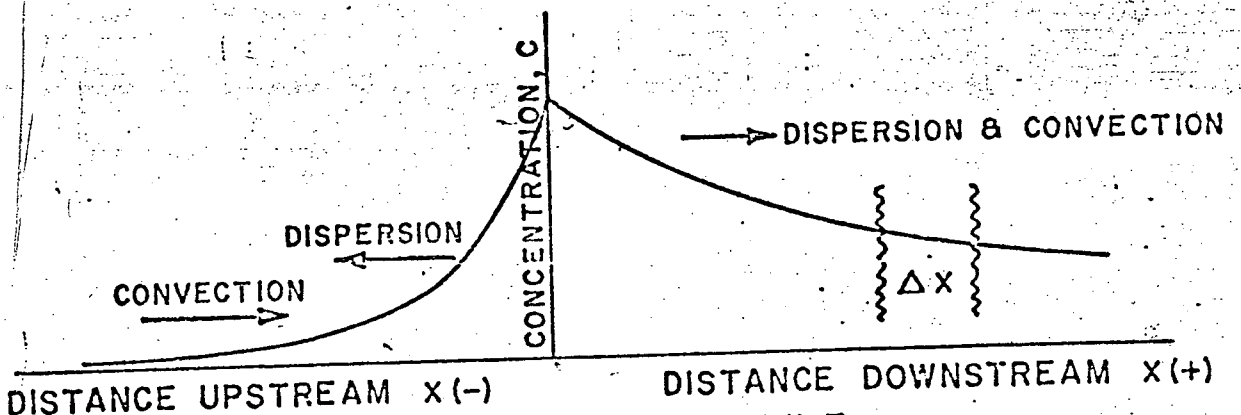
FIGURE 12

CONTAMINANT DISTRIBUTION IN AN ESTUARY

MASS TRANSPORT RELATIONSHIPS

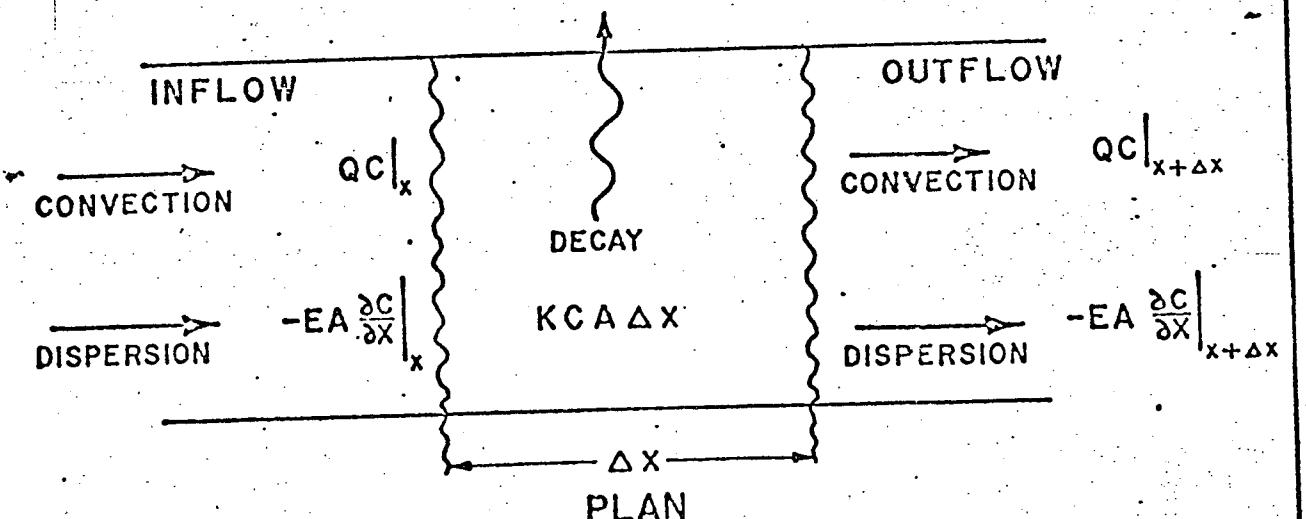


PLAN



CONCENTRATION PROFILE

MASS BALANCE OVER VOLUME ELEMENT, $A\Delta x$



PLAN

Figure 1

1. Surface temperature no hotter than 90°F.

2. 50% of the cross-section including 1/3 of the surface no hotter than 4°F above the ambient (natural) temperature of the estuary, or a maximum of 83°F, whichever is less.

