William J. Cahill, Jr.
Vice President

Consolidated Edison Company of New York, Inc.
4 Irving Place, New York, N Y 10003
Telephone (212) 460-3819

Regulatory File Cy.

November 7, 1975

RECEIVED NOV 11 1975 U.S. NUCLEAR REGULATORY COMMISSION

Director of Nuclear Reactor Regulation
ATTN: Mr. R. C. DeYoung, Assistant Director
for Light Water Reactors, Group 1
Division of Reactor Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Re: Indian Point 3 - Docket No. 50-286

Dear Sir:

The second paragraph of your November 5, 1975 letter to me refers to a letter dated October 31, 1975 from Mr. Edward J. Sack of Con Edison to Mr. George W. Knighton and indicates what appears to be a misunderstanding by Mr. Knighton. Mr. Sack's letter did not purport to be a reply to Mr. Knighton's letter to me dated October 8, 1975. Mr. Sack's letter was in response to Mr. Knighton's specific request to him for a list of all of Con Edison's requested changes in the Environmental Technical Specifications as a prerequisite to the scheduling of a meeting. The reply to Mr. Knighton's letter dated October 8, 1975 is contained in my letter to Mr. Knighton dated November 3, 1975, which was delivered to Mr. Knighton on November 6, 1975.

We trust that this clarifies the matter.

Sincerely yours,

William J. Cahill, Jr.

DOCKETED USNRC NOV 11, 1975 U.S. NUCLEAR REGULATORY COMMISSION Mail Section

12918

William J. Cahill, Jr.
Vice President

Consolidated Edison Company of New York, Inc.
4 Irving Place, New York, N Y 10003
Telephone (212) 460-3819

Regulatory File Cy.

50-3
50-246
50-286

November 3, 1975

RECEIVED NOV 6 1975 U.S. NUCLEAR REGULATORY COMMISSION Mail Section

Mr. George W. Knighton, Chief
Environmental Projects Branch No. 1
Division of Reactor Licensing
United States Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Knighton:

Pursuant to Enclosure 2 of your letter dated October 8, 1975, enclosed please find our response to each of the three subjects for which you requested additional information.

Sincerely,

William J. Cahill, Jr.

klm/klg

DOCKETED USNRC NOV 1975 U.S. NUCLEAR REGULATORY COMMISSION Mail Section

12788

REQUEST FOR ADDITIONAL INFORMATION FOR
ENVIRONMENTAL TECHNICAL SPECIFICATIONS
INDIAN POINT UNITS NOS. 1, 2 AND 3
DOCKET NOS. 50-3, 50-246, 50-286

Request 1: On July 25, 1975, you requested to replace the words "each species" with "key species" in Paragraph 2, Line 1 on page 4.1-11. We agree that the analysis of "each species" is unnecessary. You have identified blueback herring, striped bass, white perch, Atlantic tomcod, American shad, bay anchovy, alewife, rainbow smelt, American eel, spottail shiner, hogchoker as the "major fish species" in the Hudson River (T.I., "Fisheries Survey of the Hudson River," Vol. IV, p. II-1). Which species listed above would you include as "key species"?

Response: The key species are considered to be striped bass, white perch and tomcod.

Request 2: In reference to your request to delete the words "by species" in Spec. A Impingement (i) on page 4.1-15, we were informed in our previous meetings with you that you have a study underway to quantitate the impingement losses from the fixed screens at Units Nos. 1 and 2 in which fish have not been picked up by the travelling screens to be counted. Provide available results which could be used to develop correction factors to be applied by species for adjusting the daily impingement counts.

Response: Preliminary results of tests to determine the number of impinged fish washed from fixed screens and which are not subsequently collected by the travelling screens will appear in the report on 1974 impingement studies which is currently being finalized.

In view of the novelty of the problem and the preliminary nature of the results, our consultant has advised us that these data cannot properly be applied to develop correction factors.

We intend to investigate further the extent of these losses in an attempt to develop appropriate means of estimating uncollected impinged fish.

Request 3: On p. 4.1-16, in Section 4.1.2a(3) on impingement, you proposed an alternate specification for (ii) based on a justification that the revised specification describes the procedures presently being utilized. Provide a description of these procedures and documentation supporting your proposed change to item (ii) on page 4.1-16. In addition, you have performed a statistical analysis of data collected in 1972 through 1974 which you say demonstrates that the present procedure is responsive to study results and is more efficient. Provide 12 copies of your report on statistical analysis of the 1972 - 1974 impingement data.

Response: Attachment A is a description of the procedures to be followed in the impingement sampling program.

