

CATEGORY 1

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9806110236 DOC.DATE: 98/06/04 NOTARIZED: NO DOCKET #
 FACIL:50-397 WPPSS Nuclear Project, Unit 2, Washington Public Powe 05000397
 AUTH.NAME. AUTHOR AFFILIATION
 ARBUCKLE,J.D. Washington Public Power Supply System
 BEMIS,P.R. Washington Public Power Supply System
 RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 98-005-00:on 980506,potential for failure of RHR sys
 valve to close on isolation signal was noted.Caused by
 design deficiency.Caution tag was placed on RHR-V-40 control
 switch to inform plant operators of limitation.W/980604 ltr.

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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

P.O. Box 968 • Richland, Washington 99352-0968

June 4, 1998
GO2-98-094

Docket No. 50-397

U.S. Nuclear Regulatory Commission
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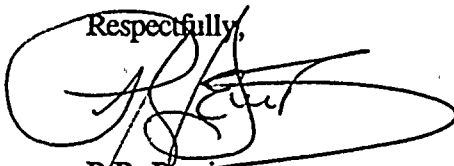
Gentlemen:

Subject: **WNP-2, OPERATING LICENSE NPF-21
LICENSEE EVENT REPORT NO. 98-005-00**

Transmitted herewith is Licensee Event Report No. 98-005-00 for WNP-2. This report is submitted pursuant to 10 CFR 50.73 and discusses the items of reportability, corrective action taken; and action to preclude recurrence.

Should you have any questions or desire additional information pertaining to this report, please call me or P.J. Insera at (509) 377-4147.

Respectfully,



P.R. Bemis
Vice President, Nuclear Operations
Mail Drop PE23

Attachment

cc: EW Merschoff - NRC RIV
KE Perkins, Jr. - NRC RIV, WCFO
C Poslusny, Jr - NRC NRR

NRC Senior Resident Inspector - 927N
DL Williams - BPA/399
PD Robinson - Winston & Strawn

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Washington Nuclear Plant - Unit 2	DOCKET NUMBER (2) 50-397	PAGE (3) 1 OF 5
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TITLE (4)
Potential for Failure of Residual Heat Removal System Valve to Close on an Isolation Signal

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV. NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
05	06	98	98	005	00	06	04	98	FACILITY NAME	DOCKET NUMBER

OPERATING MODE 5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
POWER LEVEL 0				
20.402(b)		20.405(c)	50.73(a)(2)(iv)	73.71(b)
20.405(a)(1)(i)		50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
20.405(a)(1)(ii)		50.36(c)(2)	50.73(a)(2)(vii)	OTHER
20.405(a)(1)(iii)		50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
20.405(a)(1)(iv)	X	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
20.405(a)(1)(v)		50.73(a)(2)(iii)	50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)	
NAME J.D. Arbuckle, Licensing Technical Specialist	TELEPHONE NUMBER (Include Area Code) (509) 377-4601

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	MONTH	DAY	YEAR
YES (If yes, completed EXPECTED SUBMISSION DATE).	X	NO					

ABSTRACT:

On May 6, 1998, with the plant in a shutdown condition for the annual maintenance and refueling outage, the plant was discovered to be outside of the design basis with regard to Residual Heat Removal (RHR) isolation capability for a single valve in the system. This determination was based upon an April 23, 1998 engineering review that showed discharge-to-radwaste valve RHR-V-40 would not close upon receiving a manual close or isolation signal when throttled open less than 13 percent. This configuration was in conflict with the RHR system description described in the WNP-2 Final Safety Analysis Report, which states that RHR-V-40 closes on an isolation signal. The valve would not close, when less than 13 percent open, due to the bypass limit switch contact being open and in series with the isolation signal.

Valve RHR-V-40 is a four-inch, motor operated outboard isolation on a branch line from the RHR, Loop B, injection line. The normal position for the valve is closed. During shutdown, the valve is used for initiation of RHR, Loop B, shutdown cooling. During operation, the valve is used for reducing suppression pool level. The valve is in series with inboard isolation valve RHR-V-49. The problem was limited to RHR-V-40.

