BEFORE THE UNITED STATES

ATOMIC ENERGY COMMISSION

In the Matter of	)	
	)	
	)	
Consolidated Edison Company of New York, Inc. (Indian Point Station, Unit No. 2)	)	Docket No. 50-247
	)	
	)	

TESTIMONY OF

RUSSELL J. GRIEMSMANN, M.S.

ON DISTRIBUTION OF EARLY LIFE STAGES OF STRIPED BASS NEAR INDIAN POINT AND MORTALITY OF EARLY LIFE STAGES OF STRIPED BASS ON PASSAGE THROUGH INDIAN POINT.

February 19, 1973

I. The aim of this brief study is to examine the distribution of early life stages of striped bass in the Hudson River about the Indian Point Nuclear Generating Station as reported in John P. Lawler's testimony of October 30, 1972. The null-hypothesis maintained here is that there are no differences in concentrations of early life stages of striped bass with respect to the eastern and western halves of the River.

The data used for the statistics now to be developed is taken from the NYU data of 1971, Lawler's basis for his current best estimate. In the NYU study, Stations C, D & E are located about Indian Point, C & D situated at the intakes of the generating station and E at the discharge. Station C is in the western half of the River and will supply the data representing that side. Stations D & E are on the eastern side and will therefore represent that half of the River. Stations A, B, F and G are ignored, both because of distance from Indian Point and because of trouble with tows on the bottom at Stations A, B and F (Responses of Dr. Gerald J. Lauer, January 12, 1973).

In order to examine the effects at the intakes, C supplies the western data while D supplies the eastern data. To bring the effects of the discharge into the study, the data from Station E was combined with that of Station D. Thus, two series of tests are to be developed: one being C versus D, and the other being C versus the combination of

D & E. All the relevant NYU data on striped bass are set out in Tables 1, 2 and 3.

Quirk, Lawler & Matusky in creating a model of the Hudson River about Indian Point developed formalae to measure concentrations of striped bass early life stages. My study shall use the same formulae for the sake of later comparisons. The two forms being employed here are the QL&M half river formula and upper quadrant concentration formula.

Since day and night readings were taken on different dates, they are not comparable. Hence, one must consider these readings in separate tests.

One now has a series of eight separate tests. This series was tested over each of the early life stages examined in the QL&M study (egg, yolk-sac larvae, and later larvae) resulting in a grand total of twenty-four tests.

The t statistic was chosen to detect a difference in the mean concentrations in the western half of the river versus the eastern half of the river. The level of significance was chosen at .01, the same level of significance chosen by Lawler in his analysis.

All tests with the exception of one showed no significant differences in concentrations between the halves of the River. The one test that did show a difference was the egg stage, daytime, QL&M half river formula, Station C versus Station D. This indicates that at the intake transverse there

TABLE 1

STRIPED BASS EGGS (DAY)

No./100m^3

DATE	BOTTOM			MID-DEPTH			SURFACE		
	C	D	E	C	D	E	C	D	E
5/10	0	8	0	0	0	0	0	0	0
5/18	0	0	0	0	0	0	0	0	0
5/20	13	71	0	0	8	0	0	0	0
5/24	244	396	441	23	324	33	0	34	12
5/28	47	83	79	31	22	45	6	0	6
6/2	0	21	15	0	24	6	0	0	0
6/3	14	0	0	18	0	0	0	0	0
6/7	0	7	0	0	0	0	0	0	0
6/10	0	0	0	0	0	0	0	0	0
6/14	0	0	0	0	0	0	0	0	0
6/17	0	0	0	0	0	0	0	0	0
6/21	0	0	0	0	0	0	0	0	0
6/24	0	0	0	0	0	0	0	0	0
6/28	0	0	0	0	0	0	0	0	0
7/1	0	0	0	0	0	0	0	0	0
7/6	0	0	0	0	0	0	0	0	0
7/9	0	0	0	0	0	0	0	0	0
7/12	0	0	0	0	0	0	0	0	0
7/15	0	0	0	0	0	0	0	0	0
7/19	0	0	0	0	0	0	0	0	0
7/27	0	0	0	0	0	0	0	0	0
7/30	0	0	0	0	0	0	0	0	0

STRIPED BASS EGGS (NIGHT)

5/11-12	0	10	16	0	0	0	0	0	0
5/26-27	549	59	89	285	83	84	21	33	0
6/8-9	0	0	0	0	0	0	0	0	0
6/22-23	0	0	0	0	0	0	0	0	0
7/7-8	0	0	0	0	0	0	0	0	0
7/21-22	0	0	0	0	0	0	0	0	0

TABLE 2

STRIPED BASS YOLK-SAC LARVAE (Day)

