



Law Department
Consolidated Edison Company of New York, Inc.
4 Irving Place, New York, N.Y. 10003

DOCKETED
USNRC

April 28, 1983

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David Lewis, Esq.
Law Clerk to Atomic Safety
and Licensing Board
United States Nuclear Regulatory
Commission
Washington, D.C. 20555

Re: Consolidated Edison of New York, Inc.,
et al (Docket Nos. 50-247-SP, 50-286-SP)

Dear Mr. Lewis:

Enclosed are the following documents which were shown to NRC Staff Witnesses Bellups and Kornegay during their cross-examination on April 22, 1983.

1. Page B-101 of the "Final Environmental Statement Related to the Operatin of Indian Point Nuclear Generating Plant Unit No. 3", together with the cover sheet to this document (see Tr. 14308-09).
2. The cover sheet and page 2 to the Addendum to the Environmental Statement related to the Operation of the Indian Point Nuclear Generating Station Unit No. 3 (see Tr. 14309-10).
3. Page V-152 of the "Final Environmental Statement Related to Operation of Indian Point Nuclear Generating Plant Unit No. 3" together with the cover sheet to the document (see Tr. 14310-12)
4. The cover sheet and page VII-51 to "Entrainment Impact Estimates for Six Fish Populations Inhabiting the Hudson River Estuary" Joint Testimony of John Boreman, et al., May 1979 (see Tr. 14313-15).
5. A May 1, 1982 letter, with attachments, from John D. O'Toole to Ronald C. Haynes (see Tr. 14316-17).
6. The cover sheet and Table 4-11 from the Indian Point Generating Station Entrainment Survival and Related Studies, 1980 Annual Report (see Tr. 14317-18 and 14320).

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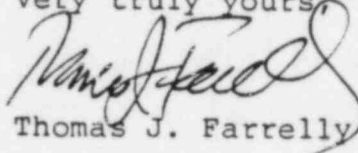
DS03

7. A New York State Department of Environmental Conservation Certificate for Ravenswood 3 (see Tr. 14324-25).

8. A New York State Department of Environmental Conservation Certificate for Astoria 4 (see Tr. 14325).

9. A New York State Department of Environmental Conservation Certificate for Astoria 5 (see Tr. 14325-26).

Very truly yours,

A handwritten signature in cursive script, appearing to read "Tom Farrelly".

Thomas J. Farrelly

TJF/evr
Attachments
cc: All parties

Final

NRCY

**environmental
statement**

related to operation of

**INDIAN POINT
NUCLEAR GENERATING PLANT
UNIT NO. 3**

CONSOLIDATED EDISON COMPANY OF NEW YORK , INC.

DOCKET NO. 50-286

February 1975

Volume II

**UNITED STATES NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION**

used in the applications of the staff's model are presented in Table B-28.

Table B-28. Intake avoidance factor and optimum plant survival percentage values employed in the staff's model

Life stage	Intake avoidance factor	Optimum plant survival percentage
Egg	0.00	0.20
Yolk-sac larva	0.00	0.20
Post yolk-sac larva	0.00	0.20
Juvenile I	0.20	0.00
Juvenile II	0.80	0.00
Juvenile III	1.00	0.00

(iii) Plant Survival Conditions

The reductions in the age group population densities, as they pass through the power plant system, are based on the plant percentage survival factors for the life stages. This factor represents the mean survival probability of a striped bass young-of-the-year life stage (based on physiological capabilities) after it is exposed to representative levels of mechanical and thermal stresses that generally occur in passing through the plant. The differences in the overall plant percentage survivals for different plants are readily considered in the general formulation of the model by assigning appropriate values to the intake and discharge geometric factors that incorporate the special design characteristics of the particular plants.

Because the plant survival percentage depends both on mechanical and thermal stresses, it is considered in two parts, as the optimum plant survival percentage without the thermal effects and a multiplicative factor to modify the optimum value for the cases with the thermal effects.

The optimum plant survival percentage values employed in the staff's model are presented in Table B-28. These represent the best estimate values for the optimum survival percentages for the striped bass young-of-the-year life stages based on the discussion given in Chapter V.

(B)

Environmental Statement
related to operation of
INDIAN POINT NUCLEAR GENERATING STATION UNIT NO. 3
Consolidated Edison Company of New York, Inc.
Docket No. 50-286
Volume II, February 1975

ADDENDUM

In Appendix B the results given for the Striped Bass Young-of-the-Year Model (Section 4.b) and for the Striped Bass Life-Cycle Population Model (Section 4.c) are intended as illustrative examples only. The results used in the staff's assessment are given in Chapters V and XI.

The various parameters given in Appendix B correspond to the results given in Appendix B. The parameters used to obtain the results in Chapters V and XI are given in the Tables in this Addendum. Only those Tables in which the parameters are different are included; parameters in other Tables are the same. An additional Table is attached which gives the values used to obtain the results in Chapters V and XI which differ from the corresponding values in the text and Figures in Appendix B.

