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SUBJECT: Responds to NRC 920508 ltr re violations noted in insp rept 50-305/92-08 on 920301-0422.Corrective actions: interdisciplinary design team has been established to address design problems associated w/TDAFW pump.

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June 8, 1992

10CFR2.201

U. S. Nuclear Regulatory Commission
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Washington, D.C. 20555

Gentlemen:

Docket 50-305
Operating License DPR-43
Kewaunee Nuclear Power Plant
Reply to Notice of Violation

Reference: 1) Letter from L. Robert Greger (NRC) to CA Schrock (WPSC) Dated May 8, 1992 (Inspection Report 92-008)

In the reference, the Nuclear Regulatory Commission (NRC) provided Wisconsin Public Service Corporation (WPSC) with the results of a routine inspection conducted from March I, through April 22. The attachment to this letter provides our response to the violation identified during the inspection.

If you have any questions concerning this issue, please contact me or a member of my staff.

Sincerely,

C. A. Schrock

C. A. Schrock
Manager - Nuclear Engineering

jac

cc - US NRC - Region III
Mr. Patrick Castleman, US NRC

LIC\NRC\N18.WP

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ATTACHMENT 1

To

Letter from C. A. Schrock (WPSC)

To

Document Control Desk (NRC)

Dated

June 8, 1992

Re: Inspection Report 92-008

NRC NOTICE OF VIOLATION

During an NRC inspection conducted on March 1 through April 22, 1992, a violation of NRC requirements was identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," 10 CFR Part 2, Appendix C (1992), the violation is listed below:

A. 10 CFR Part 50, Appendix B, Criterion XI requires, in part, that all testing required to demonstrate that systems and components will perform satisfactorily in service be identified in written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents.

Contrary to the above, on April 11, 1992, the licensee approved Design Change Procedure 2239, "Installation and Retest Governor Replacement TDAFW Pump," which did not incorporate the requirements and acceptance limits contained in the applicable design documents to demonstrate that: 1) the pump could attain the necessary operating speed to fulfill its safety function, and; 2) that the turbine's governor could adequately regulate turbine speed to less than the overspeed trip setting.

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

Wisconsin Public Service Corporation's (WPSC's) Response:

Design Change Request (DCR) 2239 was written to replace the governor on the turbine driven auxiliary feedwater (TDAFW) pump. The DCR was initiated in order to improve the reliability of the pump. The governor was originally scheduled for replacement on March 6, 1992, as the plant was shutting down for its annual refueling outage. During post installation testing on March 6, it was determined that the governor supplier (Dresser Rand) had supplied a governor with the wrong internal configuration. The plant shutdown continued for the scheduled refueling outage and the governor was returned to the supplier for rework.

The governor was subsequently returned to the plant and installed on the TDAFW pump during the outage. Post modification testing was scheduled for plant start up when steam would again be available to test the pump. Technical Specification 3.4.a.2 states that all three AFW pumps shall be operable prior to the reactor exceeding 350 degrees F. The constraints of T.S. 3.4.a.2 and available steam pressure at RCS temperatures of less than 350 degrees F necessitated that a phased approach be taken to determine operability. The DCR procedure was written to test the pump at three different steam pressures to ensure operability. The first test was scheduled to coincide with a reactor temperature of approximately 340 degrees F and steam generator (SG) pressure of approximately 100 psig. Due to the low steam pressure available at 340 degrees F, the first test would be conducted with the pump decoupled from the turbine. With the pump coupled, the 100 psig of steam pressure would be insufficient to accelerate turbine speed to 3600 RPM. This test, in conjunction with the successful completion of Surveillance Procedure (SP) 05B-286, "Turbine Driven AFW Pump Operability Verification Below 350°F," would provide adequate assurance of operability to allow heatup to continue. The second test would be conducted with the reactor in hot shutdown and a steam generator pressure of approximately 1000 psig. The final test would be conducted at 30% reactor power and a steam generator pressure of approximately 900 psig.

