

DEC 11 1972

Docket No. 50-286

R. C. DeYoung, Assistant Director for Pressurized Water Reactors, L
CONSOLIDATED EDISON COMPANY OF NEW YORK, INC. - INDIAN POINT NUCLEAR
GENERATING UNIT NO. 3 - RECOMMENDATIONS FOR ESTABLISHING POSITIONS ON
UNRESOLVED ITEMS - DOCKET NO. 50-286

As a result of our continuing review of the Indian Point - 3 operating
license application, the L:RS Electrical, Instrumentation and Control
Systems Branch has identified several items that can not be resolved
by additional questions or discussion with the applicant. The project
manager, H. Specter, L:PWR-1, has requested early identification of
problem areas in order to allow as much time as possible for resolution.

Enclosed are our recommendations for establishing a licensing position
on each unresolved item that has been identified to date. Included are
a brief description of the design, a statement of the problem, and the
bases for each recommended position. Those items identified with asterisks
may be resolved by the responses to the second set of questions
sent to the applicant on November 6, 1972. However, based on information
obtained during an electrical drawing review meeting on November 10,
1972, design changes initiated by the applicant are not expected. All
items discussed in the enclosure were discussed with the applicant during
that meeting.

Donald F. Knuth, Assistant Director
for Reactor Safety
Directorate of Licensing

Enclosure:
Recommended Positions on
Unresolved Items

- cc: w/encl:
- S. Hanauer, DRTA
- J. Hendrie, L:TR
- A. Giambusso, L:RP
- D. Vassallo, L:PWR-1
- H. Specter, L:PWR-1
- V. Moore, L:EI&CS
- R. Pollard, L:EI&CS

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design of the circuitry used to change from the injection phase to the recirculation phase is unacceptable because it does not conform to this requirement, i.e., any one of several switches, if not properly positioned, could prevent automatic initiation of redundant safety equipment.

3. Safety Injection Bypass

The safety injection system is designed to permit bypassing the low pressurizer pressure/low pressurizer level initiation signal. A single switch is provided to accomplish this bypass in both redundant initiation circuits. We consider this to be a violation of the single failure criterion.

Recommended Position: It is required that the circuitry used to bypass the low pressurizer pressure/low pressurizer level safety injection signal be designed in accordance with IEEE Std 279-1968. The present design does not conform with this requirement because of the use of a single switch common to both redundant initiation circuits.

*4. Disconnection of Instrument Bus 33

Instrument Bus 33 is one of four vital instrument buses and its power is disconnected as part of the load shedding scheme following an accident. We consider this arrangement to be a violation of Section 4.20 of IEEE Std 279-1968 which requires that "the design shall minimize the development of conditions which would cause meters, annunciators, recorders, alarms, etc., to give anomalous indications confusing to the operator."

Recommended Position: It is required that the protection system be designed in accordance with IEEE Std 279-1968. The disconnection of power to Instrument Bus 33 in the event of an accident is unacceptable because that feature does not conform with the requirements of Section 4.20 of IEEE Std 279-1968.

5. Lack of Independence Between Redundant Safety Injection Pumps

The description of the high pressure injection system presented in the FSAR implies that the system is capable of performing its function even in the event of failure of any one of the three pumps. The FSAR does not describe the following design feature which was

*This item may be resolved by the response to question 7.24

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RECOMMENDED POSITIONS ON UNRESOLVED ITEMS FOR INDIAN POINT UNIT 3

1. Automatic Transfer Circuits

The applicant's response to Question 8.2 describes the automatic transfer circuits that are provided for the diesel generator control circuits and the 480 volt switchgear breaker control circuits. The applicant states that the automatic transfer circuits have been provided "in order to provide a reliable 480 volt safeguards system" and that the transfer scheme meets the intent of Safety Guide 6. We have concluded that the need for automatic transfer results from the incompatibility between the number of a-c power sources (three diesel generators) and the number of d-c power sources (two 125 volt batteries). We have also concluded that the design does not conform to Safety Guide 6 and that the automatic transfer circuits compromise the independence between redundant safety systems. The following position is similar to that taken on other recent operating licensing cases.

Recommended Position: It is required that the d-c power system used to control the diesel generators and the 480 volt switchgear be designed without use of automatic circuit transfers between redundant power sources.

