Peter Zarakas
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July 15, 1980

Director of Nuclear Reactor Regulation
ATTN: Mr. Steven A. Varga, Chief
Operating Reactors Branch No. 1
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Varga:

Attachment A to this letter completes our response to the request for additional information concerning the eletrical override/bypass aspects of the containment purge system contained in Mr. A. Schwencer's April 23, 1980 letter. A partial response to this request was previously provided by letter dated May 28, 1980.

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

Very truly yours,

Peter Zarakas
Vice President

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Attachment A

Final Response to NRC's April 23, 1980
Request for Additional Information
Concerning Electrical Override/Bypass
Aspects of the Containment Purge System

Consolidated Edison Company of New York, Inc.
Indian Point Unit No. 2
Docket No. 50-247
July, 1980

Question 6.(2)a)

6. Indian Point 2 must meet the conditions of General Design Criteria 1, 2, 4 and 23 of Appendix A and Sections III and XI of Appendix B (to 10 CFR Part 50) and the national standards identified in Part II, "Acceptance Criteria", of Standard Review Plan Section 3.11 (which includes IEEE Std 323). To ensure that these conditions are met:

   (1) Provide the information requested in Parts 2 thru 6 below for the following equipment:

      a) "RESET" switches used in the logic circuits for: Containment Ventilation Isolation, Containment Isolation, Containment Spray, and Safety Injection;

      b) The inverters that supply power to the Safeguards Cabinets;

      c) The Safety Injection (AGA) timer; and

      d) The slave relays (e.g., SI-1X)

   (2) For each item listed in Part 1 above, provide the design specification requirements, including:

      a) The system safety requirements.

RESPONSE:

Reset Switches

For each of the circuits listed above, the "Reset" switches function to restore control of individual components to the plant operator. In addition, the reset function inhibits reinitiation by any of the other automatic initiating signals until the original initiating signal has cleared. This safety feature precludes unwarrented reinitiation of safeguards sequencing upon actuating the reset function.

Inverters

The static inverters form a part of the uniterruptable power supply necessary to initiate safeguards actuation and support the instrumentation and control systems duirng normal plant operation and in the event of loss of offsite power.

Safety Injection Timer

The safety injection timer is provided to prevent resetting of the safety injection signal before the safeguards actuation sequence has gone to completion. This action precludes the possbility of defeating the safeguards sequence in the event that the initiating signal is a real one, rather than the result of a spurious signal resulting from electrical or other system disturbances.

Slave Relays

The slave relays function to actuate various individual or groups of safeguards equipment (e.g., pumps, valves, breakers etc.) upon actuation of the master relay. In general, actuation can be accomplished either manually or automatically when a sufficient number of input signals are available to makeup the actuation logic. The specific load group assignments for individual slave relays can be found on Con Edison Drawing No. 110E089, Sheets 4 and 6, previously provided.

Question 6.(2)b)

6. Indian Point 2 must meet the conditions of General Design Criteria 1, 2, 4 and 23 of Appendix A and Sections III and XI of Appendix B (to 10 CFR Part 50) and the national standards identified in Part II, "Acceptance Criteria," of Standard Review Plan Section 3.11 (which includes IEEE Std 323). To ensure that these conditions are met:

   (1) Provide the information requested in Part 2 thru 6 below for the following equipment:

      a) "RESET" switches used in the logic circuits for: Containment Ventilation Isolation, Containment Isolation, Containment Spray, and Safety Injection;

      b) The inverters that supply power to the Safeguards Cabinets;

      c) The Safety Injection (AGA) timer; and

      d) The slave relays (e.g., SI-1X)

   (2) For each item listed in Part 1 above, provide the design specification requirements, including:

      b) An environmental envelope as a function of the time that includes all extreme parameters, both maximum and minimum values, expected to occur during plant shutdown, normal operation, abnormal operation, and any design basis event (including LOCA and MSLB), and post event conditions. The envelopes shall include an explicit statement of the range of energy supply and electrical loads.

