NRC-00-050

Wisconsin Public Service Corporation
(a subsidiary of WPS Resources Corporation)
Kewaunee Nuclear Power Plant
North 490, Highway 42
Kewaunee, WI 54216-9511
920-388-2560

June 20, 2000

10 CFR 50.73

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Ladies/Gentlemen:

Docket 50-305
Operating License DPR-43
Kewaunee Nuclear Power Plant
Reportable Occurrence 2000-008-00

In accordance with the requirements of 10 CFR 50.73, "Licensee Event Report System," the attached Licensee Event Report (LER) for reportable occurrence 2000-008-00 is being submitted. This report does not contain any new commitments.

Sincerely,

for
Mark L. Marchi
Vice President-Nuclear

GOR

Attach.

cc - INPO Records Center
US NRC Senior Resident Inspector
US NRC, Region III

IE22

NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION (6-1998)

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001

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TITLE (4)

High Head Recirculation Outside Design Basis Of Plant.

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
05	26	2000	2000	-- 008 --	00	06	20	2000		05000
									FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
POWER LEVEL (10)	000	20.2201(b)	20.2203(a)(2)(v)	50.73(a)(2)(i)	50.73(a)(2)(viii)
		20.2203(a)(1)	20.2203(a)(3)(i)	X 50.73(a)(2)(ii)	50.73(a)(2)(x)
		20.2203(a)(2)(i)	20.2203(a)(3)(ii)	50.73(a)(2)(iii)	73.71
		20.2203(a)(2)(ii)	20.2203(a)(4)	50.73(a)(2)(iv)	OTHER
		20.2203(a)(2)(iii)	50.36(c)(1)	50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A
		20.2203(a)(2)(iv)	50.36(c)(2)	50.73(a)(2)(vii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Gerald O. Riste – Licensing Leader	(920) 388-8424

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE).	X NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On May 26, 2000, while the plant was in the Refueling Shutdown condition, it was determined that the as-built condition of the plant did not meet its current design basis. The condition involves the Residual Heat Removal (RHR) Heat Exchanger to Safety Injection (SI) pump motor operated valves. These valves receive an open-permissive signal from the RHR system on low pressure. This signal circuitry was found not to meet the requirements of the Institute of Electrical and Electronic Engineers (IEEE)-279 standard. The pressure signal prevents the valves from opening when RHR pressure is greater than the design pressure of the SI suction piping. This permissive was designed to prevent the valves from being inadvertently opened when RHR is in its cooldown line up. Its post-accident function is to allow the valves to open.

Original documentation from plant construction and discussions with the Nuclear Steam Supply System vendor, indicated that the original design did not require meeting IEEE-279. However, the Kewaunee Updated Safety Analysis Report does not appear to reflect this design philosophy. As this event dates from original construction the cause is unknown. To ensure these valves can be operated from the control room a jumper has been installed to remove the open-permissive from the valve control circuitry. With the jumper installed the motor operated valve circuitry meets IEEE-279 standards.

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DESCRIPTION OF EVENT

On May 26, 2000, while the plant was in the Refueling Shutdown condition, it was determined that the as-built condition of the plant did not meet its current design basis. The condition involves the Residual Heat Removal (RHR) [BP] Heat Exchanger (HX) to Safety Injection (SI) [BQ] pump [P] motor operated valves [20]. These valves receive an open-permissive signal from the RHR system on low pressure. The signal circuitry was found not to meet the requirements of the Institute of Electrical and Electronic Engineers, Inc. (IEEE)-279 standard. The pressure signal prevents the valves from opening when RHR pressure is greater than the design pressure of the SI suction piping. The permissive was designed to prevent the valves from being inadvertently opened when RHR is in its cooldown line-up. Its post-accident function is to allow the valves to be opened. It accomplishes this function by not malfunctioning.

Original documentation from plant construction and discussions with the Nuclear Steam Supply System (NSSS) vendor indicated that the original design did not require meeting IEEE-279. However, the Kewaunee Updated Safety Analysis Report (USAR) does not appear to reflect this design philosophy.

RHR-299A and RHR-299B are the RHR HX to SI pump A and B suction motor operated valves (MOV's). These valves are remote motor operated manual valves with no automatic opening or closing features. Their purpose is to provide emergency core cooling system (ECCS) flow post-accident during containment sump recirculation. They are only required to be opened when reactor coolant system (RCS) [AB] pressure is greater than the shutoff head of the RHR pumps, following the injection phase of the accident. Upon transfer to containment [NH] sump recirculation, if RCS pressure is greater than the RHR pump discharge pressure, RHR-299A(B) are opened allowing use of the SI pumps higher head capacity to inject water for core cooling. RHR pump discharge pressure can only be greater than 210 psig when the RHR system is in the cooldown lineup where its pressure could be as high as 600 psig.

During a review of the quality assurance (QA) typing of instruments in the relay room, a question was raised concerning the typing of pressure instrument loops 628 and 629. The purpose of these loops is to provide RHR pump discharge pressure indication [PI] to the control room and provide an interlock [IEL], an

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open-permissive to valves RHR-299A(B). The permissive prevents the valves from opening when RHR pump discharge pressure is greater than 210 psig.