3. During July through September, if the ambient surface temperature is more than 83°F, at no point in the passageway described above shall the temperature be above 84.5°F.

The Staff's thermal analysis indicates that under many conservative input conditions, the operation of once-through cooling will contravene all three parts of the State's Water Quality Thermal Criteria (DES, A-14, 26). Moreover, even with a cooling tower at Indian Point 2 (Alternative A) the resultant once-through operation of Indian Point Units 1 and 3 will contravene Part 2 and 3 of the State criteria.

The Staff's predictions of thermal effects need more adequate parametric tables. The intermediate field thermal model was not discussed in terms of the results of the far-field model. Similarly, no connection was made between the results of the near-field model and the results of the other two models. Connecting these would form another set of parametric tables far more meaningful than those presented.

For example, it would be useful to know what effects on the near and intermediate-field models would result from an 86°F. intake temperature as indicated by the far-field model. The intermediate-field model would then show that Parts 1 and 2 of the State criteria would be violated (over 50% of the cross-section will be raised 4°F. or more to at least 90°). Looking to the near-field model, it would predict approximately a 6°F. rise in the surface discharge plume or about 92°F. violating Part 1 of the criteria.

Finally, as discussed below in section D, this massive heating of the estuary will be exacerbated by ambient ocean temperatures which were under-estimated by the Staff by at least 3°F.

C. The Staff's Model

The Staff, in assessing the probability of compliance of Indian Point 3 with State criteria, used a far-field model which includes most sources of heat of artificial origin contributing to the river. The sources in the staff's model included:

Danskammer Plant
Roseton Plant
Indian Point Plants 1, 2 and 3
Lovett Plant
Bowline Plant

While this model did take into account the complex mixing characteristics of a tidal estuary, it neglected to take into account the many industrial and municipal discharges that now exist or can be foreseen to exist over the useful life of Indian Point 3. Similarly, the thermal effects of anticipated power plants on the Hudson River were also left out. The projected Storm King pumped storage plant, for example, would add 24 billion BTU/day to the Hudson, 1/7 the heat of Indian Point 3 (See page 11). Some information on existing major discharges can be found in the Q.L.M., "Hudson River Water Quality and Waste Assimilation Capacity Study", (December, 1970). These additional thermal imputs should be included in an updated FES model.

D. The Staff's Far-Field Model

As in the striped bass recruitment model which appeared in the FES for Indian Point 2, the Staff's far-field thermal model suffers from incomplete presentation of supporting data upon which its conclusions are based. Without this material, it is impossible to recompute the predictions of the DES on pages A-21-25.

Secondly, there were no "ambient" temperature curves included in figures A-4 through A-7 which would connect the assumed ambient temperature of 80°F. with the ocean temperature in the Battery. Such curves were presented in the Indian Point 2 proceedings in a "Preliminary Study . . ." by M. Siman-Tov, February 8, 1973, figs. 3-6. Without information on what the water temperature would be in the lower Hudson before the addition of heat of artificial origin it is impossible to predict the extent of non-compliance by the applicant with State Thermal criteria, since the criteria is based on an "artificially unheated" standard.

Thirdly, the Staff mistakenly assumed the average water temperature of the ocean at the Battery to be 70°F. The National Ocean Survey has tabulated the surface temperature of the Battery since 1927. The most recent long-term means between 1927 and 1971 at that station are 71.4°F. for July and 73.2°F. for August. These figures are only means. Higher average temperatures exist for individual weeks and for individual months during hot, dry years. Additional information compiled by the New York City Department of Water Resources, the Annual Harbor Survey, indicates even higher average temperatures during 1973. The model should be amended to include such data on a time-dependent basis. A parametric study should then use the amended model with

reference to various cool-wet years and hot-dry years.

E. The "Ambient" Temperature Profile

Only after the predicted temperature profiles for the lower Hudson River are calculated can the natural temperature of the river be calculated. This task is impossible at the present with the absence of an "ambient" temperature profile in the DES.