As an immediate corrective action, a caution tag was placed on the RHR-V-40 control switch to inform plant operators of the limitation that the valve must not be left in the partially open position because the limit switch may not be closed. The cause of this event is a design analysis deficiency that has existed since the original plant design. Further corrective actions consisted of performing a review of control circuits for similar problems and implementing a plant modification to correct the circuit. The safety consequences pertaining to this event were minimal.

LICENSEE EVENT REPORT (LER)

Potential for Failure of Residual Heat Removal System Valve to Close on an Isolation Signal

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
Washington Nuclear Plant Unit 2	50-397	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 5
		98	005	00	

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

Event Description

On May 6, 1998, with the plant in a shutdown condition for the annual maintenance and refueling outage, the plant was discovered to be outside of the design basis with regard to Residual Heat Removal (RHR) System [BO] isolation capability for a single valve in the system. An April 23, 1998 engineering review that showed valve RHR-V-40 [ISV] would not close upon receiving a manual close or isolation signal when throttled open less than 13 percent. Valve RHR-V-40 is a motor operated outboard isolation which discharges to the radwaste system.

Nine-to-13 percent is the setting range of the bypass limit switch for the torque switch. This is the point where the bypass limit switch is set to close when RHR-V-40 is opening. In the case of manual operation using the remote manual switch, plant operators can continue to throttle the valve to beyond the 13 percent open position, then turn the control switch to the close position and the valve will close.

In the event of an automatic isolation signal, the valve would not automatically close when less than 13 percent open. This is due to the bypass limit switch contact being open and in series with the isolation signal. Also, plant operators would not be able to open the valve because the isolation relay interrupts the open control circuit. The bypass limit switch in an open configuration prevents the isolation signal from energizing the "close" contactor in the motor control center. When the valve is throttled open, it must be opened for at least three seconds to ensure that the 13 percent setting for the limit switch is passed (21 seconds stroke time x 13 percent = 2.7 seconds). At this point, the valve "close" functions can operate.

The configuration is in conflict with the WNP-2 Final Safety Analysis Report (FSAR), which states that RHR-V-40 closes on an isolation signal. The valve is one of two in series that provide a "close" safety function of secondary containment isolation and emergency core cooling system lineup (i.e., the valves automatically close on a low pressure coolant injection initiation signal). A redundant valve receives an auto-close signal from a separate circuit and its isolation function is not affected. This problem had no impact on any other design functions of the RHR system.

Immediate Corrective Action

A caution tag was placed on the RHR-V-40 control switch to inform plant operators of the limitation that the valve must not be left in the partially open position because the limit switch may not be closed.

Further Evaluation

1. This event is reportable in accordance with 10 CFR 50.73(a)(2)(ii) as any event or condition that resulted in the nuclear power plant being in a condition that was outside the design basis of the plant. Although the valve control circuitry was in accordance with the original design of the nuclear steam supply system supplier, it did not reflect the design as presented in the FSAR.

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Potential for Failure of Residual Heat Removal System Valve to Close on an Isolation Signal

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In the FSAR, it is stated that the isolation control system provides an isolation signal to RHR-V-40. When abnormal conditions are sensed, instrument contacts open and de-energize the trip logic, thereby, initiating isolation. Once initiated, the isolation control system logic seals in and may be reset by the operator only when initial conditions return to normal.

The FSAR also contains a schematic representation of the emergency core cooling system logic (e.g., functional control diagram) which shows that the valve is designed to automatically close upon a low pressure coolant injection signal.

- Globe valve RHR-V-40 is a four-inch, motor operated outboard isolation on a branch line from the RHR, Loop B, injection line. The normal position for the valve is closed. The valve is used to control (throttle) flow rate to radwaste. During shutdown, the valve is opened for warm-up of RHR, Loop B, for initiation of shutdown cooling and drain-down of RHR, Loop B. During normal operation, the valve is opened for reducing suppression pool level and directing the water to a floor drain radwaste collection tank. The valve is one of two motor operated valves in the discharge of the RHR system to radwaste. The other valve in series with RHR-V-40 is inboard gate valve RHR-V-49 [ISV], which is used for isolation. The normal position for the redundant valve is closed.

