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 VARGA, S.A. Operating Reactors Branch 1

SUBJECT: Forwards addl info requested in NRC 840517 ltr re removal of auto closure feature on RHR isolation valves. Procedures, control board indication, alarms & training instituted to insure one valve would not be open at full RCS pressure.

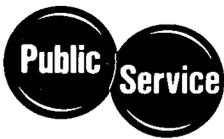
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WISCONSIN PUBLIC SERVICE CORPORATION

P.O. Box 1200, Green Bay, WI 54305



October 30, 1984

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

Dear Mr. Varga:

Docket 50-305
 Operating License DPR-43
 Kewaunee Nuclear Power Plant
Removal of RHR Autoclosure Feature

- References:
- 1) Letter from S. A. Varga to C. W. Giesler dated May 17, 1984
 - 2) Haried V. A. "Evaluation of Events Involving Decay Heat Removal Systems in Nuclear Power Plants, "NUREG 1CR-2799 (ORNL/NSIC-209) Oak Ridge National Laboratory, Oak Ridge, Tennessee, July 1982.
 - 3) Vince G. and Layman W., "Residual Heat Removal Review and Safety Analysis, Pressurized Water Reactors" NSAC-52 Nuclear Safety Analysis Center, Palo Alto, California, January 1983

In a letter dated May 17, 1984 (reference 1) you requested additional information about the removal of the autoclosure feature on the residual heat removal system's (RHRS) isolation valves. The attachment to this letter provides our response to your request for additional information. I trust this letter will clear up any unanswered questions and/or misgivings you may have.

Very truly yours,

DCH
 D. C. Hintz
 Manager - Nuclear Power

DWS/jks
 Attachment
 cc - Mr. Robert Nelson, US NRC

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Attachment

Question 1. The alarms to warn against excessive RHRS pressure

"If the Residual Heat Removal System (RHRS) isolation valves are manually operated there is the possibility for pressurizing the Reactor Coolant System (RCS) to full pressure with only one isolation valve closed in each line. In this event what alarms would give the operator the time he needs to take action to prevent the possible overpressurization of the RHRS?"

Answer 1. The control room annunciator 4702331, "RHR Abnormal Line Up", will alarm whenever the RCS pressure is above 700 psig and any one isolation valve is not fully closed. This alarm will alert control room personnel in sufficient time to take appropriate action. The 700 psig setpoint is well below the design pressure of the isolation valves (2580 psig). Therefore, valve failure at the alarm setpoint is considered incredible. Furthermore, the interlock presently does not close the valve until a RCS pressure of 700 psig is reached. Therefore, the ability of the RHRS to relieve a 700 psig pressure surge is presently accepted. The alarm is tested during each refueling to insure its operability during startup. We are not proposing to remove this alarm.

Question 2. "Since the removal of the automatic closure feature on the RHRS isolation valves would increase the probability of one valve being open at full RCS pressure, please demonstrate that Kewaunee would still be in compliance with GDC-14 if the automatic closure system is removed."

General Design Criterion 14 of 10 CFR Part 50, Appendix A states: "The reactor coolant pressure boundary shall be designed, fabricated, erected, and tested so as to have an extremely low probability of abnormal leakage, or rapidly propagating failure, and of gross rupture."

Answer 2. We disagree that removing the autoclosure feature would result in an increase in the probability of a rapidly propagating failure. To insure that one valve would not be open at full RCS pressure Kewaunee has instituted procedures, control board indication, alarms, and simulator training.

The RHRS isolation valves are closed, isolating it from the RCS, at step 4.2.11 ("Alignment of the RHR System for Plant at Power Operation") of operating procedure N-RHR-34 ("Residual Heat Removal System Operation"). To ensure valve closure, the position of the isolation valves are then checked at step 5.0 ("Remotely Operated Valves for Plant at Power Operation") of operating procedure N-RHR-34-CL ("Residual Heat Removal Prestartup Checklist"). These steps are performed at a temperature of about 350°F and a pressure of about 400 psig.

In addition to the procedures, each valve has a control room indication light, red for open and green for closed, adjacent to the valve control switch. These lights provide indication to the operator, allowing him to know the position of all four valves during plant startup.

If a valve is still not fully closed Annunciator 4702331, "RHR Abnormal Lineup", will alarm in the control room when the RCS pressure reaches 700 psig. This annunciator is described in detail in answer number 1 of this report.

In summary an operator would have to ignore two procedures, four indicating lights, one alarm and all of his training to overpressurize the RHRS. This constitutes an "extremely low probability of . . . or rapidly propagating failure" (GDC14 10 CFR 50).

Question 3. "It is the staff's position that Section B.1.c of Branch Technical Position RSB 5-1 should be complied with. In view of this how can operating procedures alone provide the independent, diverse interlock required to protect against one RHRS isolation valve in a line being open while the RCS pressure is going up to 2200 psi?"

Answer 3. While operator action is necessary to isolate the RHR system under the proposed scheme, the input to the operator is diverse and independent. Operating procedures and training provide the first level of defense. It is highly unlikely that a licensed reactor operator following approved procedures would take incomplete action by closing only one valve in either train. The second level of defense is evident at a RCS pressure of 700 psig. At this pressure the alarm described in answers 1 and 2 actuates. These levels of defense are sufficient to meet the intent of BTP RSB5-1.

The task of RHR isolation with independent verification is not unlike many other manual actions required to accomplish a safety function. One such example is low head safety injection line-up postrefueling. It is necessary to manually align the low head SI system to the refueling water storage tank. The tank serves as the initial source of cooling water during a design basis accident. Failure to properly align low head SI would have severe consequences under design basis accident conditions. Yet, low head SI manual alignment is an accepted industry wide practice. Common arguments suggest that the RHR manual isolation function should be acceptable.

It is our concern for safety that has prompted us to initiate this action; a malfunction of the autoclosure may isolate the RHR's spuriously while it is needed for decay heat removal.

A 1982 report published by Oak Ridge National Laboratory reported that for the two year period from June of 1979 to June of 1981: "The most frequent event involving a significant problem with DHR was cavitation of the RHR pumps."(2) Five events were traced to premature closure of the suction valves due to signals from their autoclosure interlocks. In 1983 an EPRI report (3) detailed twenty four events, occurring over 5 years, of RHR cooling loss due to the failure of the autoclosure interlock. Three events resulted in significant pressure excursions (50-800 psig, 95-1300 psig, and 50-2250 psig). To avert this type of event from occurring at Kewaunee it was decided that the auto closure feature should be removed.

To summarize, alarms are in place to warn the reactor operator of an improper RHR line-up. This alarm along with training and procedures provide diverse and independent means to assure proper system line-up thus preventing the possibility of a rapidly propagating failure of the RCS pressure boundary. Therefore, the BTP's are satisfied and a change is allowable in accordance with 10 CFR 50.59.