John D. O'Toole
Vice President

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4 Irving Place, New York, NY 10003
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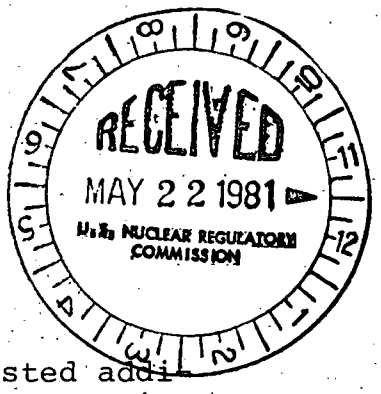
Letter No. 81-97
May 19, 1981

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. Darrell G. Eisenhut, Director
Division of Licensing

Dear Mr. Eisenhut:

By letter dated February 20, 1981, you requested additional information regarding our facility's fire protection program. This letter provides the additional information you requested, as discussed in our letter of March 19, 1981. We have provided in Attachment A, B, and C of this letter responses to the questions and staff positions contained in Enclosure 1 (Section 8) and Enclosure 2 (Sections 1 & 2) of your letter.

Should you or your staff have any additional questions regarding our fire protection program, we would be pleased to discuss them with you.

Very truly yours,

John D. O'Toole

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ATTACHMENT A

Response to Staff Position on Safe Shutdown Capability - Enclosure 1 (Section 8) from the NRC Letter of February 20, 1981 to All Power Reactor Licensees

Consolidated Edison Company of New York Inc.

Indian Point Unit No. 2

Docket No. 50-247

May 1981

Staff Position 8.(a):

Description of the systems or portions thereof used to provide the shutdown capability and modifications required to achieve the alternate shutdown capability if required.

Response:

The description of the systems or portions of systems used to provide the alternate shutdown capability were provided in the Consolidated Edison letters to the NRC of September 18, 1978 and December 12, 1978. NRC Regulatory Staff review and approval of the alternate shutdown system was contained in their January 31, 1979 Safety Evaluation Report (SER) accompanying Amendment No. 46 to Facility Operating License No. DPR-26.

Staff Position 8.(b):

System design by drawings which show normal and alternate shutdown control and power circuits, location of components, and that wiring which is in the area and the wiring which is out of the area that required the alternate system.

Response:

Descriptions of the normal and alternate shutdown control and power circuits were provided in the Consolidated Edison letters to the NRC of September 18, 1978 and December 12, 1978, (Also reference NRC's January 31, 1979 SER).

Staff Position 8.(c):

Demonstrate that changes to safety systems will not degrade safety systems. (e.g., new isolation switches and control switches should meet design criteria and standards in FSAR for electrical equipment in the system that the switch is to be installed; cabinets that the switches are to be mounted in should also meet the same criteria (FSAR) as other safety related cabinets and panels; to avoid inadvertent isolation from the control room, the isolation switches should be keylocked, or alarmed in the control room if in the "local" or "isolated" position; periodic checks should be made to verify switch is in the proper position for normal operation; and a single transfer switch or other new device should not be a source for a single failure to cause loss of redundant safety systems).

Response:

The only modifications made which physically interface with existing safety systems are the installation of a manual transfer switch for one motor-driven auxiliary feedwater pump and the addition of pneumatic instrumentation inside the Unit 2 containment building for steam generator level and pressurizer pressure and level.

The transfer switch for the auxiliary feedwater pump is locked in its normal power mode and its design exceeds the unit's original design specifications by meeting IEEE standards Nos 323(1974) & 344(1975) for safety related electrical equipment. Additionally, the switch will be checked for proper position when the monthly surveillance test is performed on the auxiliary feedwater pumps.

The pneumatic instrumentation system provides no automatic function, simply local indication, and the installation meets the requirement for safety grade equipment and exceeds the unit's original design specifications.

These systems have been reviewed and approved by the NRC in its Safety Evaluation Report of January 31, 1979.

Staff Position 8.(d):

Demonstrate that wiring, including power sources for the control circuit and equipment operation for the alternate shutdown method, is independent of equipment wiring in the area to be avoided.

