

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

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 FACIL: 50-397 WPPSS Nuclear Project, Unit 2, Washington Public Powe 05000397
 AUTH. NAME AUTHOR AFFILIATION
 WASHINGTON, S. L. Washington Public Power Supply System
 POWERS, C. M. Washington Public Power Supply System
 RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 87-024-00: on 870722, limitorque motor-operated open-
 direction torque switch bypass jumper discovered missing.
 Caused by personnel error. All missing jumpers installed &
 memo re top tier drawings issued to personnel. W/870821 -ltr.

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 TITLE: 50.73 Licensee Event Report (LER), Incident Rpt, etc.

NOTES:

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	REG FILE 02	1 1	RES DEPY GI	1 1
	RES TELFORD, J	1 1	RES/DE/EIB	1 1
	RGN5 FILE 01	1 1		
EXTERNAL:	EG&G GROH, M	5 5	H ST LOBBY WARD	1 1
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	NSIC HARRIS, J	1 1	NSIC MAYS; G	1 1

LICENSEE EVENT REPORT (LER)

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TITLE (4) Missing Limitorque Motor Operator Open-Direction Torque Switch Bypass Jumpers Caused by Personnel Error																
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 7	2 2	8 7	8 7	0 2 4	0 0 0	8 2 1	8 7						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)														
4		20.402(b)				20.405(c)				50.73(a)(2)(iv)				73.71(b)		
POWER LEVEL (10)		20.405(a)(1)(i)				50.38(c)(1)				50.73(a)(2)(v)				73.71(c)		
0 0 0		20.405(a)(1)(ii)				50.38(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)(ii)				50.73(a)(2)(viii)(A)								
20.405(a)(1)(iv)				50.73(a)(2)(iii)				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 S.L. Washington, Compliance Engineer										TELEPHONE NUMBER 5 0 9 3 1 7 7 - 1 2 0 8 1 0						
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS						
SUPPLEMENTAL REPORT EXPECTED (14)												EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)												<input checked="" type="checkbox"/> NO				

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

On July 22, 1987, while the plant was in Cold Shutdown, Plant engineers and electricians discovered a Limitorque motor operator open-direction torque switch bypass jumper missing. This bypass jumper was required to be installed by a Plant Commitment in response to IE Circular No. 81-13 "Torque Switch Electrical Bypass Circuit for Safeguard Service Valve Motors." The missing jumper was discovered by Plant personnel investigating the cause of a motor failure on a Main Steam Isolation Valve Leakage Control System Valve Motor Operator (MSLC-V-1A and MSLC-MO-1A).

A review of Plant documentation led to the field inspection of all MSLC inboard valves. All 12 Inboard MSLC Valves were found with the open-direction torque switch bypass jumpers missing.

Plant Management delayed restart of the Plant and organized a Task Force to further investigate the scope of the problem. The Task Force reviewed all Safeguard Service Valve Motors and identified 66 valves to be field inspected. Only two other valves were found with jumpers missing. They were Residual Heat Removal Valve RHR-V-6A, a shutdown cooling crosstie isolation valve, and Plant Service Water Valve SW-V-90, an isolation valve to a Diesel Generator Building Corridor Heating and Ventilation System.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/88

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

Abstract (continued)

The first Task Force recommended that the Safeguard Service Valve Motor list for WNP-2 be reviewed for completeness. A second Task Force reviewed this list and determined that six additional valves should be added to the list. Three of these valves should have been included on the original list. They are Main Steam Valve MS-V-146, the main steam supply to auxiliaries and Standby Gas Treatment Valves SGT-V-3A1 and 3B2, inlet valves to SGT secondary fans. The other three valves FPC-V-149 (demineralized effluent to suppression pool water) and AS-V-68A and B (auxiliary steamline reactor building isolation valves) were installed after Plant startup and the list was not updated.

The cause of the missing jumpers was attributed to either: 1) personnel error on the part of Plant personnel who removed installed jumpers while using non top-tier plant drawings (no documentation could be found that authorized or documented removal of the jumpers), or 2) The jumpers were never installed because of conflicting installation directions from the Plant Architect/Engineer.

The major corrective actions are: 1) all missing jumpers were installed prior to Plant restart, 2) the Plant Manager issued a memorandum to all Plant personnel reminding them of their responsibility to use top tier drawings, 3) the Safeguard Service Valve Motor list will be formalized and included in the Plant Design data base, 4) the Maintenance Department will undertake an effort to improve documentation of work performed, and 5) a Engineering effort to upgrade Plant Electrical Wiring Diagrams to top tier status will be expedited.

