Wisconsin Electric POWER COMPANY
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June 1, 1984

Mr. H. R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. NUCLEAR REGULATORY COMMISSION
Washington, D. C. 20555

Attention: Mr. D. G. Eisenhut, Director
Division of Licensing

Gentlemen:

DOCKET NOS. 50-266 AND 50-301
ADDITIONAL RESPONSE TO GENERIC LETTER 83-28
REACTOR TRIP BREAKER AUTOMATIC SHUNT TRIP ACTUATION
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

On July 8, 1983 the NRC transmitted Generic Letter 83-28, "Required Actions Based on Generic Implications of Salem ATWS Events". In our response dated November 7, 1983 we committed to submit plant-specific design information in May 1984 describing our proposed modification which would incorporate automatic actuation of the reactor trip breaker shunt trip attachment. The generic design of the automatic shunt trip attachment was transmitted by the Westinghouse Owners Group (WOG) to the NRC via letter OG-101 dated June 14, 1983. The specific design information provided in this letter was requested in the NRC's August 10, 1983 Safety Evaluation Report (SER) on the WOG generic design.

The specific design information requested in the SER is provided in Attachment A. Each request is listed as found in the SER and is followed by our response. Additional attachments are provided to furnish specific information and are addressed in Attachment A. We have provided five copies of all attachments for your use. Please note that our response to request 13 includes a proposal for a Technical Specification change which could be implemented to incorporate the testing of the modified shunt trip attachment. This is not a Technical Specification change request; if this proposed Technical Specification change is satisfactory to your staff, we will provide a formal license amendment application at a later date.

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As we stated in our November 7 letter, we intend to install this modification in Unit 2 during the fall 1984 refueling outage and in Unit 1 during the spring 1985 refueling outage. This assumes that we will receive NRC approval of our plant-specific modifications by August 1, 1984. Should you have any further questions concerning this matter or the information provided, please contact us.

Very truly yours,

C. W. Fay

Vice President-Nuclear Power

C. W. Fay

Attachments

Copy to NRC Resident Inspector

ATTACHMENT A

RESPONSE TO NRC REQUEST FOR "PLANT SPECIFIC DESIGN INFORMATION REQUIRED FOR WESTINGHOUSE PLANTS INCORPORATING THE AUTOMATIC SHUNT TRIP MODIFICATION". (ATTACHMENT TO SER ON GENERIC WESTINGHOUSE AUTO SHUNT TRIP DESIGN)

1. Request

"Provide the electrical schematic/elementary diagrams for the reactor trip and bypass breakers showing the undervoltage and shunt coil actuation circuits as well as the breaker control (e.g.,closing) circuits, and circuits providing breaker status information/alarms to the control room."

Response

Attached is a proposed revision to Westinghouse drawing 617F354, Sht. 5 of 13, for Point Beach Nuclear Plant Units 1 and 2. This drawing shows the undervoltage and shunt trip coil actuation circuits as well as breaker control circuits and circuits providing breaker status information/ alarms to the control room. This revision shows the circuits as they will exist after the modification to implemlent the automatic shunt trip feature is implemented.

2. Request

"Identify the power sources for the shunt trip coils. Verify that they are class 1E and that all components providing power to the shunt trip circuitry are class 1E and that any faults within non-class 1E circuitry will not degrade the shunt trip function. Describe the annunciation/indication provided in the control room upon loss of power to the shunt trip circuits. Also describe the overvoltage protection and/or alarms provided to prevent or alert the operator(s) to an overvoltage condition that could affect both the UV coil and the parallel shunt trip actuation relay."

