

CATEGORY 1

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 9806080033 DOC. DATE: 98/06/01 NOTARIZED: NO DOCKET #
 FACIL: 50-397 WPPSS Nuclear Project, Unit 2, Washington Public Powe 05000397
 AUTH. NAME AUTHOR AFFILIATION
 INSERRA, P.J. Washington Public Power Supply System
 BEMIS, P.R. Washington Public Power Supply System
 RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 98-004-00: on 980502, determined that primary containment penetration overcurrent protection does not meet Reg Guide 1.63 requirements. Caused by inadequate design changes.
 Installed addl fuse in RHR-MO-9 circuit. W/980601 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 5
 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

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June 1, 1998
GO2-98-091

Docket No. 50-397

U.S. Nuclear Regulatory Commission
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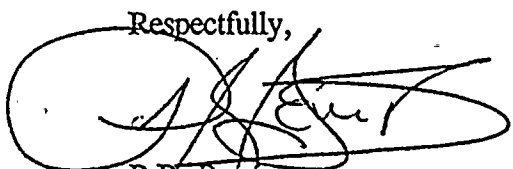
Gentlemen:

Subject: **WNP-2, OPERATING LICENSE NPF-21
LICENSEE EVENT REPORT NO. 98-004-00**

Transmitted herewith is Licensee Event Report No. 98-004-00 for WNP-2. This report is submitted pursuant to 10 CFR 50.73 and discusses the items of reportability, corrective action taken, and assessment of safety consequences.

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

Respectfully,



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

Attachment

cc: EW Merschoff - NRC RIV
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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 4
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TITLE (4) **Primary Containment Penetration Overcurrent Protection Does Not Meet Regulatory Guide 1.63 Requirements**

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	02	98	98	004	00	06	01	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)		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 P.J. Inserra, Licensing Manager	TELEPHONE NUMBER (Include Area Code) (509) 377-4147
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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 2, 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 primary containment electrical penetration overcurrent protection. One of two parallel conductors within primary containment penetration E-X-104D, designed to supply electrical power to Residual Heat Removal (RHR) System motor-operated valve RHR-MO-9, was not connected to each of the RHR-MO-9 supply power conductors. This configuration is in conflict with Regulatory Guide 1.63, as committed to in the WNP-2 Final Safety Analysis Report.

Regulatory Guide 1.63 requires that containment electrical penetration conductors be capable of withstanding the maximum possible fault current vs. time condition (I^2t) that could occur, given a single random failure of circuit overload protective devices. To comply with the Regulatory Guide 1.63 requirement, the I^2t rating of the protective devices must not exceed the I^2t rating of the penetration conductors. The as-found configuration created a condition where the electrical penetration conductor I^2t value for RHR-MO-9 was less than that of the secondary overcurrent protective device (fuse). The primary overcurrent fuse was adequately sized to protect the penetration conductor.

As an immediate corrective action, an additional fuse was installed in the RHR-MO-9 circuit. This action established an as-built configuration in compliance with Regulatory Guide 1.63. Applicable design calculations and drawings were revised to reflect the new configuration. The root cause of this event was inadequate coordination between plant design changes conducted in 1982. Further corrective actions included a review of other electrical penetration overcurrent protection design change documents for conflicting direction. The safety consequences pertaining to this event were minimal.

LICENSEE EVENT REPORT (LER)

Primary Containment Penetration Overcurrent Protection Does Not Meet Regulatory Guide 1.63 Requirements

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Washington Nuclear Plant Unit 2	50-397	98	004	00	2 OF 4

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

Event Description

On May 2, 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 primary containment electrical penetration overcurrent protection. One of two parallel conductors within primary containment penetration E-X-104D [PEN], designed to supply electrical power to Residual Heat Removal (RHR) System [BO] motor-operated valve RHR-MO-9 [MO], was not connected to each of the RHR-MO-9 supply power conductors. This configuration was in conflict with Regulatory Guide 1.63 Revision 0, as committed to in the WNP-2 Final Safety Analysis Report (FSAR).