Response:

There are no remote control circuitry necessary for operation of the alternate safe shutdown system. All control is local and instrumentation pneumatic as described in our letters to the NRC of September 18, 1978, December 12, 1978 and March 19, 1981.

As indicated in those letters, power sources for the alternate shutdown system are routed independent of the areas to be avoided.

Staff Position 8.(e):

Demonstrate that alternate shutdown power sources, including all breakers, have isolation devices on control circuits that are routed through the area to be avoided, even if the breaker is to be operated manually.

Response:

Alternate shutdown power sources and their routing are detailed in the Consolidated Edison letters to the NRC of September 18, 1978 and December 12, 1978. As described therein, all controls are local and alternate shutdown power sources are not routed through the areas to be avoided and are independent of the existing Indian Point Unit No.2 power sources. Therefore, no isolation devices on control circuits are required.

Staff Position 8.(f):

Demonstrate that licensee procedure(s) have been developed which describe the tasks to be performed to effect the shutdown method. A summary of these procedures should be submitted.

Response:

Procedure No. E-4-B "Loss of Normal and Emergency Power" has been developed for use of the alternate shutdown system and outlines the tasks to be performed to energize the equipment necessary to bring the unit to a safe shutdown. The procedure specifies both the personnel who will perform critical operations and the timing constraints within which the equipment must be started. The procedure also highlights the fact that no "Automatic Actions" are necessary to operate the alternate shutdown system.

Staff Position 8.(g):

Demonstrate that spare fuses are available for control circuits where these fuses may be required in supplying power to control circuits used for the shutdown method and may be blown by the effects of a cable spreading room fire. The spare fuses should be located convenient to the existing fuses. The shutdown procedure should inform the operator to check these fuses.

Response:

The alternate shutdown system used at Indian Point Unit No.2 does not use control circuits; all control is local and therefore, unaffected by fires in the areas to be avoided. This is described in our letters to the NRC of September 18, 1978 and December 12, 1978 and in the NRC's January 31, 1979 SER.

Staff Position 8.(h):

Demonstrate that the manpower required to perform the shutdown functions using the procedures of (f) as well as to provide fire brigade members to fight the fire is available as required by the fire brigade technical specifications.

Response:

The manpower that will perform the shutdown functions will consist of a combination of plant and on-site Electrical Construction Bureau (ECB) personnel.

The shutdown functions (running of equipment and system) will be performed by the on-site operations personnel with the emergency cable installation and power hookups being performed by ECB. The operations personnel involved are independent of the personnel required for the fire brigade. In addition ECB has no responsibility for Fire Brigade manning or plant operations, and can supply a minimum of 15 personnel to hookup equipment within the time frame required for the safe shutdown systems to be operable.

Staff Position 8.(i):

Demonstrate that adequate acceptance tests are performed. These should verify that: equipment operates from the local control station when the transfer or isolation switch is placed in the "local" position and that the equipment cannot be operated from the control room; and that equipment operates from the control room but cannot be operated at the local control station when the transfer or isolation switch is in the "remote" position.

Response:

All of the recently installed alternate shutdown system equipment has undergone acceptance testing as follows:

(1) The Auxiliary Feedwater Pump has been tested in its "local" (i.e. alternate supply) position using the newly installed alternate shutdown manual transfer switch.

(2) All the other alternate shutdown power feed/disconnect switches were continuity and megger checked to verify operability of the circuits.

(3) All the pneumatic instrumentation has been calibrated following installation.

The equipment necessary for the Alternate Shutdown system cannot be operated from the control room when the transfer or isolation switch is in the "local" position, because, all the remote control & power cables, to the equipment will be isolated.

Response to Staff Position 8.(i) continued

An acceptance test was successfully performed proving that the equipment meets the criteria of this Staff Position. Additionally, the Auxiliary Feedwater Pump will be incorporated into our inservice pump test program. (See the Response to Staff Position 8.(j)).

Staff Position 8.(j):

Technical Specifications of the surveillance requirements and limiting conditions for operation for that equipment not already covered by existing Tech. Specs. For example, if new isolation and control switches are added to a service water system, the existing Tech. Spec. surveillance requirements on the service water system should add a statement similar to the following:

"Every third pump test should also verify that the pump starts from the alternate shutdown station after moving all service water system isolation switches to the local control position."