Without an accurate far-field model prediction of the intake water temperature, verification of the plant's compliance with State thermal criteria is impossible. There is no place on the Hudson where a true "ambient," relative to Indian Point, can be physically measured. All temperature measurements above and below Indian Point will be "polluted" with heat from other sources in the process of decay. (See Figure 1).

Incidentally, physical on-site monitoring of thermal pollution is impossible. One classical means of measuring heat discharge employs infra-red aerial monitoring. However, this will only compare the discharge plume to the already elevated intake temperature. Actual temperature readings of the Hudson would both be impractical and inaccurate. Simultaneous readings of the river temperature from its source to its mouth, on lateral and verticle cross-sections, is totally unfeasible.

Moreover, even if such were possible, present thermal discharges would make the data worthless as an "ambient" temperature guide.

F. Thermal Effects on Biota

The biological effect of waste heat discharge on the various organisms of the Hudson estuary was considered by the Staff at XI-38 and V-49 - V-53. The presentation inadequately considered the preferential and lethal temperature of various species of aquatic biota. The staff should refer to studies such as the Gift-Westman Study, "Responses of Some Estuarine Fishes to Increasing Thermal Gradients" June, 1971, and recent data by Dr. R.E. Loveland on the thermal responses of benthic organisms in Barnegat Bay. The DES also failed to consider the effects of thermal pollution in its cost-benefit analysis. Some attempt was made to consider the magnitude of the thermal problem at V-52. This method should be expanded to quantify some negative value for this additional source of adverse environmental impact.

Despite the shortcomings outlined above, we want to thank the Staff for the outstanding work that they have done in preparing this draft statement. The Attorney General is of the same opinion as the Staff that a closed-cycle cooling system must be installed at Indian Point 3 as soon as possible in order to protect the Hudson River biota from serious adverse harm.

BEFORE THE UNITED STATES

ATOMIC ENERGY COMMISSION

In the Matter of	)	
	)	
Consolidated Edison Company of New York, Inc.	)	Docket No. 50-286
	)	
[Indian Point Station, Unit No. 3]	)	
	)	

CERTIFICATE OF SERVICE

I hereby certify that I have served document entitled "Detailed Comments by the Attorney General" by mailing copies thereof first class and postage prepaid to each of the following persons this 17th day of December, 1973:

Atomic Safety and Licensing
Board Panel
U.S. Atomic Energy Commission
Washington, D.C. 20545

Samuel W. Jensch, Esq.
Atomic Safety and Licensing
Board Panel
U.S. Atomic Energy Commission
Washington, D.C. 20545

Atomic Safety and Licensing
Appeal Board
U.S. Atomic Energy Commission
Washington, D.C. 20545

Dr. John C. Geyer, Chairman
Department of Geography and
Environmental Engineering
The Johns Hopkins University
Baltimore, Maryland 21218

Mr. R. B. Briggs, Director
Molten-Salt Reactor Program
Oak Ridge National Laboratory
Post Office Box Y
Oak Ridge, Tennessee 37830

Myron Karman, Esq.
Counsel for AEC Regulatory
Staff
U.S. Atomic Energy Commission
Washington, D.C. 20545

Edward J. Sack, Esq.
Joel M. Lasker, Esq.
Joyce P. Davis
Law Department
Consolidated Edison Company
of New York, Inc.
4 Irving Place
New York, New York 10003

Angus MacBeth, Esq.
Sarah Chasis, Esq.
Natural Resources Defense Council
15 West 44th Street
New York, New York 10036

Frank W. Karas
Chief, Public Proceedings Staff
Office of Secretary of Commission
Atomic Energy Commission
Washington, D.C. 20545

J. Bruce MacDonald, Esq.
Deputy Commissioner and Counsel
New York State Department of Commerce
99 Washington Avenue
Albany, New York 11210

Nicholas A. Robinson, Esq.
Marshall, Bratter, Greene, Allison & Tucker
430 Park Avenue
New York, New York 10022

Harry H. Voigt, Esq.
LeBoeuf, Lamb, Leiby & MacRae
1757 N Street, N.W.
Washington, D.C. 20036

Honorable George Segnit
Mayor, Village of Buchanan
Buchanan, New York 10511

James P. Corcoran

JAMES P. CORCORAN

Assistant Attorney General