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PRAIRIE ISLAND NUCLEAR GENERATING PLANT
Docket Nos. 50-282 License Nos. DPR-42
50-306 D.R-60

Response to Inspection Reports
50-282/88012(DRP) and 50-306/88012(DRP)

In response to your letter of August 22, 1988, which transmitted Inspection Reports No. 282/88012 and 306/88012, the following information is offered.

Violation #1

Technical Specification 3.5 requires that three of four reactor protection system (RPS) channels be operable for the reactor power operation.

Contrary to the above, on July 26, 1988, it was determined that Unit 2 had three out of four RPS channels for overtemperature Delta T and overpressure delta T inoperable since 1974 and that Unit 1 may have had two of four channels inoperable during maintenance and surveillance testing.

This is a Severity Level IV violation (Supplement 1).

Response

On July 25, 1988, Unit 1 was at 85% power (end-of-cycle coastdown) and Unit 2 was at 100% power. At 1700, a load reduction to 50% power was begun on Unit 1 for maintenance. The time spent at reduced power was longer than anticipated, and as xenon concentration was increasing, it became necessary to withdraw control rods to maintain reactor coolant system temperature and power. As a result of the control rod withdrawal and the xenon build-up, a large axial flux tilt developed.

The flux tilt was sufficient to require the reactor protection system to apply a penalty to the overpower and overtemperature delta T reactor

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protection setpoints. However, operators noted that one of the four channels (the blue channel) of overpower and overtemperature delta T setpoints was not responding properly. Investigation overnight and the following day revealed that the blue channel flux tilt controller did not respond to changes in the input signal. Further investigation showed that the affected flux tilt controller was a Foxboro 62-H-2E Style C, while the other three Unit 1 controllers were Foxboro 62-H-2E Style B. The Style B controllers responded properly. When the corresponding controllers in Unit 2 were inspected, four of the Style C controllers, which would not respond properly to flux difference input were found in use.

Corrective Action Taken and Results Achieved

At 2324 on July 26th, a Notification of Unusual Event (NUE) was declared and a shutdown of Unit 2 was begun since the minimum operable delta T reactor protection channel requirements of Technical Specification 3.5 were not met. Three of the four channels of each delta T trip function are required to be operable. Unit 1 was then shutdown so that the Style B controllers installed in Unit 1 could be removed and transferred to Unit 2 (which was capable of more generating capacity since Unit 1 was in end-of-cycle coastdown). Unit 1 was in hot shutdown by 2400. By 0146 on July 27th, the Unit 2 nuclear instrumentation system (NIS) delta T channels again satisfied the Technical Specification requirements for minimum operable channels. The NUE and Unit 2 load decrease were terminated and Unit 2 was returned to full power.

The cause of the problem was found to be an incompatibility in signal interface between the Westinghouse nuclear instrumentation system inputs and the Foxboro H-Line Style C controller. The controller did not work properly in this application because the positive leads were tied together. This design would work for circuits interfacing with isolated common inputs. However, in the Prairie Island nuclear instrumentation system, the negative signal leads are tied together. The result was a controller output that did not respond to changes in input signal. The problem was not identified during routine surveillance testing because the test jack isolates the interface between the Foxboro and Westinghouse equipment.

Following consultation with Westinghouse and Foxboro, a modification to the Style C controllers was developed by the plant technical staff and reviewed by the Operations Committee. The four Style C controllers were modified to make them compatible with the Prairie Island nuclear instrumentation system (supplied by Westinghouse). The modified Style C controllers were installed in Unit 1 and tested. Unit 1 was returned to service at 1340 on July 28th.

Because of the potential generic implications of the event both Westinghouse and Foxboro were notified and the problem was reported on the INPO Nuclear Network System.

A review of Prairie Island operating data found that there has never been a case where the inoperability of the flux difference input to the overtemperature and overpower delta T trips resulted in a failure of any protection channel to trip.

Investigation revealed that originally all four sets of Flux Tilt Controllers in Unit 1 were Style E while all four Unit 2 controllers were Style C. In July 1980 one set of Unit 1 controllers was exchanged for spares, which were Style C, due to an instrument problem. The Unit 2 controllers remained Style C until the discovery of the problem.