Table B-24. Parameter values employed in the staff's model for population density dependent compensatory mechanism for survival percentages of life stage populations

Life stage	Maximum population density (number per 1,000 ft ³)	Effective survival percentage	Critical population density (number per 1,000 ft ³)	Optimum survival percentage
Egg	No population density dependent compensatory effect			36.0
Yolk-sac larva	7.08	40	0.354	58.0
Post yolk-sac larva	5.56	64	0.278	74.8
Juvenile I	1.84	90	0.092	93.0
Juvenile II	1.13	90	0.057	93.0
Juvenile III	0.45	95	0.022	96.5

Table B-26. Approximate data employed in the staff's model for the mobility characteristics of life stage age group populations

Life stage	Maximum swimming speed (fps)	Sustained duration (hour)	Intake avoidance parameter	Shoaling effect parameter	Crowding effect parameter
Juvenile I	0.50	2.00	0.00	0.4	0.2
Juvenile II	1.00	4.00	0.80	0.4	0.2
Juvenile III	1.00	6.00	1.00	0.4	0.2

Table B-28. Intake avoidance factor and optimum plant survival percentage values employed in the staff's model

Life stage	Intake avoidance factor	Optimum plant survival percentage
Egg	0.00	0.20
Yolk-sac larva	0.00	0.39
Post yolk-sac larva	0.00	0.39
Juvenile I	0.00	0.28
Juvenile II	0.80	0.00
Juvenile III	1.00	0.00

Final

②

environmental statement

related to operation of

**INDIAN POINT
NUCLEAR GENERATING PLANT
UNIT NO. 3**

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

DOCKET NO. 50-286

February 1975

Volume I

UNITED STATES NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION

quantitative properties of the forecasts. The staff offers no apology for not presenting a more quantitative assessment, which has a lower level of uncertainty, of the potential impact of Indian Point on the Hudson River striped bass population. Our efforts reflect the state of the science and the state-of-the-art of forecasting the effects of environmental impacts on a large fish population, inhabiting an open system, that is the subject of an intense sport and commercial fishery. The staff hastens to add that these comments are equally valid for the applicant's modeling efforts.

The staff emphasizes that its striped bass life-cycle model is a single-species population model, which appears to simulate the behavior of the population in a reasonable manner. However, in reality, the Hudson River spawned striped bass population is one component of a complicated fish community that inhabits an even more complicated estuarine and marine ecosystem. Thus, the dynamics of the striped bass population undoubtedly depend, to some extent, on interactions between striped bass and other biotic and abiotic components of the ecosystem. In addition, since striped bass are the subject of an intense sport and commercial fishery, and since fishing mortality is of importance in regulating the population, the dynamics of the Hudson River striped bass population also depend on social and economic factors that affect fishing effort. Neither the staff's nor the applicant's life-cycle model includes interactions between the striped bass and other biotic and abiotic components of the ecosystem or the social and economic factors that may influence fishing effort. The justification for the more limited approach adopted is that data on these interactions and social and economic factors are lacking, and even if they were available, an understanding of the cause-effect relationships necessary to include such phenomena in a model is not adequate. The hope is that by focusing on the population per se, where there are adequate data on fecundities and survivals, the staff's life-cycle model will be sufficiently realistic to a first approximation to serve as part of the basis for making a rational management decision concerning the unacceptability of once-through cooling at Indian Point Unit No. 3 (base design or Alternative A) and the timing of installation of closed-cycle cooling at Unit No. 3.

The staff's life-cycle model has certain properties which must be kept in mind when interpreting the results but which the staff feels are justified given the present state-of-the-art of forecasting the long-term effects of environmental impacts on a fish population such as the striped bass. A natural steady state has been assumed such that following the removal of a perturbation to

Corrected 12/13/79 per. 11/28/79 (46) J.S. EX-200
Replacement Pages VIII-16/17/18

(D)

ENTRAINMENT IMPACT ESTIMATES FOR
SIX FISH POPULATIONS INHABITING
THE HUDSON RIVER ESTUARY

Joint Testimony of

John Boreman, Ph.D.¹
Lawrence W. Barnthouse, Ph.D.²
Douglas S. Vaughan, Ph.D.²
C. Phillip Goodyear, Ph.D.¹
Sigurd W. Christensen, Ph.D.²

¹National Power Plant Team
U.S. Fish and Wildlife Service
2929 Plymouth Road
Ann Arbor, Michigan 48105

²Environmental Sciences Division
Oak Ridge National Laboratory
Oak Ridge, Tennessee 37830

PREPARED FOR THE
U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION II

May 1979

Table VII-10. Immediate mechanical mortalities^a for four Hudson River plants by population and life-stage with lower and upper estimates representing \pm one standard error about the middle estimate (calculated from data tapes provided by utilities on November 16, 1977 and April 5, 1978)

Species	Life-stage ^b	Bowline Point	Roseton	Indian Point	Danskammer Point
<u>Lower estimate</u>					
Striped Bass	Y	0.33	0.33	0.33	0.33
	P	0.13	0.18	0.16	0.0
	J	0.0	0.0	0.0	0.0
White Perch	Y	0.33	0.33	0.33	0.33
	P	0.0	0.31	0.58	0.0
	J	0.0	0.0	0.0	0.0
Clupeids	Y	0.37	0.37	0.37	0.37
	P	0.0	0.41	0.12	0.34
	J	0.46	0.46	0.46	0.46
<u>Middle estimate</u>					
Striped Bass	Y	0.44	0.44	0.44	0.44
	P	0.17	0.23	0.23	0.03
	J	0.0	0.0	0.0	0.0
White Perch	Y	0.44	0.44	0.44	0.44
	P	0.0	0.38	0.78	0.0
	J	0.04	0.04	0.04	0.04
Clupeids	Y	0.39	0.39	0.39	0.39
	P	0.15	0.44	0.41	0.43
	J	0.51	0.51	0.51	0.51
<u>Upper estimate</u>					
Striped Bass	Y	0.54	0.54	0.54	0.54
	P	0.22	0.29	0.29	0.26
	J	0.0	0.0	0.0	0.0
White Perch	Y	0.54	0.54	0.54	0.54
	P	0.0	0.46	0.99	0.17
	J	0.13	0.13	0.13	0.13
Clupeids	Y	0.42	0.42	0.42	0.42
	P	0.34	0.47	0.71	0.51
	J	0.57	0.57	0.57	0.57

^aDischarge temperature less than 30°C.

