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SUBJECT: Provides response to violations noted in Insp Rept 50-305/93-08. Corrective actions: as-found static testing performed to determine thrust & torque values of valve actuator.

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August 4, 1993

US Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555

Reply to a NOV  
(10CFR2.201)

Ladies/Gentlemen:

Response to Inspection Report

Reference: Letter from L. R. Greger (NRC) to C. A. Schrock (WPSC) Dated June 18, 1993  
(Inspection Report 93-008)

In the reference, the Nuclear Regulatory Commission (NRC) provided Wisconsin Public Service Corporation (WPSC) with the results of a routine inspection conducted from March 30 through May 28, 1993. The attachments to this letter provide our detailed response to the violations identified during the inspection. As discussed with Kewaunee's Senior Resident Inspector, this response is being submitted on August 4, 1993.

WPSC recognizes the importance of Kewaunee's root cause program and its role in ensuring the continued safe and reliable operation of the Kewaunee plant. In recognition of its importance, the program has been reviewed four different times in the past year, including two NRC inspections. As a result of these reviews, changes have and are being taken to improve the program including additional training in root cause determination and procedural enhancements. These changes have already resulted in improvements in our root cause and corrective action program as noted in a recent NRC inspection of Kewaunee's engineering organization. I anticipate continued improvement as my staff gains additional experience and becomes proficient in performing the actions described in the body of this letter.

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

Sincerely,

*CA Schrock*  
Charles A. Schrock  
Manager - Nuclear Engineering

TJW/cjt  
Attach.

9308100131 930804  
PDR ADDCK 05000305  
G PDR

cc - US NRC, Region III  
US NRC Senior Resident Inspector

**Attachment 1**

**For**

**Response to Inspection Report 93-008**

**Letter from C. A. Schrock (WPSC)**

**To**

**Document Control Desk (NRC)**

**Dated**

**August 4, 1993**

NRC Notice of Violation:

10 CFR Part 50, Appendix B, Criterion V requires, in part, that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings.

Kewaunee Nuclear Administrative Directive, NAD 12.5, "Shift Operation and Turnover," Revision O, November 13, 1992, requires, in part, that safeguards systems or components removed from service be logged on the shift supervisor's status board and on the control operator shift turnover checklist.

Contrary to the above, on April 21 and 22, 1993, the licensee removed a safeguards system component, auxiliary feedwater system valve AFW-10A, from service and failed to identify and log this action on the shift supervisor's status board and on the control operator shift turnover checklist.

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

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

At 0518 hours on April 21, 1993, the Shift Supervisor logged valve AFW-10A out of service for diagnostic testing. The valve was to be tested under static and dynamic conditions. At the time, the Shift Supervisor recognized that the testing of AFW-10A affected the operability of the turbine driven auxiliary feedwater pump (TDAFWP); however, he also realized that the pump was still available. Since he did not want to mislead the operators into thinking the pump was unavailable, he did not log the pump out of service. As a result, the 72 hour limiting condition of operation (LCO) action statement for the pump (see attachment 2, TS 3.4.b) was not logged as required by Kewaunee's administrative directives. The next shift entered the 72 hour LCO for the TDAFWP at 1130 hours on April 21, 1993, when dynamic testing of AFW-10A began.

As-found static testing had been performed to determine the thrust and torque values of the valve actuator. The as-found static testing found an overthrust and overtorque condition. Following the as-found static testing, the torque switch setting was adjusted to bring the actuator output to allowable levels for both torque and thrust. The resulting thrust, at torque switch trip (TST), was below the minimum thrust calculated for closure of the valve at maximum differential pressure. The torque switch was not adjusted further because this could have resulted in exceeding the maximum thrust value. Since the calculated target values are conservative, it was decided that, although the thrust at TST was below the minimum thrust limit, the motor operated valve (MOV) may still be able to pass the dynamic test.

During the dynamic test, the valve was opened and the measured parameters were all within prescribed limits. However, during the closing stroke, the torque switch tripped and stopped the actuator prior to full closure.

The torque switch was then adjusted as high as could be attained without exceeding the Limitorque torque rating under static conditions. Flow cutoff could not be obtained under the subsequent dynamic test conditions.

Based on the information contained in the Kalsi Engineering report, which justifies actuator operation at thrust values 40% greater than the Limitorque limits, it was decided to proceed with torque switch adjustments that could result in maximum thrust values in excess of Limitorque's recommended maximum thrust limit. At 2100 hours on April 21, the dynamic test was again performed. Again during the opening stroke the valve performed satisfactorily and the measured parameters were all within prescribed limits. During the closing stroke, the actuator torqued out just prior to flow cutoff.