Corrective Action to be Taken to Avoid Further Violations

Style B controllers were installed in Unit 2 so it could remain operational. A modification was made to the Style C controllers, including spares, to tie the negative inputs together and to separate the positive inputs. The modified Style C controllers were installed in Unit 1. Testing was performed from the nuclear instrumentation to the controller to verify proper operation.

Power Supply Quality Assurance initiated a special audit of the Flux Tilt Controller problem to investigate whether the condition found in the Flux Tilt Controllers had implications in other installations at Prairie Island. This audit did not identify any additional problems but gave several recommendations for further investigation by the plant. The audit recommendation to check the Delta-I circuitry as a complete loop during the annual calibration is being implemented. The plant staff is in the process of reviewing the rest of the recommendations and will take additional action as appropriate.

Date When Full Compliance Will Be Achieved

Full compliance has been achieved.

Violation #2

Technical Specifications Paragraph 4.2.A states in part that "inservice inspection of ASME Code Class 1, Class 2, and Class 3 components shall be performed in accordance with Section XI" Included in Section XI is a requirement for the stroke time testing of applicable valves.

Contrary to the above, pressurizer power operated relief valves (PORV) were not included as part of the ASME Section XI and therefore were not stroke time tested until very recently

This is a Severity Level IV violation (Supplement 1).

Response

The boundaries for the ASME Code Class 1, 2 and 3 systems were originally established in accordance with NRC Regulatory Guide 1.26 by the plant staff in 1976. Within the boundaries, all components were screened to the requirements of the edition of Section XI of the ASME code approved by the NRC at that time. The pressurizer power operated relief valves (PORV's) were determined to be outside the code requirements.

Since the original screening in 1976, many components have been added and deleted from the Prairie Island Inservice Testing Program (IST) as a result of plant and NRC reviews. In this particular case, due to changes in the interpretation of the criteria for selection of components which fall within the Prairie Island IST Program, and the increased safety significance placed on the pressurizer PORV's since the Three Mile Island accident, it was determined that the pressurizer PORV's should be incorporated into the Prairie Island IST program.

Corrective Action Taken and Results Achieved

Following the determination that the pressurizer PORV's should be included in the Prairie Island IST program, surveillance test procedures (SP 1291 and 2291), which met all the requirements of the NRC approved Prairie Island IST Program, were developed and implemented for the pressurizer PORV's.

It should be noted that the pressurizer PORV's and associated block valves have received a high degree maintenance and testing attention since plant startup in 1973. Specifically, the PORV block valves have been stroked quarterly in accordance with Technical Specification requirements and the PORV's have been inspected and tested annually as part of preventive maintenance procedure PM-3114-1. As part of this preventive maintenance procedure, if valve seat leakage is identified during testing at power the following actions are taken:

- The valve is disassembled, the seat and disc are lapped and new internals are installed
- Prior to reassembly, there is a verification that no foreign objects are left inside the valve.
- The valve is reassembled and critical measurements are taken to assure correct assembly which include measurements of torque and uniform gasket compression.
- The valve is packed with low friction factor, high leak resistance material.

- The valve stem stroke is set and the closing spring forces adjusted to meet design requirements for stroke time and seat leakage.
- Finally, the valve is stroked from the Control Room with maintenance personnel at the valve to verify the valve operates smoothly.

Also as part of the preventive maintenance procedure, the air operators and associated solenoid valves are inspected annually for air leaks and are replaced as necessary.

The Prairie Island PORV maintenance practices were recognized by the industry in 1978 when Prairie Island PORV maintenance and testing practices were presented by the system engineer to an ASME Conference in Chicago, and the Plant Superintendent of Maintenance presented the practices used at Prairie Island to achieve superior PORV performance at a plant maintenance conference in Clearwater, Florida.

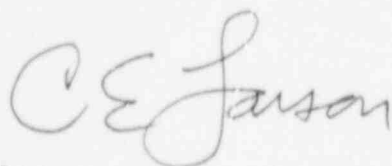
Corrective Action to be Taken to Avoid Further Violations

Based on past NRC reviews of the Prairie Island IST program and the differences in the interpretation of Section XI requirements between 1973 and the present, we have concluded that the current process used for the selection of components to be included in the IST program is adequate and that no changes to the selection process are necessary.

Date When Full Compliance Will Be Achieved

Full compliance has been achieved.

Please contact us if you have any questions related to our response to these violations.



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