^bY = yolk-sac larvae, P = post yolk-sac larvae, J = entrainable juveniles.

John D. O'Toole
Vice President

Consolidated Edison Company of New York, Inc.
4 Irving Place, New York, NY 10003
Telephone (212) 460-2533

May 1, 1982

Re: Indian Point Unit Nos. 1, 2 and 3
Docket Nos. 50-03, 50-247 and
50-286

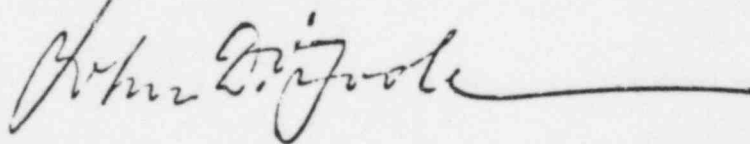
Mr. Ronald C. Haynes, Regional Administrator
Region I
Office of Inspection and Enforcement
U. S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, Pa. 19406

Dear Mr. Haynes:

Transmitted herewith are two (2) copies of the Indian Point Site Annual Environmental Protection Plan Report and the Indian Point Site Annual Environmental Operating Report - Radiological for the period January 1, 1981 to December 31, 1981. These reports are submitted in accordance with Environmental Technical Specification Requirements (ETSR) contained in Appendix B to facility licenses DPR-5, DPR-26 and DPR-64 for Indian Point Unit Nos. 1, 2 & 3, respectively. Specifically, these reports satisfy the requirement of Section 5.4.1 of Part I of the ETSR and Section 5.6.1 of Part II of the ETSR.

Should you or your staff have any questions, please contact us.

Very truly yours,



enc.

cc: Mr. Richard DeYoung, Director (20 copies)
Office of Inspection and Enforcement
c/o Distribution Services Branch, DDC, ADM
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Mr. William G. McDonald, Director (2 copies)
Office of Management Information and Program Control
c/o Distribution Services Branch, DDC, ADM
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Mr. Leroy W. Sinclair, President
Power Authority of the State of New York
10 Columbus Circle
New York, N. Y. 10019

Mr. Ted Rebelowski, Senior Resident Inspector
U. S. Nuclear Regulatory Commission
Post Office Box 38
Buchanan, New York, 10511

Mr. W. H. Baunack, Acting Chief, Indian Point
U. S. Nuclear Regulatory Commission
P. O. Box 38
Buchanan, New York 120511

Mr. T. J. Kenny, Resident Inspector
Indian Point Unit 3
U. S. Nuclear Regulatory Commission
P. O. Box 38
Buchanan, New York 10511

Annual Environmental Protection Plan Report
for the Period
April 24, 1981 through December 31, 1981
and the Interim
January 1, 1981 through April 23, 1981
Pursuant to Appendix B to
Facility Operating Licenses
Indian Point Generating Units
Numbers 1, 2 and 3

This Annual Environmental Protection Plan (EPP) Report is prepared pursuant to Section 5.4.1 of Appendix B, Part I to The Facility Operating Licenses for Indian Point Units 1, 2 and 3 which was issued April 24, 1981.

Section 5.4.1 of the EPP requires that an Annual Environmental Protection Plan Report describing implementation of this EPP for the previous year shall be submitted to the NRC prior to May 1 of each year. This report is for the period April 24, 1981, when the EPP became effective, through December 31, 1981. However, in order to provide continuity, activities conducted between January 1 and April 23, 1981 pursuant to the Environmental Technical Specification Requirements specified in Appendix B to the Facility Operating Licenses for Indian Point Units 1, 2 and 3, prior to their revision, are addressed.

Section 5.4.1 specifies that the report shall include summaries and analyses of the results of the Environmental Protection activities required by subsection 4.2 of this Environmental Protection Plan for the report period. Since Section 4.2 specifies that no environmental monitoring is required, no summaries or analyses are provided herein.

The following reports on environmental studies were prepared pursuant to former ETSR section 4.1.2.a requirements and were distributed to the New York State Department of Environmental Conservation and to the Nuclear Regulatory Commission in 1981.

Indian Point Generating Station
Entrainment and Near Field River Studies
1977 Annual Report
(December 1980)

Hudson River Ecological Study
In the Area of Indian Point
1979 Annual Report
(December 1980)

1978 Year Class Report
For The Multiplant Impact Study
of The Hudson River Estuary
(September 1980)

1979 Bottom Trawl Comparability Study
For The Interregional Trawl Survey
(January 1981)

The following reports on earlier environmental studies were completed subsequent to revision of Appendix B, Part I to the Facility Operating License for Indian Point Units 1, 2 and 3 (issued April 24 1981) and have been distributed upon request.