At 0100 on April 13, 1992, with the reactor at approximately 340 degrees F, the first test of the TDAFW pump with the new governor installed commenced. The governor was set using DCR

procedure 2239 to control speed at 3600 RPM and the turbine was re-coupled to the pump. The pump was returned to Operations at approximately 0400 on April 13.

Prior to exceeding a reactor temperature of 350 degrees F, Operations performed surveillance procedure (SP) 05B-286, "Turbine Driven AFW Pump Operability Verification Below 350°F." During the procedure, turbine speed is compared to an accepted reference value. This is the same methodology used in the inservice testing program. The procedure identified expected turbine speed to be between 2450 to 2500 RPM when reactor temperature is between 340 and 349 degrees F. When the pump was tested, the "As Found" speed was 2644. In accordance with the procedure, the governor was adjusted to control speed at 2490 RPM. The procedure was completed at 0455 on April 13, the TDAFW pump was declared operable, and the plant startup from the refueling outage continued. The hot shutdown test of the TDAFW pump was scheduled for later that day.

At 2015 on April 13, with the plant in hot shutdown, the Operations Supervisor was discussing the second planned retest of the TDAFW pump with the field engineer. During the discussion, the Operations Supervisor became aware that the governor had been reset during the performance of SP 05B-286. He immediately became concerned with the operability of the pump. He reviewed the situation with the engineers involved and Operation's management. They theorized that the governor would control turbine speed at the set speed of 2490 RPM and not at the design speed of 3600 RPM. To verify this theory, the pump was tested at 2110 hours

on April 13. During the test, pump speed stabilized at approximately 3400 RPM, which was inconsistent with the "As Left" speed adjustment of the governor. Further investigation revealed that the governor was attempting to close the governor valve and decrease speed to 2490 RPM but mechanical binding in the governor valve was preventing closure. Since the governor was incorrectly set, the TDAFW pump was declared inoperable at 2120 hours on April 13, 1992. The LCO time clock was started from the time the reactor exceeded 350 degrees F.

The governor valve was removed, repaired, and reinstalled on the TDAFW pump. Retests of the TDAFW pump with the new governor were conducted between 1400 hours and 1700 hours on April 14 with the reactor in hot shutdown and a steam generator pressure of approximately 1000 psig. During these tests, the governor was unable to prevent an overspeed trip of the TDAFW pump. Therefore the pump would have been inoperable even if the governor had not been reset during SP 05B-286. As a result, the old governor was re-installed. The TDAFW pump was successfully retested and returned to service at 0522 on April 15, 1992.

The inoperability of the TDAFW pump was caused by procedural and design inadequacies.

SP 05B-286 incorrectly requires resetting the governor to adjust turbine speed if it does not fall within the range identified by the procedure. However, at a reactor temperature of 340 degrees F and a steam pressure of 100 psig, the governor valve will be wide open for any governor setting greater than approximately 2500 RPM. Reducing the governor setting to control speed

between 2450 and 2500 RPM ensures that the governor will not control at 3600 RPM as required. Since this procedure was used only one other time, and during that test the governor was not adjusted, this procedure error was not discovered prior to this event.

The engineering evaluation of the TDAFW pump failed to sufficiently look at the entire design of the steam supply system to the TDAFW pump. As a result, factors other than governor performance that influence turbine performance were not adequately considered in the design. Factors that should have been considered are, steam supply valve design, the design of the motor operator for the steam supply valve, valve location, etc.

To prevent recurrence of this event the following actions have or will be taken:

Prior to being used again, SP 05B-286 will be revised as necessary to prevent a similar occurrence.

An interdisciplinary design team has been established to address the design problems associated with the TDAFW pump. The team consists of operations, maintenance, licensing, and engineering personnel. They will review the design of the steam supply system to the TDAFW pump and develop a comprehensive design to improve reliability of the pump. It is currently estimated that the design can be completed and implemented by the end of the 1993 outage.

In order to improve the design change process an internal critique of the design changes implemented during the 1992 outage is being performed. The results of the critique will be reviewed to determine where improvements can be made. The critique is expected to be completed in November of 1992.

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