Response:

As detailed in Con Edison's September 18, 1978 and December 12, 1978 submittals, the only application where a manual transfer switch is physically connected is the Auxiliary Feedwater Pump. We are revising our procedures to require that following the unit's return to service, every third Auxiliary Feedwater Pump test be performed with the alternate power supply energizing the pump. Furthermore, we plan to revise our refueling surveillance procedures to incorporate requirements for pneumatic transmitter calibrations and for continuity and megger checks for all alternate power feeds/disconnect switches (except for the Auxiliary Feedwater Pump).

The requirement to perform every third Auxiliary Feedwater Pump test with the alternate shutdown power source will be incorporated into the present Section XI inservice pump testing program for the Auxiliary Feedwater Pump. Proposed technical specifications for the refueling surveillance tests described above are presently planned for submittal to the NRC by August 3, 1981.

Staff Position 8.(k):

Demonstrate that the systems available are adequate to perform the necessary shutdown functions. The functions required should be based on previous analyses, if possible (e.g., in the FSAR), such as a loss of normal a.c. power or shutdown on a Group 1 isolation (BWR). The equipment required for the alternate capability should be the same or equivalent to that relied on in the above analysis.

Response:

The systems and equipment that are used for the alternate shutdown system are the same equipment that is used for normal and emergency plant operations. Thus, the systems available are adequate to perform the necessary safe shutdown functions.

The only additional equipment that was installed for the specific purpose of being used for the alternate shutdown system is the pneumatic instrumentation. This instrumentation is located inside the unit's containment building and its function is for local indication of steam generator level and pressurizer pressure and level.

The instruments and installation meet or exceed the criteria of the unit's original design specifications and meet the staff position of being the same or equivalent to systems the equipment interfaces with.

Therefore, it is our position that the systems available are adequate to perform the necessary shutdown functions.

Staff Position 8.(1):

Demonstrate that repair procedures for cold shutdown systems are developed and material for repairs is maintained on site.

Response:

"Corrective Maintenance" procedures exist for major components necessary for operation of systems used to reach cold shutdown. These procedures are performed by either the in-house maintenance group or the off-site Power Generation Maintenance (PGM) group, depending on the size and scope of the repair.

Con Edison has a Computerized "Class and Stock" System for all equipment including those necessary for maintenance of safe shutdown systems. The system automatically orders spare parts when a preset minimum is reached. The spare parts necessary for repairs are stored in our Buchanan Service Center warehouse which is located approximately ½ mile from the Indian Point site.

ATTACHMENT B

Response to the Staff Position on Safe Shutdown Capability - Enclosure 2 (Section 1) NRC Letter of February 20, 1981 All Power Reactor Licensees

Consolidated Edison Company of New York Inc.

Indian Point Unit No. 2

Docket No. 50-247

May 1981

Staff Request Enclosure 2, Section 1:

For each fire area where an alternative or dedicated shutdown method, in accordance with Section III.G.3 of Appendix R to 10 CFR Part 50, is provided by proposed modifications, the following information is required to demonstrate that associated circuits will not prevent operation or cause maloperation of the alternative or dedicated shutdown method:

A. Provide a table that lists all equipment including instrumentation and support system equipment that are required by the alternative or dedicated method of achieving and maintaining hot shutdown.

B. For each alternative shutdown equipment listed in 1.A above, provide a table that lists the essential cables (instrumentation, control and power) that are located in the fire area.

C. Provide a table that lists safety related and non-safety related cables associated with the equipment and cables constituting the alternative or dedicated method of shutdown that are located in the fire area.

D. Show that fire-induced failures of the cables listed in B and C above will not prevent operation or cause maloperation of the alternative or dedicated shutdown method.

E. For each listed in 1.B above, provide detailed electrical schematic drawings that show how each cable is isolated from the fire area.

Response:

The information requested in Items A through E above has been provided to the NRC Regulatory Staff by Con Edison letters dated September 18, 1978, December 12, 1978 and March 19, 1981. We believe that these letters also provide the information required by Section III.G of Appendix R to 10 CFR Part 50. In summary, the alternate shutdown system

is physically separated from the fire areas of concern by 3-hour fire barriers. Maloperation or failure of the alternate shutdown system will not affect the normally functioning systems, and since control and instrumentation are provided locally at the equipment, the requirements for associated circuits are satisfied.

