January 28, 1970

K. Kniel
Reactor Projects Branch #1, DRL
THRU: D. Thompson, Chief
Operational Safety Branch, DRL

CONSOLIDATED EDISON, INDIAN POINT STATION, UNIT NO. 2
DOCKET NO. 50-247

Ref: (a) Memo F. R. Allenspach to K. Kniel of April 8, 1969. Draft Questions for Consolidated Edison, Indian Point Unit No. 2.

(b) Letter of August 4, 1969 to Consolidated Edison, Indian Point Unit No. 2, from P. A. Morris.

The applicant has not adequately answered the questions submitted formally to him in reference (b). These questions address the subject of staffing, training and experience for Indian Point No. 2 Station. While we do not anticipate any major weakness in this area, they have not provided sufficient information to adequately document a formal finding of adequacy in these areas.

Therefore, the following information needs to be obtained from the applicant:

1. Provide personnel resumes for the Superintendent Performanee, Supervisor Engineering (Health Physics), Assistant Superintendent (Maintenance), Assistant Supervisor Engineering (Nuclear Plant Instrumentation, Health Physics and Conventional Plant Instrumentation) and the remaining General Watch Foremen.

2. Indicate, relative to Figure 1, Section 12, Supplement No. 2 the anticipated number of individuals under the following job titles; Maintenance Mechanics, Technical Assistants (Chemist), Senior Production Technicians (Shift Chemist), Production Technicians (Chemist), Senior Production Technicians (Shift Chemist), Production Technicians (Chemist), Senior Production Technicians, Production Technicians (Performance), Technicians (Nuclear Plant Instruments), Technicians (Shift H.P.) and Technicians (Conventional Plant Instruments).

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3. Indicate on Figures 1 & 2, Section 12, Supplement No. 2, all positions for which you intend to license personnel on Unit No. 2; whether the licenses are Senior Operator Licenses or Operator Licenses and whether these persons will be "cold" or "hot" licensed.

4. Has the Superintendent Performances' staff and/or the Supervisor Engineering Health Physics' staff been expanded for Unit No. 2 operation and if so, describe the specific training received by the new personnel, including course content and number of hours? Describe the training to be received by the Superintendent Performance, Assistant Superintendent Maintenance and the Supervisor Engineering Health Physics, including course content and the number of hours.

/s/ F. R. Allenspach
Operational Safety Branch, DRL

cc: D. J. Skovholt, DRL
D. Muller, DRL

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SURNAME ▶	FRAllenspach:el	DThompson				
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CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

INDIAN POINT NUCLEAR GENERATING UNIT NO. 2 - DOCKET NO. 50-247

ELECTRICAL ITEMS WHICH DO NOT MEET PRESENT DAY CRITERIA

1. Housing of the Diesel Generators

We previously raised the issue as to the adequacy of the diesel generator housing to meet present day tornado requirements[1] and indirectly the requirements for independence and redundancy of Criterion 39 (now Criterion 17).

The three diesel generators are housed in a common sheet metal, steel framed building. This installation represents the only application recently reviewed or being reviewed which houses the redundant onsite electrical power sources in a common room. Further, the controls for the three diesel generators are housed in a common, partitioned control panel which is located at one end of the diesel building.

Upon questioning by DRL the applicant stated, Supplement 3 to the FSAR, that the diesel building is by virtue of its location protected from tornados and major missiles generated by them. The Supplement further stated that protection between machines is not considered necessary on the basis of the engine manufacturers'

[1] RT-240A dated March 17, 1969, and RT-671A dated September 8, 1969.

case histories of engine failures. Lastly, the Supplement stated that reliance in the case of a tornado is placed on power supply redundancy, not solely on the diesel installation.

Should a tornado strike the site, it could damage the diesels by producing missiles (e.g., blowing down the Indian Point 1 plant stack). It is not clear to us that all missiles produced by one of the diesel generators would be retained inside the machine. Should a missile be produced by one of the machines, it could damage a second unit or damage the control panel. Further, all three diesel generators are vulnerable to a fire in the diesel building. Our review of the applicant's electrical drawings supplemented by a site visit has not disclosed any special features of the auxiliary power system which might affect our evaluation of the electrical system other than the fact that a gas turbine generator is located at the site. This machine, however, is a manually actuated, slow start unit. The applicant has stated that the gas turbine can be activated on tornado alerts. The fact that the gas turbine is located on the opposite side of the Indian Point 1 reactor building from the diesel building reduces the probability of simultaneous loss of the gas turbine and the diesels to a tornado.

We, therefore, recommend that Con Ed be requested to provide

additional assurance of onsite electrical power source availability. This additional assurance could take the form of hardening of the present diesel generator installation and providing barriers between the diesel generators, the construction of additional diesel generator enclosures, making power available from the Indian Point 3 diesel generators to Indian Point 2 or other schemes which the applicant might devise.