Attachment B contains documentation which justifies the subsampling procedure to estimate total sample size, and documentation which justifies the subsampling procedure used to determine the length-weight relationship of impinged fish.

Attachment A

1975 Impingement Sampling

I. The 1975 impingement sampling plan has the following objectives for each unit at Indian Point:

1. Check white perch (WP) and striped bass (SB) for marks. Also, check tomcod (TC) during the winter spawning run for marks. Because of this requirement, exact counts and total weights are easily obtained.

2. Estimate the total numbers and measure the total weight for each of the remaining species.

3. For WP, SB and TC, estimate the length-weight regression parameters and the length frequency distribution.

II. To accomplish the above, the following sampling scheme was devised for each units:

1. Daily, for each species WP, SB and TC:

   a. weigh total sample of fish
   b. count all fish and check for marks (TC only during winter spawning run); return marks to fisheries
   c. perform 3f when necessary
   d. determine if quality control check (re-examination of fish thought not to have marks) is to be performed

2. Daily, for the remaining species (also TC not in winter spawning run period):

   a. put all fish in appropriate species group
   b. record total weight for each species
   c. count up to 100 fish for each species, record number and total weight of fish counted

3. Bi-weekly, for each species WP, SB and TC:

   a. place fish in appropriate length class (e.g., O-Div, Div +1-150, 151-250, 251 +)
   b. count all fish in each length class: (TC only during winter spawning run)
   c. obtain total weight for each length class
   d. randomly sample 25 fish from each length class
   e. obtain lengths and weights for each of the group of 25 fish

f. if 25 fish are not obtained in a particular length class, perform d and a on subsequent days for the length class until a total of 25 fish are obtained or until the first day of the next subsampling period.

Objective 1 is clearly satisfied by the above sampling plan. For objective 2, it is necessary to count the number of fish (up to 100) since estimates for a rare species would be unreliable. For species with more than 100 fish, impingement counts can be estimated from the formula:

Estimated number = 100 total weight/weight of one hundred fish

For objective 3, bi-weekly measurements are thought sufficient since the regression and length frequency relationships are not highly variable. Also, the data should be sufficient to compute the regression equations for different length (year) classes of fish.

III. The sampling plan and associated estimation procedures involved are statistically sound since:

1. Censusing S.B., W.P., and T.C. collections involve no errors other than person (counter) error, which will be quantified via Quality Control efforts

2. Counting up to 100 fish in a species other than SB, WP, and TC should in many cases amount to censusing. In these situations where more than 100 of a species have been collected, the estimate

$$\hat{Y} - y \frac{W}{w} = \bar{y}W$$

where $\hat{Y}$ = estimated total number collected for the species

y = number counted in a random sample of the species

W = Total weight of the collected species

w = weight of the random sample of the species

$\bar{y}$ = average number per unit weight of the species considered for the sample

is unbiased for Y. The estimated variance of this estimate is

$$\text{VAR } (\hat{Y}) = \frac{W}{w} \quad s^2 \quad (1 - \frac{w}{W})$$

1975 Impingement Sampling (Cont'd)

and is also unbiased for the time variance of Y. In addition the size of the sample (100) is sufficient to be able to sufficiently estimate rare occurrence of species.

(Reference: Cochran, W.G. (1963) Sampling Techniques, John Wiley & Sons, New York)

ATTACHMENT B

CHANGES TO LABORATORY PROCEDURES

UTILIZED IN THE IMPINGEMENT

MONITORING PROGRAM

OCTOBER 1975

SUMMARY

This document presents background, reasons and findings supporting changes in the procedures utilized to estimate the length-weight relationship of impinged striped bass, white perch and tomcod, and for estimating the numbers of fish of species other than striped bass, white perch and tomcod.

The procedure presently utilized to estimate the number of impinged fish of species other than striped bass, white perch and tomcod provides calculated numbers that are generally within 5% of actual count as verified by checks on this procedure. This procedure, which is also utilized in the river sampling program, allows for more efficient manpower utilization.

The procedure utilized to obtain length-weight relationships shows that there is no significant variation between length-weight regression lines for subsamples and total sample. Increased subsample size would reduce confidence intervals but would not significantly improve the correlation coefficient between subsample and total sample.

These procedures are thus uniform to the field sampling and impingement collection programs.

ESTIMATE OF COLLECTION PROCEDURE

Background

Review of the impingement collection records for 1972, 1973 and 1974, shows that striped bass, white perch and tomcod collectively (hereafter identified as "key species") make up 81% of the total impingement collections (see Table 1.). This figure varies from year to year and from unit to unit depending on the period of operation of each unit.