RESPONSE:

With the exception of the static inverters which are located in the Control Building at the 33 ft. elevation, all other equipment identified in Part 1, is located in the Central Control Room (Control Building, El.-53'). Equipment located in either of these locations is not subject to the hostile environment associated with a LOCA, MSLB, or other environmentally severe design basis events.

The only abnormal environmental operating conditions associated with either of these locations is that of short term plant operation with loss of control room air conditioning. Plant operation under such conditions is limited to a control room temperature of 120°F. This abnormal temperature condition is based on the necessity to insure that temperatures do not exceed levels where reactor protection system and safeguards system setpoints are altered appreciably. If the control room temperature were to rise to 110°F, steps would be taken to bring the reactor to a safe and orderly shutdown.

Because the equipment identified in paragraph 1 is not subject to the hostile environment associated with LOCA, MSLB, or other environmentally severe design basis events, the extreme environmental envelopes associated with such events have not been addressed in the design specifications for this equipment.

Question 6.(2)c)

6. Indian Point 2 must meet the conditions of General Design Criteria 1, 2, 4 and 23 of Appendix A and Sections III and XI of Appendix B (to 10 CFR Part 50) and the national standards identified in Part II, "Acceptance Criteria," of Standard Review Plan Section 3.11 (which includes IEEE Std 323). To ensure that these conditions are met:

   (1) Provide the information requested in Parts 2 thru 7 below for the following equipment:

      a) "RESET" switches used in the logic circuits for: Containment Ventilation Isolation, Containment Isolation, Containment Spray, and Safety Injection;

      b) In inverters that supply power to the Safeguards Cabinets;

      c) The Safety Injection (AGA) timer; and

      d) The slave relays (e.g., SI-1X)

   (2) For each item listed in Part 1 above, provide the design specification requirements, including:

      c) Time required to fulfill its safety function when subjected to any of the extremes of the environmental envelope specified in 2(b) above.

RESPONSE:

There are no severe environmental extremes associated with the operation or location of the equipment identified in Part 1. Refer to the previous response to Question 6.(2)b). The time required for this equipment to fullfill its safety function is therefore independent of such environmental envelopes.

Question 6.(3), 6.(4), 6.(5), 6.(6)

6. Indian Point 2 must meet the conditions of General Design Criteria 1, 2, 4 and 23 of Appendix A and Sections III and XI of Appendix B (to 10 CFR Part 50) and the national standards identified in Part II, "Acceptance Criteria," of Standard Review Plan Section 3.11 (which includes IEEE Std 323). To ensure that these conditions are met:

   (1) Provide the information requested in Parts 2 thru 6 below for the following equipment:

      a) "RESET" switches used in the logic circuits for: Containment Ventilation Isolation, Containment Isolation, Containment Spray, and Safety Injection;

      b) The inverters that supply power to the Safeguards Cabinets;

      c) The Safety Injection (AGA) timer; and

      d) The slave relays (e.g., SI-1X)

   (3) Provide the qualification test plan, test setup, test procedures, and acceptance criteria for each of the items listed in (1) above. If any method other than type testing was used for qualification (operating experience, analysis, combined qualification, or ongoing qualification), describe that method in sufficient detail to permit an evaluation of its adequacy.

   (4) For each piece of equipment identified in (1) above, state the actual qualification envelope simulated during testing (defining the duration of the hostile environment and the margin in excess of the design requirements). If any method other than type testing was used for qualification, identify the method and define the equivalent "qualification envelope" so derived.

   (5) Summarize the test results that demonstrate the adequacy of the qualification programs described above.

   (6) Identify the qualification documents which contain detailed supporting information, including test data, for items (3), (4) and (5) above.

RESPONSE:

The equipment identified in Part 1 is not subject to the hostile environment associated with a LOCA, MSLB or other environmentally severe design basis events. Accordingly no such testing was required to be performed. Refer to the response to Question 6.(2)b).