In summary, the test results showed that the actuator exceeded torque and thrust limits at the higher torque switch settings and could not isolate flow at the lower torque switch settings.

Since this higher torque switch setting was not successful, plant management decided to return the actuator to within the original calculated thrust band. This would maintain the maximum thrust and torque values below their respective limits. Plant procedures needed to be modified to reduce the pressure drop across the valve to allow it to close. Since there were no problems encountered during testing the opening stroke of the valve, plant management decided to leave the valve closed and suspend testing for the night due to the late hour (2100 hours). Even though the valve was still logged out of service, the 72 hour LCO for the TDAFWP was exited at this time. The individuals involved in the operability decision believed that, as long as the valve was capable of being opened from the control room to ensure adequate flow to the steam generator (SG), the pump was operable.

The next day, the engineering staff and the NRC Resident Inspector were contacted to provide assistance. After a re-examination of the operability determination from the previous night, it was determined that the TDAFWP should be considered inoperable. Therefore, the 72 hour LCO action statement for the TDAFWP was re-entered at 1320 hours on April 22 and the pump was considered out-of-service from the beginning of testing at 1130 hours on April 21.

On April 22, a safety analysis and a 10 CFR 50.59 evaluation was performed to determine the acceptability of modifying plant emergency operating procedures to allow the operators to stop the AFW pump(s) to reduce the differential pressure across the valve and ensure its closure. This action would reduce the pressure drop across the valve and allow the valve to completely close when required. The 10 CFR 50.59 evaluation and safety analysis determined that there is sufficient time during accident conditions, when the pressure drop across the valve would be

the greatest, to perform these actions without adversely affecting the health and safety of the public. The safety analysis and 10 CFR 50.59 evaluation were reviewed and accepted by the Plant Operation Review Committee on April 23.

The special operating procedures for dynamic testing of AFW-10A and B were completed at 1700 hours on April 23. The control room switch for each valve was danger tagged with the comment that the valves may not close with a high differential pressure; therefore, running AFW pump(s) may have to be stopped to allow the valve to close.

The TDAFWP was returned to service and the LCO action statement exited at 1629 hours on April 23, 1993.

WPSC's evaluation of this violation identified three weaknesses that resulted in the operators' failure to log valves AFW-10A and AFW-10B out-of-service. These weaknesses are:

1. Although the Shift Supervisor was aware of the relationship between the operability of AFW-10A and the TDAFWP, there were weaknesses in the way he logged the event.
2. Available engineering resources were not fully used when the operability decision was made at 2100 hours on April, 21, 1993.
3. The Technical Specifications for the AFW system are not consistent.

To address the first weakness, this event will be reviewed along with the administrative directive (NAD 12.5), "Shift Operation and Turnover", during the first session of the next operator requalification series beginning August 31, 1993. The requirements for documenting shift operation and turnover information will be reviewed. Also, the importance of accurately logging equipment in and out of service while entering and exiting LCOs will be stressed.

Relating to the second weakness, WPSC recognizes the need to make greater use of its engineering resources in situations similar to this event. Therefore, the Manager - Nuclear Engineering and the members of his staff will meet with the Plant Manager and the Assistant Manager - Plant Operations and members of their staff, to discuss this event and methods to increase engineering involvement in plant activities. This meeting will occur prior to September 30, 1993.

When the valves were declared inoperable, the personnel involved reviewed Kewaunee's Technical Specifications to determine the required action. TS 3.4, "Steam and Power Conversion System" contains the Technical Specifications for the auxiliary feedwater system, (see attachment 2). Technical Specification 3.4.b, "Auxiliary Feedwater Pumps," describes the

actions to be taken for an inoperable AFW pump. The operability/inoperability of the AFW-10A or AFW-10B, the respective TDAFWP discharge isolation valves for each steam generator, directly supports the operability of the TDAFWP and not the operability of the motor driven pumps. Therefore, when the valves were found inoperable, the 72 hour LCO for the TDAFWP was entered.

Following the event, an NRC inspector identified that TS 3.4.a. is also associated with the auxiliary feedwater system, (refer to attachment 2, TS 3.4.a.1.A.1, and 3.4.a.2). This TS allows the AFW system's piping and valves to be inoperable for 48 hours. This TS lacks clarity and if interpreted too conservatively, is inconsistent with TS 3.4.b.

