John D. O'Toole
Vice President

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February 26, 1985

Re: Indian Point Unit No. 2
Docket No. 50-247

Director of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

ATTN: Mr. Steven A. Varga, Chief
Operating Reactors Branch No. 1
Division of Licensing

Dear Mr. Varga:

Attachment A to this letter provides our response to your January 8, 1985 letter regarding central control room habitability.

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

Very truly yours,

John D. O'Toole

attach.
cc: Senior Resident Inspector
U. S. Nuclear Regulatory Commission
P. O. Box 38
Buchanan, New York 10511

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ATTACHMENT A

RESPONSE TO NRC JANUARY 8, 1985
REQUEST FOR ADDITIONAL INFORMATION
REGARDING CONTROL ROOM DOSES

GENERAL:

The central control room (CCR) habitability analysis submitted in May, 1981 contains a reevaluation of the control room doses based on inputs and assumptions, some of which are less restrictive than those used in the original FSAR analysis, and several of which were suggested in conversations with NRC representatives. These include changes in the iodine removal coefficients, the fractions of iodine chemical states released and the meteorological dispersion factor, X/Q. All of the analytical input parameters were explicitly listed in the May, 1981 submittal. By letter dated January 27, 1982, the NRC staff issued an SER approving the CCR habitability analysis.

The overall conclusion of that habitability analysis, approved in the NRC's SER, is that the Indian Point 2 control room, as constructed and equipped, is acceptable. This is the same conclusion drawn by the then-AEC in their Staff Safety Evaluation of Indian Point 2 dated November 16, 1970. That Safety Evaluation, based on the results of the original FSAR analysis, addressed certain compensatory measures (protective clothing, self-contained air respirators) provided in the control room. It should also be recognized that a number of design features of Indian Point 2 would have a strong dose mitigating effect. These include such features as the Isolation Valve Seal Water System and the Weld Channel and Containment Penetration Pressurization System both of which would essentially eliminate containment leakage almost immediately after the initiation of a postulated accident. These were recognized and addressed in the original FSAR habitability analysis but were not taken credit for in the 1981 re-evaluation.

Notwithstanding the approved conclusions of the 1981 study, the above compensatory measures and design features remain in place in addition to maintaining doses of potassium iodide (a thyroid blocking agent) available for control room personnel. Further, it is most likely that these compensatory measures will be rendered unnecessary when the results of the NRC's research on accident source term are released and applied.

The following presents our response to address the three specific requests for additional information in the Enclosure to your January 8, 1985 letter.

ITEM 1. In your III.D.3.4 control room habitability analysis, submitted in May 1981, an unfiltered control room infiltration rate of 164 cfm and a filter efficiency of 99% was used. Recent discussions between staff and licensee representatives indicate these values were inappropriate. Please provide your assessment of the appropriate values of these parameters and bases for the new conditions under which the laboratory tests are being conducted, along with recent test results.

RESPONSE

The original unfiltered air infiltration rate of 164 cfm was obtained from CCR ventilation system tests performed during 1980 in response to the NRR Director's February 11, 1980 Confirmatory Order. Subsequent CCR leakage tests performed during the 1982 and 1984 refueling outages resulted in an inflow rate of between 400 and 500 scfm. This actual experience indicated that an unfiltered air infiltration rate of 500 scfm would be more appropriate for analysis and its parameteric effect on the approved CCR habitability analysis was determined. With all other input parameters remaining the same, the calculated CCR doses met the guidelines of GDC-19 even with 500 scfm unfiltered air inleakage.

With regard to charcoal filter efficiency, we originally noted in response to the February 11, 1980 Confirmatory Order that the charcoal in the CCR ventilation system was replaced with charcoal impregnated with KI and TEDA. We were informed by the vendor that this charcoal met the latest requirements of Regulatory Guide 1.52, Rev. 2. The Regulatory Guide references ANSI Standard N509 for establishing standard test methods for demonstrating charcoal efficiency and identifies, for certain

specific efficiencies and charcoal types, the relationship between laboratory test results and analysis assumptions. A straightforward application of the Regulatory Guide and the ANSI N509 Standard demonstrated that the standard efficiencies for new charcoal supported the use of a 99% analysis assumption. Accordingly, when the CCR habitability analysis was performed, a 99% charcoal removal efficiency was selected.

In May, 1982, the Indian Point Unit No. 2 technical specifications were amended to require compliance with Reg. Guide 1.52, Rev. 2, for charcoal testing. However, since the Indian Point 2 system was designed and constructed prior to ANSI N509, a comparison of the Indian Point 2 design against the standard test configuration determined that a straightforward application of the Regulatory Guide position on charcoal filter efficiency testing was untenable and led to an inherent inconsistency as the Regulatory Guide criterion could not be achieved with the existing Indian Point Unit 2 design. Recognizing this inconsistency, subsequent testing was performed at design specific rather than the Standard test conditions.

