CONSOLIDATED EDISON COMPANY

OF NEW YORK, INC.

RESPONSES TO ROUND TWO QUESTIONS

SUPPLIED BY THE HUDSON RIVER

FISHERMAN'S ASSOCIATION ON FEBRUARY 22, 1971

DATED: MARCH 2, 1971

Question No. 1

Question: (a) Have any tests for radiological content or effects been made on fish taken, dead or alive, from the intake screens at Indian Point Unit No. 1?

(b) If such tests have been made, produce all reports, analyses and conclusions derived therefrom.

Answer: (a) Yes.

(b) Analyses of fish taken from the intake screens at Indian Point Unit No. 1 have been performed by New York University during 1970. These analyses consisted of gamma ray spectroscopy of an aliquot of an ashed blend of collected fish. While the preliminary results are shown in Table 1, attached, no reports analyzing the results of these tests have been officially received. An analysis of the results is shown on Table 2, which includes conversion of the Table 1 data to dose rates, and a comparison with natural background radiation.

Question No. 1 (Cont'd)

A communication was received by Con Edison with respect to Test No. 4. It is attached to this answer.

TABLE 1

PRELIMINARY RESULTS OF RADIOLOGICAL
ANALYSES OF FISH SAMPLES
INDIAN POINT - 1970

(pc/Kg Wet)

	Species	Date	Collected By	K-40	Mn-54	Co-60	Co-58	Cs-134	Cs-137	% ASH	# Fish	
1)	Tom Cod (Screens)	1/13/70	Raytheon	1478 ± 36	12 ± 3	6.4 ± 1.5	-8 ±4	7.0 ± 1.7	15.7 ± 1.7	3.09	~ 60	W
2)	Striped Bass (Screens)	1/13/70	Raytheon	1680 ± 47	14.8 ± 4.4	4.5 ± 2.1	-10.1 ± 5.8	6.8 ± 2.3	29.9 ± 2.3	3.67	~ 120	W
3)	White Perch (Screens)	1/13/70	Raytheon	1474 ± 40	2.6 ± 4.7	-2.1 ± 2.3	-3.9 ± 6.3	7.9 ± 2.5	52.6 ± 2.6	4.64	21	F
4)	White Perch (From Fishkill)	3/10/70	Dr. Lauer	1477 ± 52	9.9 ± 5.5	0.5 ± 2.7	-17.0 ± 9.7	10.5 ± 2.9	37.8 ± 3.0	4.48	30	W
5)	White Perch (Screens)	6/09/70	Raytheon	486 ± 217	2320 ± 52	3266 ± 21	3446 ± 190	310.5 ± 15.7	578.5 ± 15.8	5.76	16	G
6)	White Perch (Canal)	6/09/70	Raytheon	737 ± 62	-2.4 ± 7.6	3.9 ± 3.3	27.3 ± 15.8	7.2 ± 3.7	12.9 ± 3.6	5.74	10	G
7)	White Perch (Canal)	6/15/70	Raytheon	561 ± 67	117 ± 12.7	30.4 ± 3.8	92.7 ± 69.4	35.8 ± 4.7	93.7 ± 4.4	5.33	8	W
8)	White Perch (Canal)	6/15/70	Raytheon	380 ± 65	110.7 ± 11.1	36.3 ± 4.2	298 ± 32	75.5 ± 4.7	122.0 ± 4.6	4.59	13	W

KEY - W=Whole Fish - F=Fillets Only - G=Gutted Fish

TABLE 2

	Dose Rate to Fish From Radionuclides From Indian Point**	Natural Dose to Fish
		36 mrads/yr.*
Maximum	28 mrads/yr.	
Minimum	0.09 mrads/yr.	
Mean	4.0 mrads/yr.	

* 28 from cosmic rays; 8 from internal K-40

** Based on Table 1 data.

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May 19, 1970

Mr. George Cowherd
Consolidated Edison Company
4 Irving Place
New York, New York 10003

Dear Mr. Cowherd:

As you requested during our recent telephone conversation, I have analyzed a sample of fish collected at Indian Point during the period 3/8/70 to 3/11/70 for gamma-emitting radionuclides. The only radionuclides detected in this sample were Cesium-137 and Potassium-40, the latter which occurs naturally in nature. The activities found in the sample were:

Cs-137: 59.6 picoCuries/Kg Live Wght.
K-40 : 1572 pico Curies/Kg Live Wght.

The gamma spectra of the sample is included as verification.