Report on 1976 and 1977 Data Analyses and
Application of Life Cycle Models of the
Hudson River Striped Bass Population
(April 1981)

Yes

Indian Point Generating Station
Entrainment and Nearfield River Studies
1979 Annual Report
(May 1981)

my

Indian Point Generating Station
Entrainment Survival and Related Studies
1979 Annual Report
(April 1981)

my

Indian Point Generating Station
Entrainment Survival and Related Studies
1980 Annual Report
(January 1982)

1979 Year Class Report for the
Multiplant Impact Study of the
Hudson River Estuary
(March 1981)

Section 5.4.1 of the EPP also requires that The Annual Environmental Protection Plan Report shall include:

- a. A list of EPP noncompliances and the corrective actions taken to remedy them.

There were no EPP non-compliances during the report period at Indian Point Units 1, 2 and 3.

- b. A list of all changes in station design or operation, tests, and experiments made in accordance with subsection 3.1 which involved a potentially significant unreviewed environmental issue.

There were no changes in station design or operation, nor were there tests or experiments which involved potentially significant unreviewed environmental issues at Indian Point Units 1, 2 and 3 during the report period.

- c. A list of nonroutine reports submitted in accordance with Subsection 5.4.2.

There were no non-routine reports submitted for Indian Point Units 1, 2 and 3 pursuant to Subsection 5.4.2.

- d. A list of all reports submitted in accordance with the NPDES permit or the State Certification.

Listed below are the reports submitted in accordance with the NPDES permit and the State Certification.

1. NPDES Permit

Listed below are the recipient, transmitter and transmittal dates for the monthly Discharge Monitoring reports for 1981 submitted to the US EPA, and to NYSDEC, pursuant to NPDES permits for Indian Point Units 1 and 2 (Permit No. NY 000 4472), Unit 3 (Permit No. NY 002 7065), and for Units 1, 2 and 3 combined (Permit No. NY 000 4472), as applicable.

RECIPIENT	TRANSMITTER	TRANSMITTAL DATE
Waste Source Monitoring Section New York State Department of Environmental Conservation 50 Wolf Road Albany, New York 12201	Alan S. Cheifetz, PhD. Chief Chemical Engineer Con Edison 4 Irving Place New York, New York	February 22, 1981
"	"	March 26, 1981
"	"	April 29, 1981
"	"	May 28, 1981
"	"	June 30, 1981
"	"	July 30, 1981
"	"	August 28, 1981
"	"	September 28, 1981
"	"	November 4, 1981
"	"	December 1, 1981
"	"	December 24, 1981
"	"	February 5, 1982

Listed below are the recipient, transmitter and transmittal dates for Waste Water Treatment Facility non-compliance reports pursuant to the discharge permit for the Indian Point generating station.

CONTENT	RECIPIENT	TRANSMITTER	TRANSMITTAL DATE
Waste Water Treatment Facility Non-compliance Report	New York State Dept. of Environmental Conservation, 202 Mamaroneck Avenue White Plains, NY 10601	John C. Brons, Resident Manager Indian Point 3 Nuclear Power Plant, Buchanan N.Y.	06/29/81
	and		
"	U.S. Environmental Protection Agency Region II 26 Federal Plaza New York, NY 10278	"	12/08/81
"	"	"	12/11/81
"	"	"	12/28/81
"	"	"	12/30/81

The above items of non-compliance resulted from undetermined problems with the Waste Water Treatment Facility. The Power Authority and its contractor, LMS Engineers, have been evaluating the design and operation of this facility. The Power Authority has corresponded with the New York State Department of Environmental Conservation and the Westchester County Department of Health concerning the performance of this waste water treatment facility. A schedule for compliance is being developed with the Westchester County Department of Health and the New York State Department of Environmental Conservation.

The Discharge Permit for Indian Point Units 1, 2 and 3 combined, which was issued by the New York State Department of Environmental Conservation effective May 14, 1981, incorporated by attachment, The Hudson River Cooling Tower Settlement Agreement. This Agreement requires at Section 2.D.2 that "any deviations" from agreed upon circulating water pump flow rates at Indian Point Units 2 and 3 be reported within five days by Con Edison and PASNY respectively, to the DEC. "Such reports shall state the nature and extent of the deviation and the explanation therefore".

Listed below are the names and addresses of recipients and transmitters as well as dates of transmittal of circulating water flow deviation reports.

RECIPIENT	TRANSMITTER	TRANSMITTAL DATE
Mr. Edward Horn, Chief Bureau of Environmental Protection NYS Department of Environmental Conservation 50 Wolf Road Albany, NY 12233	Kenneth L. Marcellus Manager, Regulatory Agency Affairs Consolidated Edison 4 Irving Place New York, NY 10003	July 2, 1981
Mr. Walter E. Loveridge Bureau of Environmental Protection New York State Department of Environmental Conservation 50 Wolf Road Albany, NY 12233	William L. Kirk Director, Biological Studies and Evaluation Consolidated Edison 4 Irving Place, New York, NY 10003	July 22, 1981
Same as above	Same as above	July 22, 1981
Same as above	Same as above	July 23, 1981
Same as above	Same as above	July 27, 1981
Same as above	Same as above	July 28, 1981
Same as above	Same as above	July 30, 1981
Same as above	Same as above	July 31, 1981
Same as above	Same as above	August 3, 1981
Same as above	Same as above	August 6, 1981
Same as above	Same as above	August 7, 1981
Same as above	Same as above	August 10, 1981
Same as above	Same as above	August 11, 1981
Same as above	Same as above	August 18, 1981
Same as above	Same as above	August 21, 1981