Response

The power source for the shunt trip coils of the Train A reactor trip and bypass breakers is from the 125 VDC Train A safeguards system through DC Distribution Panel D17 for Unit 1 and DC Distribution Panel D22 for Unit 2. The power source for the shunt trip coils of the Train B reactor trip and bypass breakers is from the 125 VDC Train B safeguards system through DC Distribution Panel D21 for Unit 1 and D19 for Unit 2. Attached is drawing 6118-E-6 which is a one line of the Point Beach 125 VDC distribution system. All components which provide power to the shunt trip circuitry are considered safeguards equipment and therefore were designed and installed in a manner similar to that of other safeguards equipment at Point Beach.

A review has been completed which shows that the circuit which supplies power to the shunt trip coils of the A-Train reactor trip and bypass breakers does not share any common enclosure or raceway with that which supplies power to the shunt trip coils of the B-Train reactor trip and bypass breakers. In addition, this review indicates that seven cables on Unit 1 and 4 cables on Unit 2 are associated with both

power supply circuits due to their presence in common enclosures or raceways. For each of these cables it has been determined that:

(1) Damage due to a fault will be limited to the area of the fault based on the fact that each of the cables is protected by a circuit breaker which will interrupt the circuit at fault current values well below the capacity of the cable itself.

(2) Damage to the circuit supplying the reactor trip breaker shunt trip coil on one train due to a fire caused by a fault of one of these cables cannot propagate back along the faulted cable to a raceway which contains the circuit supplying the reactor trip breaker shunt trip coil on the other train. This is due to the installation of firestops in intervening raceways.

Please note that the reactor trip switchgear and, therefore, a portion of the cable route for those circuits which provide power to the shunt trip coils of the reactor trip breakers are not located in Seismic Class I structures.

No new control room indication/annunciation will be added as a result of incorporating the shunt trip modification. Existing indications on the main control board for breaker operation are the red and green position lights. These lights are powered from the same 125 VDC supply used for closing and shunt tripping the circuit breaker. The green light indicates that the breaker is open and that power is available for closing. The red light indicates that the breaker is closed and power is available to the shunt trip device. In addition, an annunciator on the new Unit 2 Auxiliary Safety Instrumentation Panel (2C20) in the control room will indicate over/undervoltage on either A-Train or B-Train safeguards 125 VDC systems. Voltage indicators for the voltage level present on each of the 125 VDC safeguards trains will also be located in panel 2C20.

Components in the added shunt trip circuitry will be selected based on their ability to perform their intended function up to a voltage of approximately 140 VDC. The voltage supplied to both the undervoltage and shunt trip coils is supplied from the station batteries and the voltage is, therefore, controlled by the battery voltage. Battery voltage is maintained at a level less than 135 VDC.

3. Request

"Verify that the relays added for the automatic shunt trip function are within the capacity of the associated power supplies and that the relay contacts are adequately sized to accomplish the shunt trip function. If the added relays are other than the Potter & Brumfield MDR series relays (P/N 2383A38 or P/N 955655) recommended by Westinghouse, provide a description of the relays and their design specifications."

Response

It has been verified by Wisconsin Electric and Westinghouse that the relay contacts are adequately sized for the trip function and are within the capacity of their associated power supplies. It has also been verified by Wisconsin Electric and Westinghouse that the relay contacts

are adequately sized for the trip function and are within the capacity of their associated power supplies. Wisconsin Electric will utilize the Potter & Brumfield MDR series relay (P/N 2383A38).

4. Request

"State whether the test procedure/sequence used to independently verify operability of the undervoltage and shunt trip devices in response to an automatic reactor trip signal is identical to the test procedure proposed by the WOG. Identify any differences between the WOG test procedure and the test procedure to be used and provide the rationale/justification for these differences."

Response

The test procedure used to independently verify operability of the undervoltage and shunt trip devices in response to an automatic shunt trip signal will include the steps in the test procedure submitted by the WOG to the NRC in letter No. OG-101 dated June 14, 1983.

5. Request

"Verify that the circuitry used to implement the automatic shunt trip function is Class 1E (safety related), and that the procurement, installation, operation, testing, and maintenance of this circuitry will be in accordance with the quality assurance criteria set forth in Appendix B to 10CFR Part 50."