As part of its program to determine the impact of the Indian Point plant, Texas Instruments is calculating the population size of the year class "O" fish of the key species. Collections at the Indian Point intakes provide a means of recapture for the population estimate. Every individual of the key species collected at the intakes is counted.

The other species collected at the intakes and making up an average of 19% of the total catch are mostly blueback herring, alewife and bay anchovy. In order to utilize manpower more efficiently, the feasibility of calculating the total collections of these other species from a subsample was investigated.

Laboratory Checks

A series of tests were performed on samples collected in the river to test the feasibility of the procedure. River collections from 1974 were selected at random.

The total weight for a species in the catch was determined. Initially the number of fish, selected at random, required to make up a 100 gm subsample of each sample was determined. The number of fish per 100 gm subsample was then used to calculate the total number in the catch. The total number in the catch was then determined by counting them, and then % error was determined Typical results obtained are presented in Table II. Specific calculations are presented in Appendix 1.

As the mean size of individuals increased through time (the normal growth process), the number of fish per 100 gm sample decreased. Therefore, a lower limit of 100 fish per subsample was established thus preventing inflation of standard errors associated with the subsamples.

Procedure Checks

This procedure requires that the first 100 fish of each species, other than the key species, be counted regardless of sample size. Seasonal checks on the accuracy of the procedure were performed in July 1975 and October 1975; results are presented on tables III, IV, and V respectively. As indicated in these Tables, subsamples of 100 fish are quite adequate for estimating the total catch. The maximum % absolute bias for any of the 30 subsamples was less than 6%. In fact more than 90% of the subsamples had less than 5% absolute bias in the estimates.

Taking a subsample size of 1000 would indeed give more precise estimates (Table VI), however the increase in precision for the purposes of estimating catch becomes artificial when relating it to the impact on the population. Further, application of the subsampling procedure is infrequently applied to non-key species.

LENGTH-WEIGHT DETERMINATIONS

To estimate the length-weight regression parameters and the length-frequency distribution for the key species the following subsampling scheme was devised:

1. Bi-weekly, for each species WP, SB and TC:
   a) place fish in appropriate length class (e.g. O-Div, Div +1-150, 151-250, 251 +).
   b) count all fish in each length class: (TC only during winter spawning run).
   c) obtain total weight for each length class
   d) randomly sample 25 fish from each length class
   e) obtain lengths and weights for each of the group of 25 fish
   f) if 25 fish are not obtained in a particular length class, perform d and a on subsequent days for the length class until a total of 25 fish are obtained or until the first day of the next subsampling period.

Bi-weekly measurements are thought sufficient since the regression and length frequency relationships are not highly variable. Also, the data should be sufficient to compute the length-weight regression equations for different length (year) classes of fish.

Verification Checks

Individual lengths and weights were obtained for a sample of 191 white perch collected by beach seining during October 1975. Length Class breakdown was as follows:

Length Class	#
1 (O-Div.)	1
2 (Div.+1-150)	97
3 (151-250)	92
4 (251+)	1

Three subsamples of 25 fish per length class were weighed and measured to simulate the impingement subsampling technique. Nine random subsamples of 25 fish per length class were picked at random by a computer generated function. Length-weight regression lines were calculated for the total sample and each subsample. This means that subsampling for the above sample size would require a minimum of 52 individuals.

Results show no significant variation between regressions for subsamples and for the total sample. Regression line analyses are presented in Tables VII-IX (Computer picked subsamples) and Table X (Hand picked and remeasured subsamples). As the Tables show, a decrease of 75% effort increases the confidence intervals less than 10%,which is very cost effective.

TABLE I -- TOTAL NUMBERS OF FISH COLLECTED BY UNIT AND YEAR

YEAR	UNIT	ALL SPECIES	WP[a]	SB	TC	BH	AL	BA
1972[b]	1	85321	23395	1528	37716	1552	1541	13520
	2	12114	594	68	11032	14	23	108
1973[b]	1	4465	3393	56	458	165	37	6
	2	128580	75510	1716	27752	806	1182	11847
1974[c]	1	138976	44154	1318	51923	15396	2580	17133
	2	750182	319056	4568	297582	21719	3561	76468
	3	35086	5329	185	24431	370	300	1358
	TOTAL	1154724	471431	9439	450894	40022	9224	120445
	%	100%	40.8%	<1%	39 %	3.5%	<1%	11%

a. WP-White Perch; SB-Striped Bass; TC-Tomcod; BH-Blueback Herring; AL-Alewife; BA-Bay Anchovy.

b. Texas Instruments Incorporated. 1974. Indian Point Impingement Study Report for the period 15 June 1972 Through 31 December 1973.

c. Texas Instruments Inc. unpublished data.