Same as above	Same as above	August 25, 1981
Same as above	Same as above	September 21, 1981
Same as above	Same as above	October 2, 1981
Same as above	Same as above	October 8, 1981
Same as above	Same as above	October 8, 1981
Same as above	Same as above	December 4, 1981
Same as above	Same as above	December 15, 1981
Mr. Edward Horn Bureau of Environmental Protection New York State Department of Environmental Conservation 50 Wolf Road Albany, New York 12233	John C. Brons Resident Manager Power Authority of the State of New York, Indian Point No. 3, Buchanan New York, 10511	August 21, 1981
Same as above	Same as above	August 24, 1981
Same as above	Same as above	August 26, 1981
Same as above	Same as above	August 27, 1981
Same as above	Same as above	August 28, 1981
Same as above	Same as above	September 2, 1981
Same as above	Same as above	September 4, 1981
Same as above	Same as above	November 16, 1981
Same as above	Same as above	December 7, 1981

The Settlement Agreement also specifies at Section 2.J that a Biological Monitoring Program be conducted, the elements of which are to be approved annually by the New York State Department of Environmental Conservation (DEC). Studies were conducted in accordance with a Memorandum of Agreement with DEC, and reports on the results of studies are in preparation.

The Settlement Agreement specifies at Section 4.I that an Annual Report is to be submitted to the Parties (to the Settlement Agreement) regarding the implementation of Utility obligations under the Settlement Agreement during the preceding year. Listed below are the reports relative to the Indian Point Generating Station which were submitted to the Federal and State Agencies who are Parties to the Settlement Agreement.

RECIPIENT	TRANSMITTER	TRANSMITTAL DATE
Director, Enforcement Division, U.S. Environmental Protection Agency, Region II, 26 Federal Plaza New York, New York 10007	John A. Nutant, Vice President, Consolidated Edison Company of New York, 4 Irving Place New York, New York 10003	October 30, 1981

General Counsel, New York State Department of Environmental Conservation, 50 Wolf Road Albany, New York 12233	Same as above	Same as above
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Assistant Attorney General in Charge, Environmental Protection Bureau, New York State Department of Law, Two World Trade Center New York, New York 10047	Same as above	Same as above
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Julio Morales-Sanchez, Director, Enforcement Division, United States Environmental Protection Agency, Region II, 26 Federal Plaza, New York New York 10007	J. Phillip Bayne Senior Vice President, Nuclear Generation Power Authority of the State of New York, 10 Columbus Circle, New York, New York 10019	November 2, 1981
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Richard Persico, General Counsel, New York State Department of Environmental Conservation, Room 608 50 Wolf Road, Albany, New York 12233	Same as above	Same as above
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Paul Shemin, Assistant Attorney General in Charge, Environmental Protection Bureau, New York State Department of Law, Two World Trade Center, New York, New York	Same as above	Same as above
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2. State Certification

Listed below are the monthly reports for 1981 submitted to the New York State Department of Environmental Conservation pursuant to the State Water Quality Certification for Indian Point Units Nos. 1, 2 and 3.

RECIPIENT	TRANSMITTER	TRANSMITTAL DATE
Mr. Robert Flacke, Commissioner New York State Department of Environmental Conservation Albany, New York 12201	Donald M Rosh, General Manager, Technical Support Indian Point Unit 2. Con Edison Buchanan, NY 10511	February 10, 1981
Same as above	Same as above	March 10, 1981
Same as above	Same as above	April 10, 1981
Same as above	Same as above	May 10, 1981
Same as above	Same as above	June 10, 1981
Same as above	Same as above	July 10, 1981
Same as above	Same as above	August 10, 1981

Same as above	Same as above	September 10, 1981
Same as above	Same as above	October 10, 1981
Same as above	Same as above	November 10, 1981
Same as above	Same as above	December 10, 1981
Same as above	Same as above	January 10, 1982

Mr. Walter Loveridge
Division of Water
New York State Department of
Environmental Conservation
Albany, New York 12201

INDIAN POINT GENERATING STATION
ENTRAINMENT SURVIVAL AND RELATED STUDIES
1980 ANNUAL REPORT

Prepared for

Consolidated Edison Company of New York, Inc.
4 Irving Place
New York, New York 10003

and

Power Authority of the State of New York
10 Columbus Circle
New York, New York 10019

Prepared by

Ecological Analysts, Inc.
R.D. 2, Goshen Turnpike
Middletown, New York 10940

January 1982

TABLE 4-11 ENTRAINMENT SURVIVAL ESTIMATES (S_e) FOR DOMINANT ICHTHYOPLANKTON COLLECTED AT THE INDIAN POINT GENERATING STATION, 1980

Taxa ^(a)	Life Stage	Discharge Temperature Range (C)	N_d ^(b)	S_e (%) ^(c)	χ^2 ^(d)	P
Atlantic tomcod	Late PYSL and JUV	<26	162	87.7 (66.2) ^(e)	3.456	>0.050 ^(f)
		>27	25	48.0 (29.2) ^(e)	17.568	<0.001
Striped bass	Eggs	24-31 ^(g)	147	57.5	54.076	<0.001
		<29	21	70.0	14.839	<0.001
	PYSL	30-32	16	59.0	21.151	<0.001
		<29	31	78.0	14.005	<0.001
		30-32	16	85.4	4.633	<0.050
White perch	PYSL	>33	160	57.8	62.536	<0.001
		<29	49	96.7	0.452	>0.050 ^(f)
		>33	117	53.4	52.319	<0.001
Herrings	PYSL	<29	13	69.2 ^(g)	2.006	>0.050 ^(f)
Anchovies	PYSL	<29	24	12.4	8.297	<0.005
		>33	556	5.0	165.227	<0.001