Response

The added circuitry used to implement the automatic shunt trip function will be Class 1E. Procurement, installation, operation, testing, and maintenance of this circuitry will be accordance with Section 1.8 of the Point Beach FSAR which satisfies the quality assurance requirements of Appendix B to 10 CFR Part 50.

6. Request

"Verify that the shunt trip attachments and associated circuitry are/will be seismically qualified (i.e., be demonstrated to be operable during and after a seismic event) in accordance with the provisions of Regulatory Guide 1.100, Revision 1 which endorses IEEE Standard 344, and that all non-safety related circuitry/components in physical proximity to or associated with the automatic shunt trip function will not degrade this function during or after a seismic event."

Response

Wisconsin Electric is working with the WOG and Westinghouse to obtain seismic qualification of the shunt trip attachments and added circuitry. If qualification tests show that any of the added components do not perform their intended function during or after a

postulated seismic event, these components will be substituted for during initial installation or replaced during the next scheduled outage of sufficient length.

7. Request

"Verify that the components used to accomplish the automatic shunt trip function are designed for the environment where they are located."

Response

Shunt trip components have been selected and are being procured to operate in the environment defined in the WOG Generic Design Package, Table 1, submitted to the NRC via Westinghouse Owners Group Letter No. OG-101 dated June 14, 1983. This environment envelopes that of the location of the reactor trip switchgear at PBNP.

8. Request

"Describe the physical separation provided between the circuits used to manually initiate the shunt trip attachments of the redundant trip breakers. If physical separation is not maintained between these circuits, demonstrate that faults within these circuits can not degrade both redundant trains."

Response

The circuits which provide for manual initiation of the shunt trip attachments of the redundant trip breakers are physically separated as follows.

1. Within the reactor switchgear these circuits are confined to separate metal enclosures.

2. Between the reactor trip switchgear and the main control board these circuits are run in separate raceways.

3. These circuits enter the main control board through separate risers, but are connected to common pushbuttons within the control board.

Wiring internal to the main control board will be revised to provide for adequate separation between manual initiation circuits associated with the A-Train reactor trip breakers and those associated with the B-Train reactor trip breakers. Adequate separation will consist of six inches of free air space or an intervening barrier. Barriers will be metal or other suitable material.

9. Request

"Verify that the operability of the control room manual reactor trip switch contacts and wiring will be adequately tested prior to startup after each refueling outage. Verify that the test procedure

used will not involve installing jumpers, lifting leads, or pulling fuses and identify any deviations from the WOG procedure. Permanently installed test connections (i.e., to allow connection of a voltmeter) are acceptable."

Response

A Point Beach periodic test procedure will be developed which will verify the proper operation of the control room manual reactor pushbuttons and associated wiring prior to startup after each refueling outage. This procedure will require that the following occur when each of the manual trip pushbuttons in the control room is depressed.

1. The voltage across the undervoltage coil of each of the reactor trip breakers drops to zero. This will be verified by connecting a voltmeter across test points TP1 and TP2 as shown on drawing 617F354 Sht 5 of 13 which is attached.

2. The voltage across the connection point to the combination of the shunt trip coil and the series connected 52a auxiliary switch contact of each reactor trip breaker goes to a nominal 125 VDC. This will be verified by connecting a voltmeter across test points TP5 and TP6 as shown on drawing 617F354 Sheet 5 of 13, which is attached.

This procedure will not require installing jumpers, lifting leads, or pulling fuses. It will also not require cycling of the breakers.

10. Request

"Verify that each bypass breaker will be tested to demonstrate its operability prior to placing it into service for reactor breaker testing."