Table II - Comparison of Actual vs. Estimated Catch based on a 100 gm subsample

	Actual	Estimated	%Abs. Bias
Sample 1	2120	2166	2.2
Sample 2	2128	2114	0.66
Sample 3	2108	2069	2.9
Sample 4	2146	2219	3.4
Sample 5	2126	2192	3.1

Table III - Verification check of Procedure- July 1975 -- Bay anchories

Subsampling from a sample of size 1397, total weight 2836.4

SUBSAMPLE SIZE	WT. (GMS)	ESTIMATE OF SAMPLE SIZE	% ABSOLUTE BIAS FROM N
100	208.6	1360	2.65
100	201.3	1409	0.86
100	195.0	1455	4.15
100	207.1	1370	1.93
100	211.0	1344	3.79
100	200.8	1413	1.15
100	199.8	1420	1.65
100	204.4	1388	0.64
100	209.3	1355	3.01
100	193.6	1465	4.87

Mean Estimate 1398

Mean % Absolute Bias 2.47

Table IV - Verification Check of Procedure- October 1975

-- Blueback Herring

Subsampling from a sample of size 638, total weight 1248 gms.

SUBSAMPLE SIZE	WT. (GMS)	ESTIMATE OF SAMPLE SIZE	% ABSOLUTE BIAS FROM N
100	194.5	642	0.63
100	187.9	658	3.13
100	200	624	2.19
100	203.0	615	3.61
100	208.0	600	5.96
100	184.9	675	5.80
100	199.8	625	2.04
100	195.0	640	0.31
100	186.7	668	4.70
100	200.6	622	3.09

Mean Estimate 637

Mean % Absolute Bias 3.09%

Table V - Verification Check of Procedure- October 1975

-- Blueback Herring

Subsampling from a sample of size 2487, Total Wt. 4925, grams.

SUBSAMPLE SIZE	WT. (GMS)	ESTIMATE OF SAMPLE SIZE	% ABSOLUTE BIAS FROM N
100	191.0	2579	3.70
100	190.3	2588	4.06
100	193.3	2548	2.45
100	208.1	2367	4.83
100	200.0	2463	0.97
100	197.3	2496	0.36
100	199.0	2475	0.48
100	204.0	2414	2.94
100	200.0	2463	0.97
100	203.7	2418	2.87

Mean Estimate 2481

Mean % Absolute Bias 2.36

Table VI - Estimates of Collections using Subsampling of 1000 Fish

Subsampling from samples of size 638, 1397, 2487 using 1000 as subsample size.

N	N	% Abs. Bias
638	638*	0
1397	1397**	0
2487	2479**	0.3

*This is no estimate since N<1000

**Obtained by adding the 10 subsamples of size 100 in Tables IV, V.

TABLE VII — ANALYSIS OF POOLED DATA

GROUP	A	S.E. A	95 PERCENT C.I. A	B	S.E. B	95 PERCENT C.I. B	SAMPLE SIZE	ERROR MEAN SQUARE
1	-4.800291	.8341937-001	-4.964844 -4.635738	2.969382	.3812999-001	2.894167 3.044597	191	.1141878-002
2	-4.983765	.1186136	-5.222008 -4.745523	3.053678	.5399666-001	2.945222 3.162133	52	.8538863-003
3	-5.032115	.1219480	-5.277054 -4.787175	3.074984	.5545824-001	2.963593 3.186375	52	.8714656-003
4	-4.932354	.1260794	-5.185592 -4.679116	3.030873	.5750387-001	2.915373 3.146373	52	.1099868-002
MEAN	-4.896659	.5464297-001	-5.004134 -4.789183	3.013687	.1338538-002	3.011054 3.016320	347	.1053321-002

NOTE THAT THE ABOVE M.S. ERROR FOR THE POOLED LINE IS DERIVED FORM THE POOLED WITHIN LINE ERROR.