The inconsistency between TS 3.4.a.1.A.1 and TS 3.4.b developed as a result of changes in TS 3.4 for the auxiliary feedwater system. When Kewaunee was licensed in 1974, TS 3.4 required the operability of only two AFW pumps and allowed both pumps to be inoperable for 48 hours. Subsequently, a number of amendments were made to TS 3.4, including the requirement for a third pump and decreasing the allowed outage time for two pumps to four hours. When these changes were made, TS 3.4.a.1.A.1 was not revised to ensure consistency. A TS amendment will be submitted by January 30, 1994, which will provide consistency within the TS.

NRC Notice of Violation:

10 CFR Part 50, Appendix B, Criterion XVI requires, in part, which measures shall be established to assure that conditions adverse to quality are promptly identified and corrected, and that in the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition.

Contrary to the above, corrective actions taken by the licensee in response to previously identified significant conditions adverse to quality did not preclude the recurrence of the conditions, as demonstrated by the following examples:

- a. On April 13, 1993, licensee staff blocked open door No. 244 between the Turbine Driven Auxiliary Feedwater Pump Room and the adjacent safeguard electrical equipment areas. This action placed the plant in a condition outside of its design bases. Corrective actions, taken by the licensee in response to a previous similar event, as documented in LER 91012, did not preclude recurrence of the condition adverse to quality. (305/9308-02a)
- b. On March 22, 1993, the licensee determined that the 1993 refueling outage "as-found" calibration data for the pressurizer pressure transmitters and bistables would have allowed the high pressure reactor trip signal and the safety injection block permissive signal to occur at values greater than allowed by technical

specifications. Corrective actions, taken by the licensee in response to a previous similar violation, as documented in LER 92013, did not preclude the repetition of this condition adverse to quality. (305/93008-02b)

- c. On March 28, 1993, the licensee declared the emergency diesel generator operable following completion of a routine monthly surveillance. However, data taken during the surveillance indicated that the emergency diesel generator did not perform within the prescribed acceptance criteria. Corrective actions, taken by the licensee in response to two previous similar violations, as documented in NRC Inspection Report 50-305/91020 and LER 92016, did not preclude the repetition of this condition adverse to quality. (305/93008-02c)

These are examples of a Severity Level IV violation (Supplement I).

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

Although WPSC recognizes the significance of these events, we are not in complete agreement with the inspection report's assessment of the events and the conclusion that they represent a recurrence of past events. Our assessments of each event and planned corrective actions for the events are contained in the LERs identified in the NOV and we will be providing supplemental information concerning item "b" later this year. However, we recognize the need to continuously identify and implement improvements in all of our processes. Furthermore, there have been four independent evaluations of Kewaunee's corrective action program over the last year. The NRC has evaluated the program twice in the past year (refer to inspection reports 92-012 and 93-011). INPO evaluated the program during its August 1992 assessment, and Wisconsin Electric Power Company performed an independent evaluation of the program in October, 1992. As a result of our own efforts and the four evaluations performed of the program, several actions, which should address the NRC concerns with Kewaunee's root cause and corrective action program, have or are in the process of being implemented. These actions are:

1. As of July 7, 1993, only two of the four engineers in the plant licensing group had received root cause training. This training has since been provided to the remaining engineers. In the past, this training was supplied by an outside contractor and as a result, the training was not readily available. In 1993, WPSC developed its own lesson plan for root cause training. The lesson plan is based on INPO's Human Performance Enhancement System. Current plans are to make the training available to the nuclear department staff on an annual basis. However, the frequency may increase or decrease depending on staff needs.
2. Currently, there is no formal method to prioritize incident reports. As a result many minor events get the same level of review and investigation as more



significant events, diverting resources from the more significant events. To address this concern, NAD 11.4, "Incident Reports" is currently under revision. The new revision will assign a priority code to all IRs to ensure they are reviewed and investigated commensurate with their safety significance. The revision is scheduled to be issued in November of 1993.

3. GNP 11.4.1, "Incident Evaluation Program" currently gives a general overview of the methods to evaluate an event. This procedure will be revised to provide more specific guidance on the preferred methods available to conduct a root cause investigation. This revision is scheduled for completion in November of 1993.
4. In order to track and trend the effectiveness of corrective actions, an Incident Report Tracking and Trending Program was implemented at the end of 1992. This program allows the responsible engineer (RE) to review past occurrences by component, keyword, and root cause when investigating an event. This review is described in GNP 11.4.1. The RE can then determine if a past event has recurred and if the previous corrective actions were properly implemented or effective. In addition to the review performed for each IR, an annual trend report was initiated in early 1993. This report trends the causes of the previous years events to determine if an adverse trend has developed.
5. Although several independent reviews of Kewaunee's root cause program have been performed over the past year, an additional review will be performed. The review will entail a re-examination of a sample of NRC notices of violations and WPSC's root cause and corrective action for the violation. The review will determine if the root causes of the event were identified, if effective corrective actions were implemented, and if the corrective actions were implemented in a timely manner. This review will be completed in February of 1994.