Both valves are Nuclear Steam Supply Shutoff System [BD], Group 5, isolation valves. As nuclear steam supply shutoff system components, the valves close on high drywell (1.68 psig) and low level (+13 inches) signals. Both valves provide a "close" safety function of secondary containment isolation and emergency core cooling system lineup (i.e., the valves automatically close upon a low pressure coolant injection signal).

Root Cause

The cause of this event was attributed to a control circuit design analysis deficiency that has existed since the original plant design. The circuit is in accordance with the elementary portion of a top-tier drawing and is based upon original General Electric design. The design was such that the isolation circuit was only enabled if the RHR-V-40 torque switch bypass limit switch was closed. The torque switch and associated bypass limit switch were not directly paralleled in the control circuit.

However, the design is in conflict with an FSAR functional control diagram which shows the correct wiring scheme to ensure that the valve would close as required upon an isolation signal. The functional control diagram shows the direct paralleling of the torque switch and the associated bypass limit switch (i.e., the isolation seal-in circuit connects with both the torque switch and the bypass limit switch). By this design, if either of the switches are in the closed position (valve not full closed), then the isolation signal is enabled.

The reason for the discrepancy between the original control circuit design and the FSAR functional control diagram is indeterminate.

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Further Corrective Action

1. A review of the control circuits for all DC powered motor operated valves which shared the original General Electric elementary was performed and no similar situations were identified.
2. A review of the control circuits for all AC and DC powered motor operated valves which share the FSAR functional control diagram was performed and no similar situations were identified.
3. The RHR-V-40 close-control circuitry was modified by the addition of a jumper at the motor control center. This change resulted in the bypass limit switch and torque switch being wired directly in parallel. The modification ensures automatic closure for all possible valve positions.

Assessment of Safety Consequences

The safety consequences associated with this event are minimal. The valve is normally in the closed position and, in the event of an accident, receives a close signal. The valve does not perform an "open" safety function. Operation of the valve to open is not relied upon to mitigate the consequences of, or prevent, an accident. The valve also does not have any emergency or abnormal operation functions.

In the RHR shutdown cooling mode of operation, Loop B pump suction piping is pre-warmed by opening RHR-V-40 and RHR-V-49. If these pre-warming valves were accidentally left open following initiation of shutdown cooling, reactor pressure vessel coolant inventory would drain to radwaste. If the loss of vessel inventory remained undetected and makeup did not occur, isolation valves RHR-V-8 [ISV] and RHR-V-9 [ISV] would automatically close at the reactor pressure vessel Level 3 scram signal (+13 inches).

During normal operation, RHR-V-40 and RHR-V-49 are opened periodically for suppression pool level control to ensure that level is maintained within Technical Specification limits. However, in the unlikely event of an isolation signal occurring during the infrequent time when RHR-V-40 would be open less than 13 percent, there would be minimal impact of the fulfillment of a safety function because redundant valve RHR-V-49 would provide the necessary isolation. Valve RHR-V-49 receives an auto-close signal from a redundant circuit. This separate circuit is designed to ensure that the redundant valve would close on an isolation signal, regardless of the position of RHR-V-40.

In addition, RHR-V-40 and RHR-V-49 are verified to be in the closed position on a monthly basis as part of the operability procedure for the RHR system (except when the spent fuel pool gates are removed and water level is maintained greater than or equal to 22 feet above the reactor pressure vessel flange). Opening and closing stroke times for these valves are also verified on a periodic basis as part of the WNP-2 ASME Inservice Testing Program.

In summary, during accident conditions, secondary containment integrity is provided by closure of RHR-V-40. The valve is normally closed and only opened to lower suppression pool level or warm RHR, Loop B, piping in preparation for shutdown cooling. Furthermore, secondary containment integrity is maintained by automatic isolation of inboard valve RHR-V-49, which provides redundant isolation on the branch line.

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For this event to have any safety significance, there would have to be a scenario consisting of an already low-probability accident condition, coupled with a simultaneous situation where RHR-V-40 is open less than 13 percent and a coincident single failure which prevents RHR-V-49 from automatically closing upon an isolation signal.

Similar Events

There have been no recent similar events.