LEVINE'S TEST FOR HOMOGENEITY OF VARIANCE

GROUP 1-- TOTAL SAMPLE

GROUPS 2-4--RANDOM SUBSAMPLES

TABLE VIII--ANALYSIS OF POOLED DATA

GROUP	A	S.E. A	95 PERCENT C.L. A	B	S.E. B	95 PERCENT C.I. B	SAMPLE SIZE	ERROR MEAN SQUARE
1	-4.800291	.8341937-001	-4.964844 -4.635738	2.969382	.3812999-001	2.894167 3.044597	191	.1141878-002
2	-4.861880	.8214711-001	-5.026878 -4.696883	2.997442	.3738397-001	2.922354 3.072530	52	.3837544-003
3	-4.646225	.1136000	-4.874398 -4.418053	2.899524	.5179901-001	2.795483 3.003566	52	.6727992-00[illegible]
4	-4.631835	.1177982	-4.868440 -4.395231	2.892852	.5385598-001	2.784679 3.001025	52	.7037095-003
MEAN	-4.759982	.5260293-001	-4.863445 -4.656519	2.951112	.1289480-002	2.948576 2.953648	347	.8962480-003

NOTE THAT THE ABOVE M.S. ERROR FOR THE POOLED LINE IS DERIVED FORM THE POOLED WITHIN LINE ERROR.

LEVINE'S TEST FOR HOMOGENEITY OF VARIANCE

GROUP 1--TOTAL SAMPLE

GROUPS 2-4--RANDOM SUBSAMPLES

TABLE IX - ANALYSIS OF POOLED DATA

GROUP	A	S.E. A	95 PERCENT C.I. A	B	S.E. B	95 PERCENT C.I. B	SAMPLE SIZE	ERROR MEAN SQUARE
1	-4.800291	.8341937-001	-4.964844 -4.635738	2.969382	.3812999-001	2.894167 3.044597	191	.1141878-002
2	-4.882834	.1268275	-5.137575 -4.628093	3.009007	.5780547-001	2.892901 3.125113	52	.1078225-002
3	-4.971326	.1205351	-5.213428 -4.729224	3.047741	.5486657-001	2.937538 3.157944	52	.9199716-003
4	-5.002488	.1201957	-5.243908 -4.761067	3.061341	.5473826-001	2.951396 3.171286	52	.9432289-00[illegible]
MEAN	-4.882774	.5453197-001	-4.990032 -4.775517	3.007382	.1335946-002	3.004754 3.010009	347	.1070461-002

NOTE THAT THE ABOVE M.S. ERROR FOR THE POOLED LINE IS DERIVED FORM THE POOLED WITHIN LINE ERROR.

LEVINE'S TEST FOR HOMOGENEITY OF VARIANCE

GROUP 1--TOTAL SAMPLE

GROUPS 2-4--RANDOM SUBSAMPLES

TABLE X -ANALYSIS OF POOLED DATA

GROUP	A	S.E. A	95 PERCENT C.I. A	B	S.E. B	95 PERCENT C.I. B	SAMPLE SIZE	ERROR MEAN SQUARE
1	-4.800291	.8341937-001	-4.964844 -4.635738	2.969382	.3812999-001	2.894167 3.044597	191	.1141878-002
2	-4.971326	.1205351	-5.213428 -4.729224	3.047741	.5486657-001	2.937538 3.157944	52	.9199716-003
3	-4.928077	.1335243	-5.196268 -4.659885	3.028714	.6082564-001	2.906542 3.150886	52	.1188984-002
4	-4.910683	.1215720	-5.154868 -4.666498	3.021567	.5532420-001	2.910445 3.132689	52	.9056336-003
MEAN	-4.874112	.5514014-001	-4.982566 -4.765659	3.003601	.1350589-002	3.000945 3.006258	347	.1081252-002

NOTE THAT THE ABOVE M.S. ERROR FOR THE POOLED LINE IS DERIVED FORM THE POOLED WITHIN LINE ERROR.

LEVINE'S TEST FOR HOMOGENEITY OF VARIANCE

GROUP 1--TOTAL SAMPLE

GROUPS 2-4--HANDPICKED SUBSAMPLES

APPENDIX 1- LABORATORY CHECKS TO TEST FEASIBILITY

Sample #1009

Date Collected- 7-30-74

RM- 123-1

Time- 1515

No. of Jars- 2

Species-Blueback Herring.

Split 1-	Actual Count-	2120
	Total Weight-	1370.6 gms.
	No. of fish/100 gms-	158
	No. of fish Calculated-	2166
	% error-	2.2
Split 2-	Actual Count	2128
	Total Weight-	1321 gms
	No. of fish/100 gms-	160
	No of fish calculated-	2114
	% error-	0.66
Split 3-	Actual Count-	2108
	Total Weight-	1379 gms
	No. of fish/100 gms-	150
	No. of fish calculated-	2169
	% error-	2.9

Split 4-	Actual Count-	2146
	Total Weight-	1404.4 gms
	No. of fish/100 gms-	158
	No of fish calculated-	2219
	% error-	3.4
Split 5-	Actual Count-	2126
	Total Weight-	1405.2
	No. of fish/100 gms-	156
	No. of fish Calculated-	2192
	% error-	3.1