As noted by the NRC in a recent Engineering and Technical Support Inspection, the quality of IR evaluations has improved over the last year. These improvements can be attributed to the recent staff addition to the Plant Licensing Group along with the formal and on the job training that the group has received. Improvements are expected to continue as our staff gains more experience with root cause determination and as a result of additional guidance provided by the training combined with procedural enhancements discussed previously. Finally the implementation of a formal tracking and trending program will identify recurring events, allowing the RE to determine the adequacy of the recommended corrective actions.

**Attachment 2**

**For**

**Response to Inspection Report 93-008**

**Letter from C. A. Schrock (WPSC)**

**To**

**Document Control Desk (NRC)**

**Dated**

**August 4, 1993**

### 3.4 STEAM AND POWER CONVERSION SYSTEM

#### APPLICABILITY

Applies to the OPERATING status of the Steam and Power Conversion System.

#### OBJECTIVE

To assure minimum conditions of steam-relieving capacity and auxiliary feedwater supply necessary to assure the capability of removing decay heat from the reactor, and to limit the concentrations of water activity that might be released by steam relief to the atmosphere.

#### SPECIFICATION

##### a. Steam Generators

1. The reactor shall not be heated  $> 350^{\circ}\text{F}$  unless the following conditions are satisfied.
  - A. Two steam generators are OPERABLE.
    1. System piping and valves directly associated with providing auxiliary feedwater flow to the steam generators are OPERABLE.
    2. Five main steam safety valves per OPERABLE steam generator are OPERABLE, except during required surveillance tests or during in-service testing of these valves and steam generators in accordance with 10 CFR 50.55a, provided that at least two main steam safety valves associated with the steam generator under test are OPERABLE.
  - B. A minimum of 39,000 gallons of water is available in the condensate storage tanks and the Service Water System is capable of delivering an unlimited supply from Lake Michigan.
  - C. The iodine-131 activity on the secondary side of the steam generators does not exceed  $1.0 \mu\text{Ci/cc}$ .
2. If, when the reactor is  $> 350^{\circ}\text{F}$ , any one of the conditions of TS 3.4.a.1 cannot be met within 48 hours, then within 1 hour action shall be initiated to:
  - Achieve HOT STANDBY within 6 hours
  - Achieve HOT SHUTDOWN within the following 6 hours
  - Achieve and maintain the Reactor Coolant System  $< 350^{\circ}\text{F}$  within an additional 12 hours

b. Auxiliary Feedwater Pumps

1. The reactor shall not be heated  $> 350^{\circ}\text{F}$  unless the following conditions are met:
  - A. Both motor-driven auxiliary feedwater pumps shall be operable.
  - B. The turbine-driven auxiliary feedwater pump shall be operable, or if not demonstrated operable prior to  $> 350^{\circ}\text{F}$ , it shall be declared inoperable when  $350^{\circ}\text{F}$  is exceeded.
2. If, when the reactor is  $> 350^{\circ}\text{F}$ , any one of the following conditions of inoperability may exist during the time interval specified. If OPERABILITY is not restored within the time specified, then within 1 hour action shall be initiated to:
  - Achieve HOT STANDBY within 6 hours
  - Achieve HOT SHUTDOWN within the following 6 hours
  - Achieve and maintain the Reactor Coolant System  $< 350^{\circ}\text{F}$  within an additional 12 hours
  - A. One auxiliary feedwater pump may be inoperable for 72 hours.
  - B. Two auxiliary feedwater pumps may be inoperable for 4 hours.
3. If, when the reactor is  $> 350^{\circ}\text{F}$ , three auxiliary feedwater pumps are discovered to be inoperable, all LIMITING CONDITIONS FOR OPERATION requiring MODE changes shall be suspended until at least one auxiliary feedwater pump is restored to OPERABLE status. Upon discovery, action shall be initiated immediately to restore at least one auxiliary feedwater pump to OPERABLE status.

c. Turbine Overspeed Protection System

1. Reactor power shall not exceed 50% of rated power unless two of the three turbine overspeed protection systems are OPERABLE, except as provided by TS 3.4.c.2.
2. If two or more of the turbine overspeed protection systems are inoperable, then maintain power  $< 50\%$  of rated power. When only two systems are OPERABLE, an individual system may be blocked for no longer than 4 hours to allow for testing.