- (a) Includes all taxa and life stages for which sample sizes were ≥ 10 for at least one discharge temperature category.
- (b) Number collected at the discharge station (Station DP) at the indicated temperature range.
- (c) S_e 's were calculated for temperature categories for which sample sizes were ≥ 10 , at the intake (over all temperatures) and discharge stations, except where indicated.
- (d) The null hypothesis (H_0) tested by χ^2 is that discharge survival is equal to survival of organisms at the intake ($\alpha = 0.05$).
- (e) Numbers in parentheses represent S_e (%) based on proportions surviving 24 hours from collection. This alternative S_e (%) is presented because of a significant difference between intake and discharge extended-survival proportions for Atlantic tomcod.
- (f) Indicates acceptance of H_0 , which is that the survival of organisms collected at the discharge was not significantly lower than that of those collected at the intake ($\alpha = 0.05$). The critical χ^2 value is 3.84.
- (g) Only nine herring post yolk-sac larvae were collected at the intake station, but because of the importance of this taxa, the S_e is presented.

Note: YSL = yolk-sac larvae; PYSL = post yolk-sac larvae; JUV = juveniles.

N.Y.S. DEPARTMENT OF ENVIRONMENTAL CONSERVATION - DIVISION OF AIR

0000 CE02 00003 W C

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CERTIFICATE TO OPERATE AN AIR CONTAMINATION SOURCE
STATIONARY COMBUSTION INSTALLATION UNIT
RENEWAL APPLICATION

OWNER (1) CONSOLIDATED EDISON COMPANY (2) 4 IRVING PLACE (3) NEW YORK (4) NY (5) 10003	FACILITY Boiler 30 (6) RAVENSWOOD GENERATING STATION (7) 38-54 VERNON BOULEVARD (8) QUEENS (9) 11101 (10) REP: JOHN A NUTANT VP	(11) CONFIDENTIAL STATUS NON-CONFIDENTIAL (12) COMPLIANCE STATUS IN COMPLIANCE DATE OF LAST CHANGE 05/18/82 (13) PRIOR CO ISSUE DATE 10/01/81 (14) PRIOR CO EXPIRATION DATE 10/01/82
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MISSION POINT 00003

(41) UTM-E: 508.9 KM. (42) STACK HEIGHT: 499 FT. (43) EXIT VELOCITY: ~~102.00~~ 102.11 FT/SEC (44) SIC: 9911 (45) AGENCY-CODE-1:
(46) UTM-N: 512.4 KM. (47) HT ABV STRUC: 299 FT. (48) EXIT FLOW: ~~664000.00~~ ACFM (49) CO FEE: (50) AGENCY-CODE-2:
(51) GRND ELEV: 14 FT. (52) STK DIAM: 282 IN. (53) EXIT TEMP: 270 DEGR F (54) CO CONDITIONS: 3 (55) HEAT INPUT: ~~8630.0~~ 8630.0 MILLIONS BTU/HR (56) CONTINUOUS MONITORS: (A) OPACITY EDIT: REV. REQ.

UNIT C (57) TYPE: 002 BUILT UP BOILER (58) MFG: COMBUSTION ENGINEERING CC-RR-DTP (59) HEAT INPUT: ~~8630.0~~ 8630.0 MILLIONS BTU/HR
(60) AIR INTAKE: 4 OUTSIDE AIR /W DUCT FAN HEATER (61) SOURCE CODE: *130 OIL 1.5 % SULFUR
(62) BLDG: BOILER 30 (63) FLOOR NAME: BOILER

BURNER DATA (64) TYPE: 052 STEAM ATOMIZED (65) MFG: COMBUSTION ENGINEERING WR-T-P (66) NO. OF BURNERS: 64
FUEL DATA (67) TYPE: 036 NO 6 OIL - VIRGIN FUEL QUANTITIES: (68) AVG/HR: ~~745.0~~ 745.0 (69) MAX/HR: ~~949.0~~ 949.0 (70) TOTAL/YEAR: ~~5573000~~ 5573000
(71) FUEL SUPPLIER: VARIOUS (72) HOURS/DAY: 22.0 (73) DAYS/YEAR: 340 (74) % OP BY SEASON: 21 26 30 23

CONTROL EQUIPMENT (86) TYPE: 009 ELECTRIC PRECIPITATOR (87) MFG: RESEARCH COTTRELL INC (88) ID: 01 (89) DATE INSTALLED: 12/65
(90) DISPOSAL METHOD: 02 LANDFILL - OFFSITE (91) USEFUL LIFE: 45 YEARS

AIR CONTAMINANTS	CAS NUMBER	E M I S S I O N S					% CONTROL EFFICIENCY		HRLY ACTUAL LBS/HOUR	ANNUAL EMISSIONS (LBS/YEAR)		
		ACTUAL	UNIT	HOW DET	PERMISSIBLE				ACTUAL	10*	PERMISSIBLE	
ARTICULATES	(098) NY075-00-0	(099) .080	(100) 11	(101) 05	(102) .100	(103) 0	(104) 694.000	(105) 41.000	(106) 5	(107)		
SULFUR DIOXIDE	(108) 07446-09-5	(109) 1.550	(110) 11	(111) 06	(112) .400	(113) 0	(114) 13450	(115) 79.000	(116) 6	(117) 25.977		
OXIDES OF NITROGEN	(118) NY210-00-0	(119) .230	(120) 11	(121) 05	(122)	(123) 0	(124) 2000	(125) 12.000	(126) 6	(127)		