ATTACHMENT C

Response to the Staff Position on Safe Shutdown Capability - Enclosure 2 (Section 2) NRC Letter of February 20, 1981 All Power Reactor Licensees

Consolidated Edison Company of New York Inc.

Indian Point Unit No.2

Docket No. 50-247

May 1981

Staff Request, Enclosure 2, Section 2

The residual heat removal system is generally a low pressure system that interfaces with the high pressure primary coolant system. To preclude a LOCA through this interface, we require compliance with the recommendations of Branch Technical Position RSB 5-1. Thus, this interface most likely consists of two redundant and independent motor operated valves. These motor operated valves and their associated cable may be subject to a single fire hazard. It is our concern that this single fire could cause the two valves to open resulting in a fire-initiated LOCA through the subject high-low pressure system interface. To assure that this interface and other high-low pressure interfaces are adequately protected from the effects of a single fire, we require the following information:

A. Identify each high-low pressure interface that uses redundant electrically controlled devices (such as two series motor operated valves) to isolate or preclude rupture of any primary coolant boundary.

Response:

At Indian Point Unit No.2 we have identified five areas that fall under the criteria of high-low pressure interface that use redundant electrically controlled devices to isolate the primary coolant boundary. They are:

(1) The Residual Heat Removal (RHR) system. This system uses two Motor Operated Valves (MOV) in series.

(2) The Pressurizer Power-Operated Relief System. This system uses four valves, two parallel sets of one MOV and one Solenoid Operated Valve (SOV) in series.

(3) The Chemical and Volume Control System (CVCS) Letdown System. This system uses one SOV in series with three parallel SOV's.

(4) The CVCS Excess Letdown System. This system uses two SOV's in series.

Staff Request, Enclosure 2, Section 2-B

Identify the device's essential cabling (power and control) and describe the cable routing (by fire area) from source to termination.

Response:

The attached Table 1 details the cable routing, by fire area from source to termination for the high-low pressure interfaces outlined in Response to Enclosure 2, Section 2-A. The fire zone designations correspond to those areas presented in our "Review of Indian Point Station Fire Protection program" submitted to the NRC on April 15, 1977.

TABLE 1

Indian Point Unit No.2
Power & Control Cable Routing by Fire Area

System	Valve No.'s	Source/Routing by Fire Zone	Termination
RHR	730	27A, 7A, 2A, 1A, 74A & 75A	Valves in 75A
	731	27A, 7A, 2A, 1A, 74A, 75A, 71A (Control for 731 also runs thru 32A, 11 and 15)	Valves in 71A
Pressurizer Relief	535 & 536 (MOV's)	27A, 7A, 2A, 1A, 75A, 70A & 86A (Control for 535 & 536 also runs thru 15, 11 and 32A)	Valves in 86A
	455C & 456	15, 11, 32A, 74A, 75A, 70A & 86A	Valves in 86A
CVCS Letdown	459	15, 11, 32A, 1A, 74A, 75A & 71A	Valves in 71A
	200 A, B&C	15, 11, 32A, 1A, 74A, 75A, 7A&2A	Valves in 75A
CVCS Excess Letdown	213 & 123	15, 11, 32A, 1A, 74A, 75A & 71A	Valves in 71A

Staff Request, Enclosure 2, Section 2-C

Identify each location where the identified cables are separated by less than a wall having a three-hour fire rating from cables for the redundant device.

Response:

In general the fire areas containing equipment associated with the high to low pressure interfaces identified in the response to Enclosure 2, Section 2-A, do not meet the specific criteria of Enclosure 2, Section 2-C. However, based on the justification presented in the response to Enclosure 2, Section 2-D adequate protection is provided against a fire initiated LOCA.

Staff Request, Enclosure 2, Section 2-D

For the areas identified in item 2.C above (if any), provide the bases and justification as to the acceptability of the existing design or any proposed modifications.