This review discovered that the instrument loops where not constructed to IEEE-279. A failure of the instrument loop could prevent the valves from opening post-accident. Because the instrument loops are not constructed to IEEE-279 standards, they can not be relied upon post-accident. Also, because it was not constructed to IEEE-279 standards, the field cables were not routed in separate safeguard cable trays ensuring design train separation. Thus a single failure could prevent both loops from allowing RHR-299A and RHR-299B to open as required post-accident to mitigate the consequences of certain small break loss-of-coolant accidents (SBLOCAs).

During a review of correspondence between the Nuclear Regulatory Commission (NRC), then the Atomic Energy Commission (AEC), and Wisconsin Public Service Corporation (WPSC), no reference was found associated with this permissive. Therefore, no commitment made to have this permissive has been found. All correspondence concerning this permissive is between KNPP's Architect Engineer and its NSSS vendor. The relevant letters date to the original construction of the KNPP and state that this permissive is not required to be IEEE-279 grade.

The NSSS vendor was contacted to determine the basis for the statement associated with the IEEE-279 qualification. The discussions with the vendor revealed that the design basis assumption for the KNPP was that if the permissive failed, local manual action could be taken to open the valves. On May 26, 2000 it was determined that the as built condition did not meet KNPPs design basis for single failure.

CAUSE OF THE EVENT

This event occurred as a result of a change in the design philosophy of the plant. During the original plant design, the NSSS vendor took credit for local manual operation of the RHR to SI cross-connect valves. KNPPs preliminary safety analysis report (January 1968) did not contain information on the control of RHR-299A(B) from the control room. When KNPPs Final Safety Analysis Report (FSAR) was issued

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(January 1973) credit was taken for control room control of these valves. The FSAR and USAR states that these valves are operated from the control room for recirculation and that if one of these valves fails to open the plant is protected because only one out of two is required to open. It appears a change in design philosophy occurred between initial construction and initial operation whereby the reliance on local operation was changed to reliance on control room operation. This philosophy change occurred without a resultant change to the circuitry design.

ANALYSIS OF THE EVENT

This event is being reported under 10CFR50.73(a)(2)(ii)(B), as a condition that was outside the design basis of the plant. Contrary to the original design basis, the USAR appears to assume the valves can be positioned from the control room and that no local manual action is required. This conclusion was reached because the USAR table titled, "Single Failure Analysis – Safety Injection System," has an item under category C, "Valves operated from the Control Room for Recirculation (recirculation phase)." The item is for the Safety Injection pump suction valve at residual heat exchanger discharge (RHR-299A(B)). It states that the malfunction is, "Fails to Open," and that one out of two are required to open. As this table from the USAR suggests that one of the valves should be able to be opened "from the control room," that philosophy does not match KNPPs as-built design.

The function of the open-permissive is to prevent overpressurization of the SI pump suction piping. This condition can only occur when RHR is in its cooldown lineup. During cooldown, RHR pump discharge pressures can reach 600 psig. Plant procedures restrict RHR cooldown operation to conditions where the RCS pressure is less than 425 psig. With a suction pressure of 425 psig and a design head of 154 psid for the RHR pumps, RHR pump discharge pressure reaches approximately 580 psig. If RHR-299A or RHR-299B were to open at these pressures or any pressure in excess of 210 psig, the suction piping of the SI pumps would be challenged.

During accident conditions, the discharge pressure of the RHR pumps will be less than 210 psig. This includes system alignments taking suction from either the refueling water storage tank (RWST) [TK], or

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from the containment sump. Under accident conditions, the highest suction pressure for the RHR pumps is while on recirculation. During recirculation RHR suction pressure could equal containment pressure of 46 psig. Adding the suction pressure to the maximum design head of the RHR pumps, 154 psid, has the RHR pump discharge maximum pressure equal to 200 psig. Therefore, the open-permissive is not required to function during accident conditions because the maximum discharge pressure cannot exceed the SI pump suction piping design pressure. When RHR discharge pressure is less than 210 psig, a relay must be energized to allow the valves to be opened. A loss-of-power condition to these circuits would prevent opening RHR-299A or RHR-299B. Therefore, the open-permissive is required not to malfunction during accident conditions.

CORRECTIVE ACTIONS

A temporary physical change has been installed to defeat the open-permissive. Procedures have been changed to lock open the power supply breaker to RHR-299A and RHR-299B while RHR is in the cooldown lineup to prevent an inadvertent opening of RHR-299A or RHR-299B from overpressurizing the SI pump suction piping. By locking the power off to RHR-299A and RHR-299B an equivalent or greater barrier is placed in service to prevent overpressurizing the SI pump suction piping under conditions where overpressurization may occur. These cautions ensure the plant continues to meet its design basis.

Corrective actions have been initiated to determine the best permanent fix for this condition.

ADDITIONAL INFORMATION

None

SIMILAR EVENTS

None