No./1000m^3

DATE	BOTTOM			MID-DEPTH			SURFACE		
	C	D	E	C	D	E	C	D	E
5/10	0	8	0	0	0	0	0	0	0
5/18	0	0	0	0	0	0	0	0	0
5/20	0	0	0	0	0	0	0	0	0
5/24	30	60	93	0	24	0	0	0	0
5/28	12	0	0	6	0	13	0	0	0
6/2	0	10	0	0	0	0	0	6	0
6/3	0	0	25	0	0	0	0	0	0
6/7	39	0	0	0	0	0	0	0	0
6/10	5	0	0	0	0	0	0	0	0
6/14	5	0	0	0	0	0	0	0	0
6/17	0	0	0	0	0	0	0	0	0
6/21	0	0	0	0	0	0	0	0	0
6/24	0	0	0	0	0	0	0	0	0
6/28	0	0	0	0	0	0	0	0	0
7/1	0	0	0	0	0	0	0	0	0
7/6	0	0	0	0	0	0	0	0	0
7/9	0	0	0	0	0	0	0	0	0
7/12	0	0	0	0	0	0	0	0	0
7/15	0	0	0	0	0	0	0	0	0
7/19	0	0	0	0	0	0	0	0	0
7/27	0	0	0	0	0	0	0	0	0
7/30	0	0	0	0	0	0	0	0	0

STRIPED BASS YOLK-SAC LARVAE (Night)

5/11-12	0	0	0	0	0	0	0	0	0
5/26-27	10	0	48	0	0	25	0	0	0
6/8-9	0	0	0	0	0	0	0	0	0
6/22-23	0	0	0	0	0	0	0	0	0
7/7-8	0	0	0	0	0	0	0	0	0
7/21-22	0	0	0	0	0	0	0	0	0

TABLE 3

STRIPED BASS LARVAE (Day)

No./1000m^3

DATE	BOTTOM			MID-DEPTH			SURFACE		
	C	D	E	C	D	E	C	D	E
5/10	0	0	0	0	0	0	0	0	0
5/18	0	0	0	0	0	0	0	0	0
5/20	0	0	0	0	0	0	0	0	0
5/24	0	0	0	0	0	0	0	0	0
5/28	0	0	0	0	0	0	0	0	0
6/2	33	0	6	0	0	0	0	0	0
6/3	10	0	0	0	0	0	0	0	0
6/7	1038	63	70	0	0	22	0	0	0
6/10	85	8	0	57	25	0	0	0	0
6/14	270	98	11	201	254	18	0	0	0
6/17	568	246	1395	434	6	0	0	0	0
6/21	350	44	413	85	45	12	0	0	0
6/24	0	228	376	333	20	0	0	0	0
6/28	308	362	341	0	241	445	0	0	0
7/1	161	385	497	0	218	115	0	0	0
7/6	105	373	313	0	0	70	0	0	0
7/9	97	0	161	7	0	84	0	0	0
7/12	157	64	0	48	46	9	0	0	0
7/15	0	21	97	0	0	0	0	0	0
7/19	6	15	0	0	0	0	0	0	0
7/27	0	0	0	0	0	0	0	0	0
7/30	0	0	0	0	0	0	0	0	0

STRIPED BASS LARVAE (Night)

5/11-12	0	0	0	0	0	0	0	0	0
5/26-27	0	0	0	0	0	0	0	0	0
6/8-9	7	31	23	6	7	12	0	28	22
6/22-23	462	307	0	162	175	45	251	392	0
7/7-8	31	54	0	8	0	0	0	0	4
7/21-22	0	0	10	0	7	0	0	0	0

were significantly more striped bass eggs on the eastern (generating plant) side of the River than on the west.

A first glance at the data seem to show more significant differences in the means. But due to the erratic data, the variability in these samples is so high as to render these differences insignificant.

II. Lauer and Lawler's factor F_c was recalculated using Lauer's method of calculation but employing only data that was obtained when the plant was operating at an intake-discharge temperature difference of 10° or more and only using data from the standard 5 minute tows. All data were derived from HRFA Exhibit II. Table 4 displays the results.

TABLE 4

Condition of Morone sp. at intake and discharge of Indian Point 1 using only temperature differences of 10° or more and only 5 minute tows.

	No. of Samples	Alive	Dead	Stunned	Total No. of Organisms
Intake	38	79(76%)	21(20%)	4(4%)	104
Discharge 1	13	30(67%)	10(24%)	4(9%)	44
Discharge 2	10	2(10%)	18(86%)	1(4%)	21

If one computes the plant survival fraction combining the

results of the discharges, one obtains a

$$\text{Plant survival fraction} = \frac{32}{79} = 40.5\%$$

or the cropping factor is $F_c = 59.5\%$

If one considers only the second discharge (the sampling point closest to re-entry into the River) and recomputes F_c, one obtains a

$$\text{Plant survival fraction} = \frac{2}{79} = 2.5\%$$

or the cropping factor is $F_c = 97.5\%$.