To facilitate evaluation of the Cs-137 activity contained in this sample, the following activities of this nuclide have been found in Hudson River fish on other dates and other locations:

LOCATION	DATE	pC: ^{137}Cs/Kg Live Wght.
Annual Average (Indian Pt.-Esopus*)	1964	36
"	1965	41
"	1966	29
"	1967	20
"	1968	31
Indian Point	May 1969	42
	June 1969	61
	July 1969	61
	August 1969	48
	September 1969	59
Esopus*	May 1969	27
	June 1969	24
	July 1969	21
	August 1969	30

In view of these results, the concentration of Cs-137 in the fish sample of 3/8/70 to 3/11/70 appears to be quite typical of values found in fish from this area of the river. The low-level aqueous discharges at Indian Point do account, however, for the two to three-fold elevation of Cs-137 in fish from the vicinity of Indian Point, as compared to upstream locations.

It is unlikely that "dangerously" high levels of pure beta-emitting radionuclides, e.g., Sr-90 and Tritium were present in these fish since the low Cs-137 levels which were measured imply an overall low reactor discharge of all radionuclides.

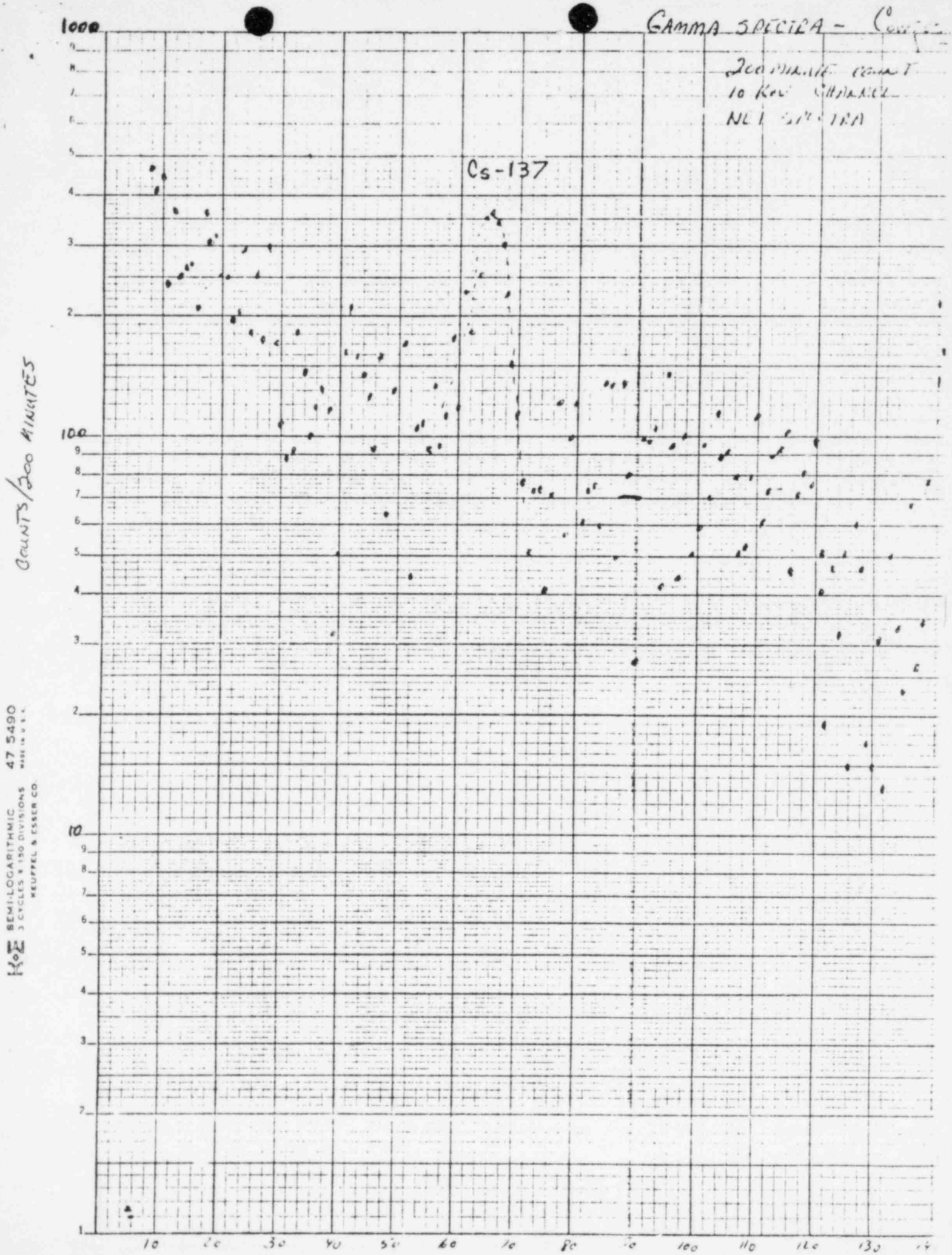
Sincerely,

Jack W. Lentsch

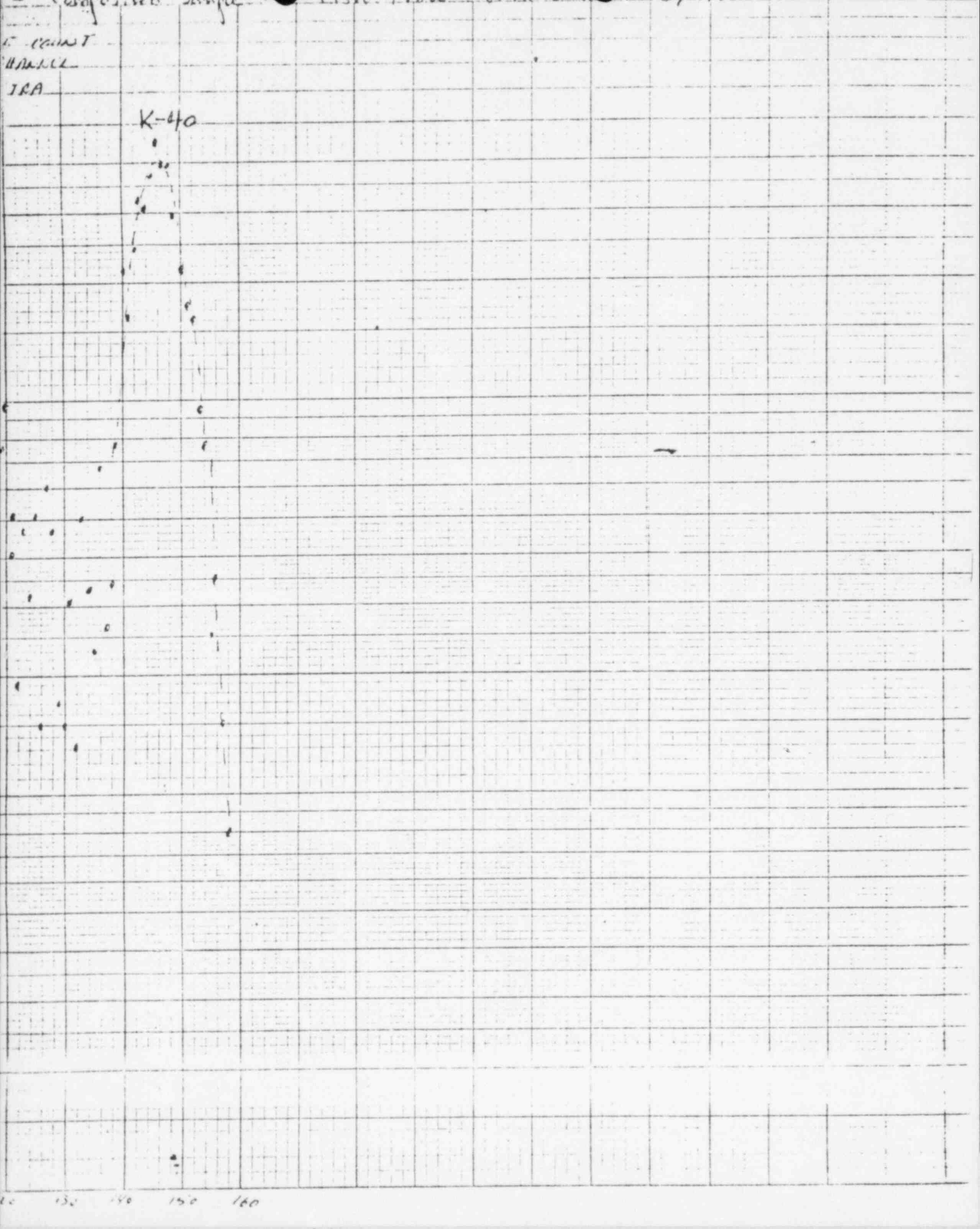
Jack W. Lentsch

JWL:hl
Encl.

