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AUTH.NAME AUTHOR AFFILIATION
ARBUCKLE,J.D. Washington Public Power Supply System
POWERS,C.M. Washington Public Power Supply System
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SUBJECT: LER 89-041-00:on 891103,limitorque motor operator for RHR sys valve undersized for degraded voltage conditions.
W/8 ltr.

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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

P.O. Box 968 • 3000 George Washington Way • Richland, Washington 99352

December 1, 1989

Docket No. 50-397

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

Subject: NUCLEAR PLANT NO. 2
LICENSEE EVENT REPORT NO. 89-041

Dear Sir:

Transmitted herewith is Licensee Event Report No. 89-041 for the WNP-2 Plant. This report is submitted in response to the report requirements of 10CFR50.73 and discusses the items of reportability, corrective action taken, and action taken to preclude recurrence.

Very truly yours,

C. M. Powers (M/D 927M)
WNP-2 Plant Manager

CMP:lr

Enclosure:
Licensee Event Report No. 89-041

cc: Mr. John B. Martin, NRC - Region V
Mr. C. J. Bosted, NRC Site (M/D 901A)
INPO Records Center - Atlanta, GA
Ms. Dottie Sherman, ANI
Mr. D. L. Williams, BPA (M/D 399)

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NRC FORM 366 (6-89)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92

ESTIMATED BURDEN PER RESPONSE TO COMPLY WTH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Washington Nuclear Plant - Unit 2	0 5 0 0 0 3 9 7	1 OF 0 5

TITLE (4) Limitorque Motor Operator For Residual Heat Removal (RHR) System Valve Undersized for Degraded Voltage Conditions - Cause Indeterminate

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 NAMES	DOCKET NUMBER(S)
										0 5 0 0 0
1 1	0 3	8 9	8 9	0 4 1	0 0	1 2	0 1	8 9		0 5 0 0 0

OPERATING MODE (9)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
1	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10) 1 0 0	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 (Specify in Abstract below and in Text, NRC Form 366A)
	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)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
J. D. Arbuckle, Compliance Engineer	AREA CODE 5 0 9 3 7 7 - 2 1 1 5

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

CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS	

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 fifteen single space typewritten lines) (16)

On November 3, 1989 it was determined by Engineering analysis that the motor for the valve operator associated with Residual Heat Removal (RHR) System valve RHR-V-40, does not provide sufficient starting torque at degraded voltage conditions. The analysis, based on the manufacturer's (Limitorque Corporation) standard calculation methods, showed that the motor operator (RHR-MO-40) would not develop sufficient thrust to close the valve during an 80% degraded voltage condition at the expected differential pressure.

The analysis was performed by Limitorque, at the request of the Supply System, in response to the requirements of NRC Generic Letter 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance." The analysis, which included all safety-related valves, initially identified 12 safety-related valve motors as being undersized. However, subsequent preliminary calculations performed by Supply System Engineering personnel indicated that, with the exception of RHR-MO-40 (Model No. SMB-000-2), all of the motors would perform their design basis function under degraded voltage conditions.

Valve RHR-V-40 [RHR Discharge to the Equipment Drain (EDR) System] is an outboard isolation on a branch line from the RHR, Loop "B", injection line. Although the normal position for the valve is closed, the valve is opened for lineup of the RHR system for shutdown cooling, and for decreasing Suppression Pool level.

The cause of this event is indeterminate.

Immediate corrective actions consisted of tagging RHR-MO-40 closed and preparing a Justification for Continued Operation (JCO) to allow for manual handwheel closure of RHR-V-40 after each open-close cycle of the valve if it is necessary to temporarily open the valve for Suppression Pool level control. Further corrective actions include: 1) changing applicable Plant procedures to station an operator at RHR-V-40 to manually verify the valve is closed should it become necessary to open the valve, and 2) replacing RHR-MO-40 with a higher starting torque motor.

This event poses no threat to the health and safety of either the public or Plant personnel.

Plant Conditions

a) Power Level - 100%
b) Plant Mode - 1 (Power Operation)

Event Description

On November 3, 1989 it was determined by Engineering analysis that the motor for the valve operator associated with Residual Heat Removal (RHR) System valve RHR-V-40, does not provide sufficient starting torque at degraded voltage conditions. The analysis, based on the manufacturer's (Limitorque Corporation) standard calculation methods, showed that the motor operator (RHR-MO-40) would not develop sufficient thrust to close the valve during an 80% degraded voltage condition at the expected differential pressure.

The analysis was performed by Limitorque, at the request of the Supply System, in response to the requirements of NRC Generic Letter 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance." The Generic Letter expanded the scope of surveillance requirements for Motor-Operated Valves (MOVs) to include all active safety-related valves. The analysis, which included all safety-related valves, initially identified 12 safety-related valve motors as being undersized; however, subsequent preliminary calculations performed by Supply System Engineering personnel indicated that, with the exception of RHR-MO-40, all of the motors would perform their design basis function under degraded voltage conditions.