There are no unacceptable adverse consequences associated with this event because: 1) the missing jumpers do not effect valve operability and 2) each valve/system was backed by redundant systems.

Plant Conditions

- a) Power Level - 0%
- b) Plant Mode - 4 (Cold Shutdown)

Event Description

On July 22, 1987, while the Plant was in Cold Shutdown, Plant engineers and electricians discovered a Limitorque motor operator open-direction torque switch bypass jumper missing. This bypass jumper was required to be installed by a Plant Commitment in response to IE Circular No. 81-13 "Torque Switch Electrical Bypass Circuit for Safeguard Service Valve Motors". The missing jumper was discovered by Plant personnel investigating the cause of a motor failure on a Main Steam Isolation Valve Leakage Control System Valve Motor Operator (MSLC-V-1A and MSLC-MO-1A).

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Plant Engineers, in an effort to determine the cause of the missing bypass jumper, initiated a review of construction documentation and maintenance records for MSLC-V-1A and the other inboard MSLC isolation and bleed valves. The results of the review were: 1) Construction documentation conclusively showed the jumpers for the inboard isolation valve motor operators were installed (MSLC-MO-1A through 1D); 2) There was no information on bypass jumper removal in any of the Plant maintenance documentation, and; 3) The construction documentation for the inboard bleed valve motor operators (MSLC-MO-2A through 2D and MSLC-MO-3A through 3D) was inconclusive as to whether the jumpers were ever installed. A field inspection of all the inboard MSLC Valves found no open-direction torque switch bypass jumpers installed. Maintenance Work Requests were prepared and the required bypass jumpers were installed. This work was completed on July 22, 1987.

As a result of the above findings, Plant Management delayed the planned Plant restart and organized a Task Force to further investigate the scope of the problem.

IE Circular 81-13 requested Plants to install torque switch bypass circuits to prevent a possible faulted condition (torque switch failure or premature actuation) from inhibiting a valve in accomplishing its safety function. In response to IE Circular 81-13 the Plant Architect/Engineer (Burns & Roe, Inc.) prepared a list of valves for WNP-2 which required torque switch bypass circuits. Burns and Roe, Inc., subsequently issued direction to incorporate these bypass circuits into the Plant design. This work was completed prior to Plant Startup pre-operational testing. The bypass circuit requirement was implemented by either; 1) the use of a limit switch in parallel with the torque switch which prevented the torque switch from being activated until the valve was nearly fully opened or closed; or 2) by hardwiring a jumper around the torque switch.

The Task Force began by reviewing informational as-built sketches of motor operator valve (MOV) wiring made for an equipment qualification walkdown performed during the Spring of 1986. This review concluded that a problem may exist in implementation of the open-direction hardwired torque switch bypass circuits (jumpers). The Task Force recommended that MOVs with open-direction hardwired torque switch bypass circuits be field inspected.

The Burns & Roe, Inc., list of Safeguard Service Valve Motors included 179 valves of which 116 valves have open or open/close torque switch bypass circuits. Those MOVs which used limit switch bypass circuits were eliminated from the field inspection list because there were no previous plant problems associated with these circuits. Also, some MOVs with hardwired bypass circuits which were known, for various reasons, to have the jumpers installed were also eliminated from the field inspection list. Sixty-six (66) MOVs were field inspected to verify the installation of the open-direction torque switch bypass jumper. Only two of the 66 MOVs inspected were found with jumpers missing (RHR-MO-6A and SW-MO-90). It was determined that the jumper in SW-MO-90 was

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removed due to personnel error in reading a Plant drawing during the Spring of 1987 outage. No documentation was found which documented the removal of the jumper in RHR-MO-6A. New jumpers were installed in both of these MOVs. The inspection results also confirmed the valve field inspection criteria as no problems with limit switch bypass circuits were found. This work was completed by July 24, 1987.

During this investigation it was determined that the original Burns & Roe, Inc. Safeguard Service Valve Motor List should be reviewed for completeness. This led to formation of a second Task Force comprised of Operations, Technical Staff and Engineering personnel. This review resulted in the addition of six new MOVs to the Safeguard Service Valve Motor list. Three of the six valves were installed after the original list was made (FPC-V-149 and AS-V-68A/B), and the other three valves (MS-V-146 and SGT-V-3A1 and 3B2) were omitted from the original list. A Plant Modification Request (PMR) was prepared processed, and approved to install jumpers in each of these valves, except for FPC-V-149. The required bypass circuit was included in the original FPC-V-149 Plant Modification package. This work was completed on July 25, 1987.