*Esopus lies 40 miles north of Indian Point.


GAMMA SPECTRA -
Cs-137
COUNTS/300 MINUTES
1000
100
10
1
10
20
30
40
50
60
70
80
90
100
110
120
130
KOE SEMI-LOGARITHMIC 47 5490
3 CYCLES X 150 DIVISIONS
KEUFFEL & ESSER CO.

Composited Sample - Fish from Indian [illegible] 3/8/70-3/11/70



Question No. 2

Question: Describe in detail the timing of radiological waste discharges into the Hudson River, i.e., is waste discharged constantly or in batches: if in batches, how often and in what quantities?

Answer: Radiological wastes are processed on a batch basis within the plant, before discharge to the Hudson River from Indian Point Unit No. 1. The Indian Point Unit No. 2 radwaste system will also process radiological wastes on a batch basis within the plant before discharge. For both the present Indian Point Unit No. 1 and proposed Indian Point Unit No. 2 operation, liquid wastes are discharged continuously in a controlled manner after processing, and are monitored to assure compliance with allowable discharge limits.

During operation of Indian Point Unit No. 1 the radwaste system processes a batch quantity of 2255 gallons approximately 5 times a day. During operation of Indian Point Unit No. 2 the radwaste system is designed to process a batch quantity of 1000 gallons approximately twice a day.

Question No. 3

Question: (a) Are there any reports of radiological tests on fish made to the AEC before August 1, 1968?

(b) If not, why were tests on fish not made until that time?

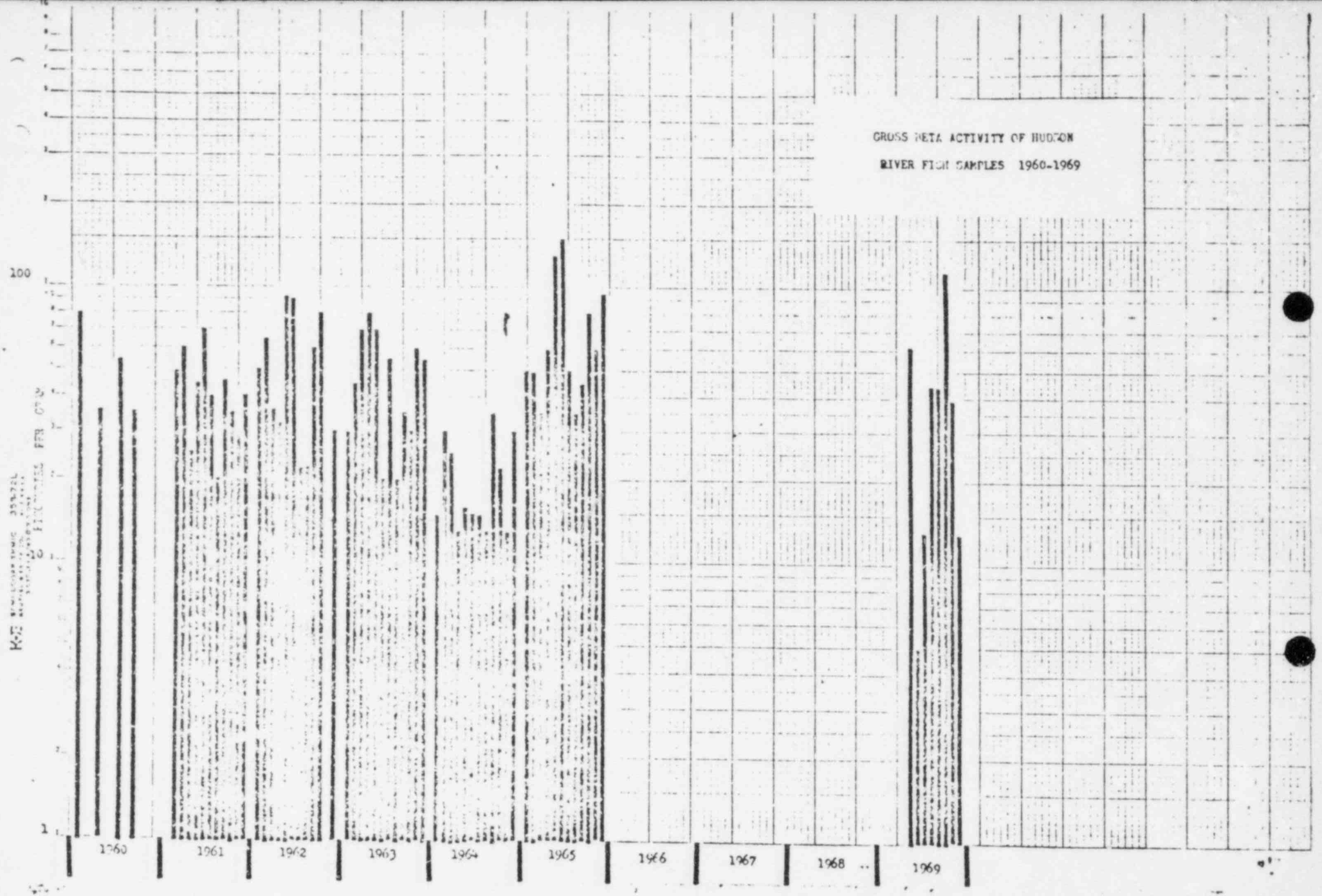
(c) If not, why were tests on fish added at that time?