Valve RHR-V-40 [RHR Discharge to the Equipment Drain (EDR) System] is an outboard isolation on a branch line from the RHR, Loop "B", injection line. The valve is normally opened during lineup of the RHR System for shutdown cooling, and for decreasing Suppression Pool level. Although not listed in the Technical Specifications, the valve is a Nuclear Steam Supply Shutoff System (NSSSS), Group 5 [RHR and Traversing Incore Probe (TIP) Systems], isolation valve. As an NSSSS Engineered Safety Feature (ESF) component, the valve closes on High Drywell (1.68 psig) and Low Level (+13 inches) signals. However, the normal position for the valve is closed. 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 RHR-V-49 (RHR Discharge to Radwaste).

The model number for RHR-MO-40 is SMB-000-2.

Immediate Corrective Action

In accordance with the Plant Problem Procedure, a Plant Operating Committee (POC) Immediate Disposition Approval Request was reviewed and approved. In addition, a Justification for Continued Operation (JCO) was also prepared and stated that closure of RHR-V-40 would ensure closed loop integrity of RHR, Loop "B", for the single failure of inboard isolation valve RHR-V-49.

Operator RHR-MO-40 was danger tagged closed and will remain as such until the motor can be replaced with a higher starting torque motor, or deemed operable by other methods. In addition, it was decided at that time that manual handwheel closure of RHR-V-40 could be performed after each open-close cycle of the valve if it is necessary to temporarily open the valve for Suppression Pool level control. [The JCO concluded that during the time required for level control (5 to 30 minutes), it is unlikely to experience the single failure of RHR-V-49, concurrent with a degraded voltage condition.]

Further Evaluation and Corrective Action

A. Further Evaluation

1. This event is reportable under 10CFR50.73(a)(2)(ii)(B) as a condition outside of the Plant Design Basis.

2. There were no other structures, components or systems inoperable at the start of this event which contributed to the event.

3. The root cause of this event is indeterminate. The valve was procured as part of a pre-purchased contract by the WNP-2 Architect Engineer (Burns and Roe, Inc.). The original valve procurement specification (issued in 1973) contained the requirement that all motors shall be able to start fully loaded and to accelerate their loads to rated speed with only 80% of motor rated voltage at the motor terminals.

However, it cannot be positively determined why the valve manufacturer (Anchor-Darling) failed to provide a valve that would meet the 80% degraded voltage requirement. During that time-frame, sizing was handled between the valve and actuator manufacturers. Burns and Roe would neither have been involved in the detailed sizing, nor would they have received the sizing data sheets to compare valve performance against the contract specification.

In 1984, during a process to procure additional motors, Limitorque requested from the Supply System a clarification of the 80% degraded voltage requirement contained in the original valve procurement specification. As a result, the specification was changed in 1984 such that valves would be required to operate at an 80% degraded voltage condition, but not necessarily with rated performance. The process has also since been changed in that the Supply System now receives sizing data sheets for new valves procured so that valve performance characteristics can be compared to the contract specification.

B. Further Corrective Action

1. Current plans are to replace RHR-MO-40 with a higher starting torque motor. However, because of an impact on the Technical Specification battery load profile for 125 VDC Battery E-B1-1, the motor operator will not be returned to normal service until such time that a Technical Specification issue concerning battery load profile surveillance testing is resolved.

2. Applicable Plant procedures were changed to station an operator at the valve (RHR-V-40) to manually verify the valve is closed at the end of the operation requiring the valve to be opened (or in the event of an isolation signal), until such time that the valve is returned to normal service.

Safety Significance

The safety significance of this event is negligible. The valve is normally in the closed position and, in the event of an accident, receives a closed signal. Operation of the valve to open is neither relied upon to mitigate the consequences of, nor prevent, an accident.

Should an accident condition occur which would require closure of RHR-V-40, the probability of a release to the site boundary in excess of 10CFR100 limits is low. Qualitatively, the following conditions would have to be in place for this event to be significant:

- RHR-V-40 open
- Failure of RHR-V-49 to close on the accident signal
- Degraded voltage condition

In addition, previous evaluation has shown that the valve would operate to its accident position well prior to the time it would take the D.C. System to reach a degraded voltage condition.

As previously stated, should it become necessary to open the valve in the interim period, an operator will be stationed at the valve to manually verify valve closure at the end of the operation requiring the valve to be opened, or in the event of an isolation signal.

This is the same mode of operation allowed by Technical Specification 3.6.3 (Action a.) in which Primary Containment Isolation Valves which are closed due to inoperability, can be reopened on an intermittent basis under administrative control.

Accordingly, this event poses no threat to the health and safety of either the public or Plant personnel.

Similiar Events

87-024 and 89-011

EIIS Information

Text Reference	EIIS Reference	
	System	Component
Residual Heat Removal (RHR) System	BO	---
RHR-V-40	BO	ISV
RHR-MO-40	BO	MO
Equipment Drain (EDR) System	---	---
Nuclear Steam Supply Shutoff System (NSSSS)	BD	---
Traversing Incore Probe (TIP) System	IG	---
RHR-V-49	BO	ISV
Battery E-B1-1	EB	BTRY
D.C. System	EB	---