2. Single Electrical Penetration Area

Sixty electrical penetrations are provided in a single electrical penetration area to provide for entry of signal, control and power cables into containment. The penetrations are located on 3-foot centers, both horizontally and vertically. The penetrations are of the hermetically sealed type which are excellent from a containment leakage standpoint but which results in terminating all cables both outside and inside containment. These terminations are made by bolting or splicing the cables either of which are more subject to undesired heat production and possible fires than continuous runs of cables. There appears to have been no attempt, however, to provide protection between penetrations or between bundles of spliced cables against fire damage.

Indian Point 2 represents only the second application recently reviewed or being reviewed which utilizes a single electrical

penetration area. H. B. Robinson is the other plant. We plan to make a separate recommendation concerning that plant.

We recommend that Con Ed be requested to provide protection between the electrical penetrations and between the bundles of spliced cables to reduce the possibility of fire propagation.

3. Single Electrical Cable Tunnel

A single electrical tunnel consisting of a square concrete conduit having inside dimensions of approximately ten feet wide by eight feet high carries the electrical cables from the electrical penetration area to the control building. This tunnel carries all of the electrical cables except the power cables for the reactor coolant pumps, the pressurizer heater cables and the rod control cables. The cables in the tunnel are arrayed on either side of a three foot aisle in trays or ladders. Separation is provided for in the form of distance, metal separators or transite barriers. Unlike the electrical penetration area the electrical tunnel is not designed to contain any bolted or spliced cable connections. Therefore, the probability of heat production and a resulting fire are reduced. Further, fire detection and an automatically operated water spray system are provided in the tunnel.

We, therefore, recommend that the single electrical tunnel design for Indian Point 2 be approved. We believe that that approval is in keeping with our approval of the Dresden 2/3 application which also contained a single electrical tunnel.

4. 480 Volt Switchgear Room

The 480 volt switchgear room contains all the switchgear for the essential buses which provide power to the engineered safety feature loads. Con Ed early in the construction of the plant identified the fact that steam lines, fire mains, and instrument air lines were designed to pass through the 480 volt switchgear room. The steam lines were subsequently rerouted. The fire mains were stubbed off at one side of the room. During our visit to the site Con Ed agreed to add a partial wall and door to separate the fire mains from the switchgear. No changes, however, were considered for the instrument air lines or the accompanying compressors.

The 2-inch instrument line (approximately 100 psig) passes in close proximity to the electrical cables which connect to the switchgear. A pipe whip in this area could damage portions of the cables to one-half of the switchgear.

We, therefore, recommend that Con Ed be requested to perform an analysis to determine whether a pipe whip could occur. If the

analysis shows that such a pipe whip could occur, they should be requested to provide protection against the event or reroute the line.

5. Design of the Engineered Safety Feature Manual Actuation Panels

Panels SB-1 and SB-2 are located in the control room to provide the necessary controls (switches, lights) for manual actuation of the engineered safety features. Our visit to the site disclosed that the cables entering this panel, the wiring inside the panel and the positioning of the control on the front of the panel do not comply with our interpretation of IEEE 279 in that the requirements for separation and independence are not met. Redundant cables were noted to enter the panel through common openings in the control room floor, redundant cables terminated on adjacent terminal boards and the positioning of the controls on the panel does not provide adequate spacing.

The design of the engineered safety feature actuation panels were discussed previously with Westinghouse.[2] We were informed by Westinghouse that channel physical separation is

[2]Minutes of Meeting of June 11, 1969 - RT-485A of June 20, 1969.

minimal (never less than one inch) but that redundant cables are carried in separate bundles. We expressed concern about the one inch physical separation. We stated that although AEC criteria had not been developed, we tended to agree with a draft IEEE document requiring barriers to be provided when less than one foot of separation is required. The minimum physical separation of components in the Indian Point panel is as Westinghouse described to us, but the criterion on wire and cable bundles described by Westinghouse are not met. Our recollection is that the clearance between components in the Ginna panel is the same as in the Indian Point 2 panel, but we do not remember whether the wire and cable bundling at Ginna was done as poorly as at Indian Point 2.

We recommend that the minimal spacing (one inch) of redundant components in these panels be accepted without requiring barriers. However, we recommend that the field and panel wiring be modified so that, as a minimum, redundant wires and cables are run in separate bundles and through separate floor openings or are separated by barriers such as conduit. We further recommend that we be permitted to inform Westinghouse that their present panel design is unsatisfactory for future construction applications. Further, in discussions with Westinghouse we should discuss the applicability of the Indian Point 2 recommendation to Westinghouse plants under construction and in operation.

6. Lack of Protection Between Engineered Safety Feature Equipment

During our site visit we noted that the three safety injection pumps are located in a common area and the containment spray pumps are located in a separate, common area. There appears to have been no attempt to protect the redundancy of these equipment other than space. Thus a common event, pipe whip or electrical fire, could result in the failure of more than one pump.

Since this is a problem of the safety feature systems of which the electrical aspect is only a part, we suggest that Reactor Projects make recommendations for its resolution.