Question 7.(1)

7. For the relays that are listed in Question 6(1) above, provide the following information:

   (1) Manufacturer's name and model number,

RESPONSE:

Manufacturer's model numbers specified for the relays identified in Question 6.(1) can be found on Con Edison Drawing No. 110E089, Sheets 4 and 6, which were previously provided. These are Westinghouse relays of the following typcial model numbers:

BFD 48S

BFD 66S

BFD 120S

Question 7.(2)

7. For the relays that are listed in Question 6(1) above, provide the following information:

(2) The minimum voltage at which it must operate,

RESPONSE:

The slave relays are rated for operation at 125 to 130 VDC. Minimum voltage at which these relays must operate is fixed by the voltage variation of their uninterruptable DC supply source. The uninterruptable power supply consists of redundant batteries and battery chargers. During normal plant operation, DC power for operation of the relays is provided from the battery chargers. These units are rated at 130 VDC with an output voltage variation of ±1%. The battery chargers are sized to maintain the batteries at full charge in anticipation of a loss of AC power incident while powering the normal DC loads. Upon loss of AC power to the battery charger(s) the batter(ies) will assume the DC load. The batteries are sized to carry expected shutdown loads following a plant trip and a loss of all AC power for a period of two hours without battery terminal voltage falling below 105 VDC. Pick up and dropout values for these relays are typically on the order of 70 VDC and 30 VDC respectively. The slave relays are required to perform their safety function within seconds of incident initiation. Thus, for the case where AC power to the battery charger(s) is unavailable and DC power is provided by the batter(ies), the voltage variation from the batter(ies) in the seconds following relay actuation would be negligible and of no concern with respect to these pickup and dropout values. For the case where the relays are powered from the battery charger(s), the normal voltage variation of the charger(s) (±1%) would again be of no concern with respect to relay operation. If larger battery charger voltage variations including charger failure are assumed the batteries would serve to power the relays.

In addition, three 50% capacity emergency diesel generators are maintained available to resupply AC power to the battery chargers and other safeguards equipment within 10 seconds of AC power loss.

Question 7.(3)

7. For the relays that are listed in Question 6(1) above, provide the following information:

(3) The voltage at which it was seismically qualified,

RESPONSE:

Information provided by the supplier of this equipment indicates that this type of equipment is seismically tested at the normal operating voltage.

Question 7.(4)

7. For the relays that are listed in Question 6(1) above, provided the following information:

(4) The normal operating voltage

RESPONSE:

The normal operating voltage for these relays is 125 VDC.

Question 7.(5)

7. For the relays that are listed in Question 6(1) above, provide the following information:

(5) The locations and functions of this type of relay.

RESPONSE:

For the location and function of these relays refer to the responses to Questions 6.(2)b) and 6.(2)a), respectively.

Question 7.(6)

7. For the relays that are listed in Question 6(1) above, provide the following information:

   (6) Justify the seismic qualification of any relay that was not qualified by test at its minimum operating voltage, or that was not tested in both the energized and de-energized state.

RESPONSE:

Seismic qualification at normal operating voltage is justified as follows:

a) As discussed in our response to Question 7.(2), pickup values for these relays are typically on the order of 70 VDC. Voltage regulation of the uninterruptable power supply at the time these relays are required to perform their safety function will maintain supply voltage at more than 105 VDC. As discussed in response to Question 7.(2), supply voltage variations of such minor magnitude as those anticipated at the time these relays are required to perform their safety function will have negligible effect on coil flux, and therefore present little concern with respect to relay operation under seismic excitation in general and to the relatively low seismic excitations anticipated for the Indian Point site in particular.

b) Conservatism in the seismic qualification of this equipment provides additional margin with respect to postulated conditions having the potential for altering relay state. Specifically, the seismic testing performed considered a Design Basis Earthquake (DBE) horizontal ground acceleration of 0.2g. The DBE horizontal ground acceleration for Indian Point Unit No. 2 is 0.15g.

c) A review of the available documentation indicates that these relays were tested in both the energized and de-energized state. This was accomplished by energizing a typical safeguards actuation matrix prior to each discrete test, then during the actual testing deliberately changing the circuitry to a post-trip condition. Satisfactory change of state on demand was used as a basis for demonstrating functional integrity.