SPECIAL CONDITIONS (148) CONDITION 1. SEE ATTACHED "SPECIAL CONDITIONS"

PRIOR COMMENTS (16) BY	(17) DATE	(18) CURRENT COMMENTS (19) BY <u>BB</u> (20) DATE <u>2/14/83</u>	(21) COMPLIANCE <u>5</u>
1. <u>See Attached "Special Conditions"</u>			(22) DATE OF NEXT ACTION <u>1/1</u>
2.			CERTIFICATE TO OPERATE
3.			(23) ISSUE DATE <u>10/01/82</u>
4.			(24) EXPIRATION DATE <u>9/13/83</u>
5.			(25) CO FEE <u>10</u>

FORM REP'S SIGNATURE: John Nutant DATE: 10/1/82 ISSUING OFFICER'S SIGNATURE: b + b. m. DATE:

N.Y.S. DEPARTMENT OF ENVIRONMENTAL CONSERVATION - DIVISION OF AIR

630000 CE01 41-42 W C

LOCATION FAC EP

CERTIFICATE TO OPERATE AN AIR CONTAMINATION SOURCE
STATIONARY COMBUSTION INSTALLATION UNIT
RENEWAL APPLICATION

OWNER (1) CONSOLIDATED EDISON CO (2) 4 IRVING PL (3) NEW YORK (4) NY (5) 10003		FACILITY <i>Boiler 40</i> (6) ASTORIA GENERATING STATION (7) 20 AVE & 21 ST (8) ASTORIA (9) 11105 (10) REP: JOHN MUTANT		(11) CONFIDENTIAL STATUS NON-CONFIDENTIAL (12) COMPLIANCE STATUS IN COMPLIANCE DATE OF LAST CHANGE 12/10/81 (13) PRIOR CO ISSUE DATE 10/05/81 (14) PRIOR CO EXPIRATION DATE 10/01/82
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EMISSION POINT 41-42

(141) RTH-E: 515.5 591.7 KM. (42) STACK HEIGHT: 292 FT. (43) EXIT VELOCITY: 55.00 FT/SEC
 (146) RTH-N: 515.0 KM. (47) HT ABV STRUC: 127 FT. (40) EXIT FLOW: 4000.00 ACFM
 (51) GRND ELEV: 14 FT. (52) STK DIAM: 169 IN. (53) EXIT TEMP: 280 DEGR F
 (44) SIC: 4911 (45) AGENCY-CODE-1:
 (49) CO FEE: (50) AGENCY-CODE-2:
 (54) CO CONDITIONS: 1

(55) HEAT INPUT: 3350.0 MILLIONS BTU/HR (56) CONTINUOUS MONITORS: (A) CAPACITY

UNIT C (57) TYPE: 002 BUILT UP BOILER (58) REG: COMBUSTION ENGINEERING CORP (59) HEAT INPUT: 3350.00 MILLIONS BTU/HR
 (60) AIR INTAKE: 4 OUTSIDE AIR /W DUCT FAN HEATER (61) SOURCE CODE: 7210 POWER GEN - SOLID
 (62) MFG: (63) FLOOR NAME:

BURNER DATA (64) TYPE: 052 STEAM ATOMIZED (65) REG: COMBUSTION ENGINEERING WRT-S (66) NO. OF BURNERS: 32

FUEL DATA (67) TYPE: 036 NO 6 OIL - VIRGIN (68) AVG/HR: 650.0 (69) MAX/HR: 757.0 (70) TOTAL/YEAR: 31200
 (71) FUEL SUPPLIER: (72) HOURS/DAY: 16.0 (73) DAYS/YEAR: 300 (74) % OP BY SEASON: 22 29 25

CONTROL EQUIPMENT (86) TYPE: 059 NONE

AIR CONTAMINANTS	CAS NUMBER	E M I S S I O N S					% CONTROL EFFICIENCY	HRLY ACTUAL LBS/HOUR	ANNUAL EMISSIONS (LBS/YEAR)		
		ACTUAL	UNIT	HOW DET	PERMISSIBLE	ACTUAL			10*	PERMISSIBLE	
TOTAL SOLID PART	(098) NY079-00-0	(099) 0.27	(100) 11	(101) 0.2	(102) .100	(103) 0	(104) 201.000	(105) 26.800	(106) 4	(107) 160.0	
SULFUR DIOXIDE	(108) 07446-09-5	(109) .300	(110) 11	(111) 0.4	(112) .400	(113) 0	(114) 1005	(115) 40.040	(116) 5	(117) 64.0	
OXIDES OF NITROGEN	(118) NY210-00-0	(119) .189	(120) 28	(121) 0.1	(122)	(123) 0	(124) 670.000	(125) 36.160	(126) 5	(127)	
							90.500	633,000	39.300	27,500	43,700