2. Switching From Injection Phase to Recirculation Phase

Pages 6.2-11 through 6.2-15 of the FSAR contain a description of the procedure used to change from the injection phase to the recirculation phase following a loss of coolant accident. Our review has disclosed that, in the event of an accident, the consequences of a single mispositioned switch are unacceptable. For example, if either "Switch Six" or "Switch Eight" is closed, all three high pressure safety injection pumps are disabled, either because their circuit breakers will not remain closed or because their common suction line is isolated. We consider this arrangement to be in violation of the single failure criterion. In addition, the design appears to violate the applicant's criteria in that operation of these switches negates a design feature intended to prevent the operator terminating a safety injection signal until after the auto-start sequence is completed.

Recommended Position: It is required that automatic initiation of the operation of engineered safety feature systems be designed in accordance with the single failure criterion. The present

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disclosed during the schematic drawing review: If either pump 31 or pump 33 fails to start, the discharge valves for pump 32 are repositioned. The applicant stated that it is not known whether or not the system performance is adequate if the valves are not repositioned correctly. We consider this to be a violation of the single failure criterion.

Recommended Position: It is required that engineered safety feature systems be designed in accordance with the single failure criterion. The adequacy of the single failure criterion is based in part on the assumption that neither operation nor failure of one component will interfere with proper operation of its redundant counterpart. Therefore, it is required that either:

1. An analysis be performed to demonstrate that operation of any two high head safety injection pumps is adequate without any changes in system operation that are based on whether or not the third pump is operating or failed; or
2. Those portions of the protection system and safety injection system that are used to detect failure of one pump and subsequently change operation of the remaining two pumps be designed in accordance with the single failure criterion.

6. Bypass of Redundant Engineered Safety Feature Systems

The testing scheme for the ESF actuation circuits requires bypassing the automatic initiation function. As described in the response to Question 7.10, there are no positive means, such as an interlock, to prevent bypassing both redundant circuits. In addition, the bypass indication does not identify which of the two circuits is bypassed nor can the operator distinguish between bypass of one and bypass of both circuits. We have concluded that this arrangement is not in accordance with Safety Guide 22 and violates Section 4.13 of IEEE Std 279-1968.

Recommended Position: It is required that the protection system be designed such that, either:

1. Positive means are provided to prevent concurrent bypasses of redundant safety equipment and each bypass is uniquely indicated on the main control board; or

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2. Indication is provided on the main control board to uniquely identify the portion of the system that is bypassed and to alert the operator to the need for immediate corrective action if redundant portions are bypassed concurrently.

7. Disconnection of Fuel Oil Transfer Pumps

All three diesel fuel oil transfer pumps are connected to non-safety buses and are disconnected from their electric power supplies in the event of an accident or loss of offsite power. We consider this a violation of Section 5.2.2 (5) of IEEE Std 308-1971 which requires that auxiliary devices be supplied from a Class IE bus that is related to the Class IE buses of the dependent equipment.

Recommended Position: It is required that all equipment necessary for operation of the diesel generators be supplied from Class IE buses related to the load groups served by the diesel generators.

8. Fuel Oil Transfer System Control Circuits

The design of the control system for the fuel oil transfer system is described in the applicant's response to Question 8.4. We have reviewed the design and concluded that the automatic control system does not meet the single failure criterion. We also find unacceptable the proposed procedure which requires the use of "jumpers" to bypass failed components in the automatic circuit. We agree with the applicant that automatic control is not required because of the time available for manual control of the fuel oil transfer system.

Recommended Position: It is required that the fuel oil transfer system be designed such that either the automatic or the manual control mode meets the requirements of IEEE Std 279-1968. If you choose the latter, it is required that permanently installed equipment be provided to change operation of the system from automatic to manual control. The use of "jumpers" as described on FSAR page Q8.4-2 is unacceptable.

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****9. Interlocks for Isolation Valves Between Low Pressure and High Pressure Systems**

The design features used to prevent low pressure piping from being subjected to high pressure fluids are described in the response to Question 7.16. We have concluded that these features do not conform to the criteria set forth in a note to E. G. Case from D. F. Knuth dated April 13, 1972. These criteria have been used on all recently licensed plants.

Recommended Position: It is required that, for high pressure to low pressure system interfaces, at least two valves in series be provided to isolate the low pressure system. For systems where both valves are motor operated, the valves shall have independent and diverse interlocks to prevent the valves from being accidentally opened unless the primary system pressure is below the pressure rating of the low pressure system. The valves shall also receive a signal to close automatically whenever the primary system pressure exceeds the pressure rating of the low pressure system.

****This item may be resolved by the response to question 7.21**

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