Response:

The types of cable used for the systems described in the response to item 2-A are highly fire retardant and are of three general types:

a) PVC insulated cable with a closely woven glass braid and overall covering of lapped mylar tape and closely woven asbestos braid saturated with a flame and moisture resistant finish.

b) EPR insulated cable with a neoprene or lead jacket.

c) Silicone rubber insulated cable with a lapped mylar tape separator and an overall braid of closely woven asbestos and finished with a flame and moisture resistant saturant.

The fire retardant properties of the cable were demonstrated by the tests which the Indian Point Unit No.2 cable has successfully passed, namely:

a) Standard vertical flame test which is in accordance with ASTM. D-470-59T, "Tests for Rubber and Thermoplastic Insulated Wire and Cable",

b) Five minute vertical flame test made with cable held in a vertical position and a 1750^{o}F flame applied for 5 minutes, and

c) Bonfire test which consists of exposing for 5 minutes, bundles of three of six cables to a flame produced by

igniting transformer oil in a 12 inch pail which the cable supported horizontally over the center of the pail with the lowest cable 3 inches above the top of the pail.

With these types of fire resistant cable, a fire will not propagate along the cable. This fact was demonstrated by the fire which occurred in November 1971 during the plant construction. The fire was of such intensity that building structural steel and electrical equipment were damaged, yet the cable was not damaged beyond the exposure area, nor did it re-ignite after the external sources of combustion had been extinguised.

Additionally, the fire retardant properties of the cable were shown by the extraordinary and unrealistic measures that had to be taken by the Sandia Laboratory to produce a catastrophic cable tray fire.

The areas of high cable concentration where safe shutdown and essential device cables are installed at Indian Point Unit No.2 are the Cable Spreading Room, the Electrical Tunnel and the Electrical Switchgear Room. Cable trays in these areas are of metallic construction with Unistrut or Binkley channel for support which is non-combustible. No PVC conduits or conduits made from other combustible materials are used. Fire

loadings in these areas are low and there is no storage or accumulation of combustible materials present. It is, therefore, most improbable that a fire could occur which could generate the intense heating conditions necessary for total consumption and catastrophic type failure of all cable.

Futhermore, those fire areas highlighted in Table I of the response to item 2-B have fire detection systems associated with them, with the critical fire areas (i.e., Zones Nos. 11 and 32A) also having installed fire suppression systems.

Each of the high-low pressure interface systems (outlined in the response to Enclosure 2, Section 2-A) are designed with two valves in series (MOV&MOV, MOV&SOV, or SOV&SOV). In order for the high-pressure interface to be violated, both the valves must be artificially signalled to open by the fire; that is, a hot short is required to cause the valves to open. Since each SOV is normally closed and the valve circuit is deenergized when closed and each MOV is normally closed and fails as is. (Note: MOV-730 and MOV-731 are normally kept deenergized and closed during power operation by locking out their circuit breakers at their respective motor control centers.) Furthermore, the operators for these valves are purposely undersized and interlocked such that they physically cannot open against the differential pressure which exists across the valves during operation.

Actuation of each valve circuit during a fire would require the burning through of at least two multi-conductor fire retardant cables in the same area. One must be a live cable, which is not shorted to ground via the cable trays or a conduit. The highly unlikely connection of exactly the correct wires of the live cable to the correct wires of the respective valve cable must occur to actuate the solenoids or Motor Operator Valves (i.e. connection of the correct voltage and polarity for SOV's or connection of the correct voltage and phase rotation for MOV's). In addition, this must happen to series valves simultaneously.

In the remote possibility that a live or a series of live cables did connect by a "hot short" to the deenergized MOV or SOV cables, they would most likely "burn free" and result in, at most, a momentary energizing before deenergization of the valve circuits.

Futhermore, the cable trays used at Indian Point Unit No.2 including the cable tray dividers, are constructed of metal and grounded. Live cables that would burn through would short out on the trays or tray dividers and trip their circuit breakers at their power sources.

In light of:

- o The high fire retardant cable design,
- o The fire detection and suppression systems provided for the critical cable areas,

- The redundant fail-safe design of the high-low pressure interface isolation valves,
- The highly improbable creation of "hot shorts" across an exact combination of cables and wires for certain specific components,

it is Con Edison's judgement that the existing plant design is acceptable and no additional fire protection modifications are necessary.