The approved CCR habitability analysis was again parametrically reexamined by varying the assumed charcoal removal efficiency and maintaining all other input parameters the same with exception of 500 scfm unfiltered air infiltration as discussed above. It was determined that a charcoal filter efficiency as low as 85% would still yield CCR doses within the guidelines of GDC-19.

Using the "factor-of-five" conservatism on 85% (as suggested by an NRC representative extrapolating the guidance of Reg. Guide 1.52, Rev. 2), a laboratory test acceptance criterion of 97% was obtained. Even this reduced efficiency limit could not be satisfied with the Indian Point 2 specific design. The inability to meet the test acceptance criterion of 97% has resulted in routinely changing out the CCR charcoal at the end of each surveillance interval and in the submission of licensee event reports to the NRC. However, it is important to point out that in all cases, used charcoal removed from service at Indian Point 2 has demonstrated an iodine removal efficiency greater than 85%. Thus, compliance with the habitability safety analysis has been maintained.

As you have requested, the attached table (Table 1) presents the laboratory test conditions under which the charcoal is now tested along with the most recent test results from the 1984 refueling outage charcoal sample. Note that the key differences between the plant specific design and the later standard designs is the charcoal bed depth of 1" vs. 2" and the charcoal face velocity of 67 fpm vs. 40 fpm. New (unused) charcoal was also tested under the plant specific design conditions for comparison purposes and a removal efficiency of 93.5% was obtained. Thus, while even new charcoal cannot satisfy the continued use ("factor-of-five") criterion of Regulatory Guide 1.52, Rev. 2, it can satisfy the 85% criterion. Based on our experience it appears that the removal efficiency of such charcoal can remain above the 85% analysis limit through at least one surveillance interval of operation.

Accordingly, it is our position that based on plant specific design, the CCR charcoal filtration system technical specifications should be modified to require an 85% laboratory test efficiency acceptance criterion and that references to Regulatory Guide 1.52, Rev. 2 criteria should be deleted. We plan to submit such a request to your staff for review and approval in the near future.

TABLE 1

INDIAN POINT UNIT NO. 2

TEST PARAMETERS AND RECENT RESULTS
OF CCR CHARCOAL TESTING

Test standard: USNRC Reg. Guide 1.52, Rev. 2, Sec. C6A; RDT M16 1T Oct. 73

TEMPERATURE:	80°C	
RELATIVE HUMDITY:	95%	
PRESSURE:	1 Atm.	
GAS VELOCITY:	67 fpm	(plant specific)
CUMULATIVE BED DEPTH:	1"	(plant specific)

CCR Charcoal Efficiency 1984 Refueling Outage Test Results

Used*	New (Unused)
90.6% (Tray 1)	93.5%
88.5% (Tray 2)	

*Test performed after 716 hours of operation

ITEM 2. Table A-1 lists the K/Q values used in your control room dose analysis. Provide the bases for obtaining these values, including the model, the input data and a justification of appropriateness.

RESPONSE

The model used to determine the X/Q had been suggested by the NRC staff at a meeting held at Indian Point Station on January 24 and 25, 1980. While it is recognized that the use of any micrometeorological model in a complex arrangement of structures and at as close a distance from a source as the control room (30 meters) is questionable, the NRC's suggested model which led to our calculated value of 5.2×10^{-4} sec/m^3 can be derived using the methodology presented in "Meteorology and Atomic Energy- 1968", Section 5-5.3.3.2. The Indian Point 2 containment cross sectional area ($1900m^2$) and an average wind velocity of 1 m/sec were used as input data.

ITEM 3. In Table A-1, a review of the LOCA parameters shows that you take credit for the elemental iodine sprays for a 24 hour period. Provide the bases for a 24 hour spray credit for the elemental iodine removal efficiency.

RESPONSE

Although the Indian Point Unit No. 2 FSAR used a factor of df=100 to determine the containment spray credit for elemental iodine removal efficiency for the original CCR dose evaluation, later guidance which was developed in the process of licensing Indian Point Unit No. 3 (Con Edison was the original licensee for Unit No. 3) provided a 24 hour duration of spray effectiveness. This is documented in the Unit No. 3 FSAR analysis of the environmental consequences of a loss-of-coolant accident, Case B on Table 14.3-18 (Sheet 1 of 2). Consequently, UE&C, as consultant to Con Edison and NYPA, performed the 1981 Indian Point 2 and Indian Point 3 CCR habitability analyses using the factor of 24 hours, as this was deemed to be the currently accepted value.