There are two causes for the missing jumpers; 1) In one case plant records show the bypass jumpers were installed; however, the Electrical Wiring Diagrams (nontop tier drawings) did not show the jumpers and the jumpers were subsequently removed to make valve wiring conform to these non top-tier drawings. Also, documentation of Plant work activities was insufficient to determine when the jumpers were removed. (Cause for MSLC-MO-1A through 1D, RHR-MO-6A, and SW-MO-90.); 2) In the second case it is believed the bypass jumpers were not installed during startup because of conflicting information in the Electrical Elementary Drawings, Connection Diagrams, and Electrical Wiring Diagrams included in the implementing Project Engineering Directives (PED). Both cases are the result of personnel error in that Plant personnel did not follow Plant directives regarding top-tier drawing use and Architect/Engineer personnel prepared and issued incomplete design packages.

There are two reasons for the additions to the original Safeguard Service Valve Motor list: 1) The Plant Architect Engineer Burns & Roe, Inc., for reasons unknown, missed three valves that should have been included on the original list, and 2) the Supply System due to an oversight did not maintain the list after the Plant was licensed.

Immediate Corrective Action

After the first missing jumpers were found, a Plant Task Force of Engineers and Maintenance personnel was formed to review all selected Safeguard Service Valve Motors to ensure that torque switch bypass jumpers were properly installed. All missing jumpers were installed by July 25, 1987.

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A second Task Force of Operations, Technical, and Engineering personnel reviewed the Safeguard Service Valve Motor List to ensure its completeness. Six new valves were added to the Safeguards Service Valve Motor List and Engineering direction was issued to install, where necessary, torque switch bypass jumpers.

The first Task Force also reviewed Plant top-tier drawings to ensure that the torque switch bypass jumpers were properly shown. Five top-tier plant Electrical Elementary Drawings were identified as needing revision. A Plant Modification request was processed and implemented to revise these drawings.

Further Corrective Action and Evaluation

The Plant Manager issued on a memorandum July 28, 1987 reminding Plant personnel of their responsibility to use top-tier drawings when performing modifications, maintenance, testing, or troubleshooting plant hardware.

The design criteria for Safeguard Service Valve Motor selection will be formalized. After the design criteria is formalized, WNP-2 valves will be re-reviewed against this criteria and a formal valve safety function list as related to IE Circular 81-13 will be issued. This valve safety function list will be incorporated into the WNP-2 design data base.

Engineering efforts already in progress to upgrade Electrical Wiring Diagrams to top-tier status will be expedited. Electrical Elementary Drawings, Connection Diagrams and Electrical Wiring Diagrams (EWDS) for all Safeguard Service Valve Motors will be cross checked to ensure that each drawing accurately reflects the Plant design with respect to torque switch bypass circuits.

Drawings with known inconsistencies resulting from the field inspection will be revised to reflect as-built status.

The Plant Maintenance Department will undertake an effort to improve the documentation of work activities performed.

Safety Significance

- There are no unacceptable adverse consequences associated with this event. First, these valves were designed to perform without the torque switch bypass circuits installed. Periodically, operation of these valves is demonstrated by Plant Surveillance Testing or by operational use. The torque switch bypass circuits were installed only to provide added assurance that a faulted condition would not prevent the valve from performing its safety function. So the chance of one of these valves not performing its safety function because of a missing torque switch bypass circuit is remote. Secondly, the discussions which follow show that each system with a valve found with a missing bypass jumper is adequately protected by redundant components or systems.

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

The MSLC system is used to control and direct main steam valve leakage through the SGT system under post accident conditions when the MSIVs are closed and core damage is present. Failure of a single MSLC valve would not jeopardize this function since the system is redundant and can draw off leakage either between or outboard of the redundant MSIVs. (MSLC-V-1A through 1D, MSLC-V-2A through 2D, and MSLC-V-3A through 3D are all part of the inboard-draws off leakage between the inboard and outboard MSIVs-system.)