Response

While there may be some benefit to reactor trip system reliability associated with frequent testing of the bypass breaker, the benefit is of questionable value. Bypass breakers are closed only during testing of main trip breakers and it is only during this time that the bypass breaker could be called upon to provide a protective action. Testing occupies in total, approximately 12-18 hours per year per train or 0.14% to 0.21% of the operating time of the reactor trip system per year. Further testing the bypass every 18 months results in an unavailability value of 3.2×10^{-3}. Finally, the purpose of the bypass breaker is to allow on-line testing of the reactor trip system. Protection is still considered to be provided by the opposite train main trip breaker. A situation which would require action by the bypass breaker would include:

Condition	Probability of Occurrance per Year
1. One train in test	2×10^{-3}
2. Requirement for Reactor Trip	12/year
3. Failure of Main Trip Breaker	3.5×10^{-4}

The occurrance of such a situation is 8.4×10^{-6} per year. Considering that bypass breaker unavailability is $3.2. \times 10^{-3}$, the probability of complete failure of the reactor trip system during testing is remote and does not appear to warrant frequent testing of the bypass breakers.

11. Request

"Verify that the test procedure used to determine reactor trip breaker operability will also demonstrate proper operation of the associated control room indication/annunciation."

Response

The test procedure used to determine reactor trip breaker operability will also demonstrate proper operation of the red and green breaker position indicating lights in the control room.

12. Request

"Verify that the response time of the automatic shunt trip feature will be tested periodically and shown to be less than or equal to that assumed in the FSAR analysis or that specified in the technical specifications."

Response

At this time it is not our intention to perform periodic response time testing. Should life cycle testing being performed by Westinghouse show that breaker trip response time degrades with operation, periodic on line testing will be considered.

The WOG Generic design package does, however, include the installation of test points which would provide for time response testing if necessary.

We will continue to monitor the results of the Westinghouse life cycle testing.

13. Request

"Propose technical specification changes to require periodic testing of the undervoltage and shunt trip functions and the manual reactor trip switch contacts and wiring."

Response

Attached is a proposed revised page 3 of 3 Table 15.4.1-2 of the Point Beach Nuclear Plant Technical Specifications. Section (26) requires monthly testing of the automatic undervoltage and shunt trip functions of the reactor trip breakers. Section (27) requires testing of the operability of the manual reactor trip switch contacts and wiring at each refueling outage.

As stated in our November 7, 1983 response to Generic Letter 83-28 we consider the above testing intervals to be adequate. We will also follow the NRC's review and disposition of WCAP-10271 and its supplements and will consider adjustments to our testing intervals based on the resolution of the issues discussed in these documents.

TABLE 15.4.1-2 (Continued)

		Test	Frequency
24.	Integrity of Post Accident Recovery Systems Outside Containment	Evaluate	Yearly
25.	Containment Purge Supply and Exhause Isolation Valves	Verify valves are locked closed	Monthly (9)
26.	Reactor Trip Breakers	a. Verify operability of Automatic Trip funtion	Monthly (9)
27.	Reactor Trip Breakers	a. Verify operability of Manual Trip Function.	Each Refueling Shutdown

(1) Required only during periods of power operation.
(2) E determination will be started when the gross activity analysis of a filtered sample indicates 10 c/cc and will be redetermined if the primary coolant gross radioactivity of a filtered sample increases by more than >10 c/cc.
(3) Drop test shall be conducted at rated reactor coolant flow. Rods shall be dropped under both cold and hot condition, but cold drop tests need not be timed.
(4) Drop tests will be conducted in the hot condition for rods on which maintenance was performed.
(5) As accessible without disassembly of rotor.
(6) Not required during periods of refueling shutdown.
(7) At least once per week during periods of refueling shutdown.
(8) At least three times per week (with maximum time of 72 hours between samples) during periods of refueling shutdown.
(9) Not required during periods of cold or refueling shutdown.
(10) During end-of-cycle period of operation when boron concentration is less than 100 ppm, this test may be waived due to operational limitations.
(11) Sample to be taken after a minimum of 2 EFPD and 20 days power operation since the reactor was last subcritical for 48 hours or longer.