Answer: Yes, radiological tests were made on fish before August 1, 1968 and were reported in the semi-annual surveys of environmental radioactivity in the vacinity of the Indian Point Station. A summary of the results of such tests for the period from 1960 to 1969 is shown on the attached chart.

The reasons for discontinuing these tests in 1966, and for resuming them in 1969 are presented in the semi-annual reports entitled "Survey of Environmental Radioactivity in the Vicinity of Indian Point Station" filed in Docket 50-3. Essentially, radioecological fish sampling as

Question No. 3
(Cont'd)

part of the monitoring program was discontinued in 1966 because there had been essentially no change in the average value of data obtained over the first five years and the monitoring program was modified to achieve more meaningful data. Fish sampling was resumed in 1969 when the monitoring program was expanded in anticipation of the forthcoming addition of Units 2 and 3.


GROSS BETA ACTIVITY OF HUDSON
RIVER FISH SAMPLES 1960-1969
100
10
1
1960
1961
1962
1963
1964
1965
1966
1967
1968
1969

Question No. 4

Question: On Page 4 of "Manmade Radionuclides in the Hudson River Estuary", it is stated that the M.P.C. of water into which Indian Point Unit No. 1 discharges was changed. Describe the analyses, findings and conclusions which led to this change in M.P.C.

Answer: The "MPC" has never been changed. The method for computing the fractional portion of MPC depends upon the state of knowledge of the identities and concentrations of the radioactive constituents of the waste.

The M.P.C. for all discharges from Indian Point has always been that allowed by 10CFR20. The change referred to is as permitted within 10CFR20. Appendix B, Table II, notes 2 through 5, therein specify an allowable limit for liquid discharge concentration for an unknown mix of radionuclides. This method was used for Indian Point discharges from 1962 to 1966. In 1966, procedures at Indian

Question No. 4
(Cont'd)

Point for release of radioactivity, were changed to include radiochemical analysis of radioactive wastes to determine isotopic content. With a knowledge of isotopic content, the computation of MPC as specified for each isotope according to 10CFR20 Appendix B, Table II, became applicable.

Question No. 5

Question: Describe procedure by which fish were chosen for radiological analysis on which reports to the AEC were based.

Answer: Fish were collected by shore seining, gill nets, trawling, and at times from the screens, and were chosen so as to include a variety of species.

Question No. 6

Question: "Manmade Radionuclides in the Hudson River Estuary" states that in 1969 changes in radiological matter in plants can be related to changes in radiological matter in fish. In its report covering February 1, 1969 to July 31, 1969, Con Edison found no identifiable radiological isotopes in fish tested. Explain the differences in tests made which appear to lead to different results and relate the results of the two studies.

Answer: There are no inconsistent results between the New York University research program and Con Edison's environmental monitoring program. There are differences, however, in the measurement sensitivities used by the two groups.

The New York University research program requires the use of ultrasensitive techniques which go far beyond the requirements of an environmental monitoring program (for the nuclides analyzed in water samples the sensitivity of the New York University program is $\sim 10^{-4}$% of MPC; the sensitivity of the Con Edison monitoring program is $\sim 10^{-1}$% of MPC).

Question No. 6 (Cont'd)

The report "Manmade Radionuclides in the Hudson River Estuary" does not draw a general conclusion that changes in radiological matter in plants can be related to changes in radiological matter in fish. The report does state that such a relationship exists for Mn-54.