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

Gentlemen:

By letter dated June 12, 1969, the board in this proceeding asked the staff to provide additional information respecting certain dose calculations, based upon information furnished by the staff on May 27 in response to earlier board questions.

Transmitted herewith is the response prepared by the Division of Reactor Licensing. Please note that the attachment corrects two previous errors. As noted in the attachment, the staff deeply regrets these errors, but emphasizes that they in no way affect our basic conclusions as to the safety of the proposed facility.

Sincerely,

Troy B. Conner, Jr.

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Trial Counsel

cc: Leonard M. Trosten, Esq.
Mr. Larry Bogart
Joseph F. Scinto, Esq.
Miss Mary Hays Weik
Mr. W. Donham Crawford
Mr. Stanley T. Robinson
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STAFF'S RESPONSE TO BOARD'S LETTER

DATED JUNE 12, 1969

By a letter dated June 12, 1969, the board asked the staff to provide additional information in five areas relating to dose calculations. In response to this question we reviewed the information we had submitted in response to the board's question on the same subject in its letter dated May 27, 1969. This letter from the board requested the staff to provide its answers concurrent with its submission of its proposed findings which were due June 8. In breaking down this contribution to the total dose between organic and inorganic iodine, an arithmetic error was made which was propagated throughout the remaining calculations. The correct values are as follows with asterisks indicating the changes:

A. SPRAY AND FILTER SYSTEMS (Applicant's Case M)

2 hour dose	Inorganic	130 rem
	Organic	136 rem
	Total calculated dose	266 rem
30 day dose	Inorganic	48 rem*
	Organic	252 rem*

B. SPRAYS ONLY OPERATIVE - NO FILTERS (Applicant's Case K)

2 hour dose	Inorganic	130 rem
	Organic	142 rem
	Total calculated dose	272 rem

30 day dose		Inorganic	48 rem*
		Organic	335 rem
		Total calculated dose	383 rem*

C. FILTERS ONLY OPERATIVE (Applicant's Case J)

CASE 1 Organic Iodide Removal - 5%/pass

2 hour dose		Inorganic	1287 rem
		Organic	136 rem
		Total calculated dose	1423 rem
30 day dose		Inorganic	3010 rem
		Organic	252 rem*
		Total calculated dose	3262 rem*

CASE 2 Inorganic Iodide Removal - 90%/pass
Organic Iodide Removal - 5%/pass

2 hour dose		Inorganic	838 rem
		Organic	136 rem
		Total calculated dose	974 rem
30 day dose		Inorganic	596 rem
		Organic	252 rem*
		Total calculated dose	848 rem*

The second error is contained in response to board question 1.f. on page 2 of our June 6 submittal and relates to question 3 in the board's letter of June 12, 1969. In preparing the initial response an error

was made in the dilution factor value for the 0-2 hour dose. The value 9.65×10^{-4} was incorrectly rounded off to 10^{-4} rather than to 10^{-3}. This correction is reflected in the attachment in response to board question 3.

The staff regrets these errors, but wishes to emphasize that they in no way affect our basic conclusions as to the safety of the proposed facility.

Our replies to the board's specific questions follow:

1. The staff has not changed its assumptions or the mathematical model relative to the initial plateout of iodine. With respect to part (a) of the question, our basic reference is TID-14844 which mathematically assumes an "instantaneous" plateout of 50% of the available iodine. Physically, plateout occurs rapidly relative to spray deposition. (See also Tr. 1373-3 and, 1696-7). As identified in Applicant's Exhibit #6 (note 4), and in the First Supplement to the Preliminary Safety Analysis Report, Tab 14, Appendix 6a, the applicant has calculated a spray removal constant of 32 hr^{-1}. With respect to part (b), the basis for the staff position on the "slower iodine removal by the alkaline sprays" is contained in the Safety Evaluation (pp 33-34).

2. When TID-14844 was prepared, chemical containment sprays for the removal of iodine were not envisioned and therefore were not considered. However, Part 100 and TID-14844 contemplate and authorize the use of unspecified engineered safety features. On this basis we conclude that the simultaneous function of plateout and containment spray removal is fully permitted by Part 100 and TID-14844. TID-14844 was also used to determine the iodine source terms and the dose conversion factors.

3. The board's understanding of the dilution factors is correct. In our response the dilution factor stated for 0 - 2 hours contains an error in that we rounded off the value "9.65×10^{-4}" to "1×10^{-4}". The correct number should have been 1×10^{-3}. We believe that this correction places the previous answer clearly in perspective.

4. We calculated the applicant's Case M (Exhibit #6) assuming (a) no removal of inorganic iodine by filters and (b) removal of inorganic iodine by filters with a maximum spray inorganic iodine discontamination factor of 100. The results are tabulated below:

CASE A	two hour dose	Inorganic	137 rem
		Organic	136 rem
		Total calculated dose	273 rem
	30 day dose	Inorganic	78 rem
		Organic	252 rem
		Total calculated dose	330 rem
CASE B	two hour dose	Inorganic	126 rem
		Organic	136 rem
		Total calculated dose	262 rem
	30 day dose	Inorganic	53 rem
		Organic	252 rem
		Total calculated dose	305 rem

These calculations assume a filter exchange probability for organic radioiodine of 5%/pass. This value is identical to that stated in the Safety Evaluation as the minimum required to meet Part 100 assuming the filters do not remove inorganic iodine and the spray operates with a removal coefficient of 4.9 hour^{-1} for the course of the accident. As would be expected, the additional conservatism

of the assumption that there is no further net removal of inorganic iodine by the containment spray after a decontamination factor of 100 is reached results in a small increase in the calculated doses.

5. The basic reason for the 12% difference between the doses calculated by the staff and those calculated by the applicant rests with the treatment of the building wake effect. The staff used its standard approach using the volumetric technique, whereas the applicant used the virtual point source technique in calculating these values. This resulted in the applicant having a higher dose at the 350 meter exclusion area boundary, but with the staff having the higher value at the low population zone boundary of 1100 meters.

The analyses of building wake effects on diffusion used by the staff and applicant are both conservative when compared with the measured results of many research experiments.

It is our judgment that the volumetric technique which we use represents a more conservative fit of the overall experimental results than the applicant's technique. The volumetric model is slightly less conservative than the virtual source technique at the nearest boundary of the exclusion area of Indian Point Unit No. 3 but becomes more conservative as distance increases.

It should be emphasized, however, that if the applicant's meteorological assumptions were used to evaluate the design basis accident with credit given for the required minimum engineered safety features (as stated in the staff Safety Evaluation, p. 45), the resulting two hour thyroid dose at the exclusion area boundary is calculated as 295 R, or still below Part 100 limits.