(15) PRIOR COMMENTS (16) BY (17) DATE	(18) CURRENT COMMENTS (19) BY <i>BIB</i> (20) DATE <i>2/14/83</i>	(21) COMPLIANCE <i>5</i>	
1.	1. <i>See attached "Special Conditions"</i>	(22) DATE OF NEXT ACTION <i>1/1</i>	
2.	2.	CERTIFICATE TO OPERATE	
3.	3.	(23) ISSUE DATE <i>10/01/82</i>	
4.	4.	(24) EXPIRATION DATE <i>9/30/83</i>	
5.	5.	(25) CO FEE <i>10</i>	

FIRM REP'S SIGNATURE: *John Mutant* DATE: *10/1/82* ISSUING OFFICER'S SIGNATURE: *Pat Robinson* DATE: *2/14/83*

N.Y.S. DEPARTMENT OF ENVIRONMENTAL CONSERVATION - DIVISION OF AIR

630000 CE01 51-52 W C

LOCATION FAC EP

CERTIFICATE TO OPERATE AN AIR CONTAMINATION SOURCE
STATIONARY COMBUSTION INSTALLATION UNIT
RENEWAL APPLICATION

OWNER (1) CONSOLIDATED EDISON CO (2) 4 IRVING PL (3) NEW YORK (4) NY (5) 10003	FACILITY (6) ASTORIA GENERATING STATION Boiler 50 (7) 20 AVE & 21 ST (8) ASTORIA (9) 11105 (10) REP: JOHN NUTANT	(11) CONFIDENTIAL STATUS NON-CONFIDENTIAL (12) COMPLIANCE STATUS IN COMPLIANCE DATE OF LAST CHANGE 12/15/81 (13) PRIOR CO ISSUE DATE 12/09/81 (14) PRIOR CO EXPIRATION DATE 10/01/82
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EMISSION POINT 51-52

(41) UTM-E: 591.7 KM. (42) STACK HEIGHT: 299 FT. (43) EXIT VELOCITY: **1083075.00** 57.94 ~~55.80~~ FT/SEC
 (46) UTM-N: 515.6 KM. (47) HT ABV STRUC: 127 FT. (48) EXIT FLOW: ~~99999.99~~ ACFM
 (51) GRND ELEV: 14 FT. (52) STK DIAM: 169 IN. (53) EXIT TEMP: 280 DEGR F
 (44) SIC: 4911 (45) AGENCY-CODE-1:
 (49) CO FEE: \$10.00 (50) AGENCY-CODE-2:
 (54) CO CONDITIONS: 1 EDIT: REV. REQ.

(55) HEAT INPUT: 3350.0 MILLIONS BTU/HR (56) CONTINUOUS MONITORS: (A) CAPACITY

UNIT C (57) TYPE: 002 BUILT UP BOILER (58) MFG: COMBUSTION ENGINEERING CCRTP (59) HEAT INPUT: 3350.00 MILLIONS BTU/HR
 (62) BLDG: NO. 50 BOILER ROOM (60) AIR INTAKE: 4 OUTSIDE AIR /W DUCT FAN HEATER (61) SOURCE CODE: 7210 POWER GEN - SOLID
 (63) FLOOR NAME: OPERATING

BURNER DATA (64) TYPE: 052 STEAM ATOMIZED (65) MFG: COMBUSTION ENGINEERING WRT-S (66) NO. OF BURNERS: 32

FUEL DATA (67) TYPE: 036 NO 6 OIL - VIRGIN (68) AVG/HR: **650.0** (69) MAX/HR: **757.0** (70) TOTAL/YEAR: **3120000**
 (71) FUEL SUPPLIER: FUEL QUANTITIES: ~~40000.0~~ (72) HOURS/DAY: 16.0 (73) DAYS/YEAR: 300 (74) % OP BY SEASON: 22 29 25 2

CONTROL EQUIPMENT (86) TYPE: 099 NONE

AIR CONTAMINANTS	CAS NUMBER	E M I S S I O N S				% CONTROL EFFICIENCY	HRLY ACTUAL LBS/HOUR	ANNUAL EMISSIONS (LBS/YEAR)		
		ACTUAL	UNIT	HOW DET	PERMISSIBLE			ACTUAL	10*	PERMISSIBLE
PARTICULATES	(098) NY075-00-0	(099) .027	(100) 11	(101) 01	(102)	(103) 0	(104) 90.500	(105) 39.300	(106) 4	(107) 160.800
SULFUR DIOXIDE	(108) 07446-09-5	(109) .300	(110) 11	(111) 06	(112) .400	(113) 0	(114) 1005	(115) 43.700	(116) 5	(117) 64.320
TOTAL SOLID PART	(118) NY079-00-0	(119) 189.100	(120) 28	(121) 0	(122)	(123) 0	(124) 633.000	(125) 27.500	(126) 5	(127)

(15) PRIOR COMMENTS (16) BY B08 (17) DATE 12/09/81 1. SEE ATTACHED SPECIAL CONDITIONS 2. 3. 4. 5.	(18) CURRENT COMMENTS (19) BY B13 (20) DATE 2/14/83 1. <i>See attached "Special Conditions"</i> 2. 3. 4. 5.	(21) COMPLIANCE 5 (22) DATE OF NEXT ACTION 1/1 CERTIFICATE TO OPERATE (23) ISSUE DATE 10/01/82 (24) EXPIRATION DATE (25) CO FEE
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FIRM REP'S SIGNATURE: *John Nutant* DATE: **10/1/82** ISSUING OFFICER'S SIGNATURE: *Bob [unclear]*