Similarly, the failure of main steam supply to auxiliaries valve (an MSLC outboard boundary valve) MS-V-146 to close would not disable the MSLC system. Again, because of MSLC redundancy, a failure of MS-V-146 would not jeopardize MSLC operation since the MSLC could be aligned the Inboard System which draws off leakage between the MSIVs.

The Residual Heat Removal System Valve RHR-V-6A is a crosstie isolation valve used to isolate the RHR Loop A Pump (RHR-P-1A) suction from the Shutdown Cooling Suction Line. The Safety function direction of RHR-V-6A is the open direction. In the event RHR-V-6A failed to open only the RHR Loop A Shutdown Cooling mode of operation would be affected, and RHR Loop A Shutdown Cooling is backed by the redundant RHR Loop B Shutdown Cooling. Only one RHR Shutdown Cooling Loop is required to remove core decay heat following a Plant Shutdown. Further, during non-accident conditions RHR-V-6A is accessible and could be opened manually, and, if neither RHR Shutdown Cooling Loop is available Alternative Shutdown Cooling which provides an alternate flow path would be available. Therefore, the failure of this valve would not cause unacceptable adverse consequences because of system redundancy, component accessibility, and/or alternate availability.

Auxiliary Steam System Valves AS-V-68A and B are Isolation valves for the Auxiliary Steamline which is routed through the Reactor Building. These valves are designed to close to isolate a high energy break in the Auxiliary steamline in the Reactor Building. Since these are redundant, in series, valves a double failure is highly unlikely the missing jumpers in AS-MO-68A and B is not a significant degradation of safety. A break in these lines has no direct affect on reactor operation, since the Auxiliary Steam is supplied from an oil fired steam boiler.

There are two independent Standby Gas Treatment (SGT) Divisions and only one Division is required to operate to meet plant safety requirements. In addition, each Division has a primary fan and a backup fan capable of meeting the Division requirements. SGT-V-3A1 and 3B2 are inlet valves to the backup fans of each SGT Division. These valve are required to open only if the primary SGT fan in the Division does not successfully start. The inlet valves for the primary fans had the proper torque switch bypass circuits installed. Even in the event of a primary valve or fan failure only one of these valves would need to successfully open to meet safety requirements. Therefore there are no unacceptable adverse consequences because multiple failures would have to occur before the operability of this system would be challenged.

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

No safety significance is associated with FPC-V-149 since the correct torque switch bypass circuit was installed. The only problem associated with this valve is it was not included on the original Safeguard Service Valve Motor list.

The Service Water Valve SW-V-90 opens to allow cooling water to the the Diesel Generator (DG) Building Corridor Heating and Ventilation System. SW-V-90 is powered from Division 2 and if it fails to operate is backed by two exhaust fans powered from Division 1. These fans will automatically actuate and maintain the DG Building corridor within design limits. Therefore, even in the unlikely event of the failure of this valve plant safety is not significantly reduced.

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

Similar Events

None

EIIS InformationText ReferenceEIIS Reference

	<u>System</u>	<u>Component</u>
Residual Heat Removal (RHR) System	BO	-----
RHR-V-6A	BO	ISV
RHR-MO-6A	BO	MO
RHR-P-1A	BO	P
Essential Service Water (SW) System	BI	-----
SW-V-90	BI	V
SW-MO-90	BI	MO
Main Steam Leakage Control (MSLC) System	SB	-----
MS-V-146	SB	V
MSLC-V-1A-1D, 2A-2D and 3A-3D	SB	FCV
MSLC-MO-1A-1D, 2A-2D and 3A-3D	SB	MO
Standby Gas Treatment (SGT) System	BH	-----
SGT-V-3A1/3B2	BH	V
Fuel Pool Cooling (FPC) System	DA	-----
FPC-V-149	DA	V
Auxiliary Steam (AS) System		-----
AS-V-68A/B		ISV
AS-MO-68A/B		MO

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

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

Docket No. 50-397

August 21, 1987

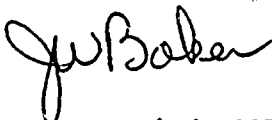
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Washington, D.C. 20555

Subject: NUCLEAR PLANT NO. 2
LICENSEE EVENT REPORT NO. 87-024

Dear Sir:

Transmitted herewith is Licensee Event Report No. 87-024 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:ac

Enclosure:
Licensee Event Report No. 87-024

cc: Mr. John B. Martin, NRC - Region V
Mr. R. T. Dodds, 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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