Regulatory Guide 1.63 requires that containment electrical penetration conductors be capable of withstanding the maximum possible fault current vs. time condition (I^2t) that could occur, given a single random failure of circuit overload protective devices. To comply with the Regulatory Guide 1.63 requirement, the I^2t rating of the protective devices must not exceed the I^2t rating of the penetration conductors. The as-found configuration created a condition where the electrical penetration conductor I^2t rating for RHR-MO-9 was less than that of the secondary overcurrent protective device (fuse). The primary overcurrent fuse was adequately sized to protect the penetration conductor. This problem affected only the primary containment penetration pressure integrity design function and had no impact on any design functions of the RHR system.

Immediate Corrective Action

As part of an ongoing modification, an additional fuse was installed in the RHR-MO-9 circuit upstream of E-X-104D. This new fuse (one per conductor) is sized to assure that electric current is interrupted prior to exceeding the I^2t rating of the penetration conductors. The new fuse works in conjunction with the previously existing primary overcurrent protective fuse. This modification was done in lieu of connecting a parallel conductor to the spliced motor leads inside the electrical penetration. This action established the as-built configuration in compliance with Regulatory Guide 1.63, Revision 0.

Further Evaluation

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. The WNP-2 FSAR states that the plant is in compliance with the Regulatory Guide 1.63, Revision 0, requirement that electric penetration assemblies in containment structures have the capability of withstanding maximum fault I^2t heating in the case that overload protective devices fail. Specifically, the WNP-2 FSAR states, "In all cases, the overcurrent protective devices in circuits subject to short circuit are backed up by other overcurrent protective devices which are also designed to limit the fault current I^2t heating experienced by the penetration conductors to levels below the conductor ratings."

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Root Cause

The root cause of this event was attributed to a lack of coordination between three design changes issued and implemented in 1982. Prior to these design changes, RHR-MO-9 cable connections inside E-X-104D were made on a terminal block. The first design change, not intending to address overcurrent protection, directed the splicing of the RHR-MO-9 power leads to their respective electrical penetration conductors in the inboard termination box. This resulted in the sparing of the terminal block connections previously used in E-X-104D (inside primary containment) for the RHR-MO-9 motor lead wires. Design drawing changes made to reflect this modification were ambiguous in that they noted that the conductors were spliced, but continued to show the RHR-MO-9 conductors landed on terminal blocks.

Subsequently, in 1982, two design modification packages were issued to address the Regulatory Guide 1.63 requirements for overcurrent protection. These design packages directed that a second (parallel) penetration conductor be added to each conductor for RHR-MO-9. This was to be accomplished by the installation of wire jumpers between specified terminal blocks. The design direction, as translated into field instructions, was correctly implemented but resulted in the three jumper wires being terminated to unused terminal blocks.

A separate "drawing change only" design package was issued later in 1982 to revise the electrical wiring diagrams to incorporate the penetration wiring modifications implemented by previous design modifications. The top tier wiring diagram for RHR-V-9 [ISV] was revised, but failed to reflect the splice joints between the penetration conductors and the RHR-MO-9 cables. Instead, the drawing showed the penetration conductors and RHR-MO-9 cables connecting to terminal block points.

Calculation E/I-02-93-04 used the top tier electrical wiring diagrams as the reference document reflecting the as-built design of the penetration circuits when assessing conformance to Regulatory Guide 1.63. This resulted in a conclusion that penetration E-X-104D design met the requirements of the regulatory guide, based on the documented connection of two parallel conductors per motor lead for RHR-MO-9.

Further Corrective Action

Electrical design connection drawings were reviewed to identify any similar direction for installation of both jumpers and splices in other parallel penetration circuits. One additional design change document was identified with similar conflicting design direction. That design change affected penetration wiring connections for Reactor Core Isolation Cooling (RCIC) System [BN] inboard containment isolation valve RCIC-V-63 [ISV].

A continuity check of RCIC-V-63 was performed on May 26, 1998 to verify the as-built design of the parallel penetration conductors. This test confirmed that the electrical penetration parallel conductors were properly connected to the RCIC-V-63 motor leads.

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Primary Containment Penetration Overcurrent Protection Does Not Meet Regulatory Guide 1.63 Requirements

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		98	004	00	

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

Assessment of Safety Consequences

The safety consequences associated with this event are minimal. The electrical penetration conductors are exposed to current flow only when RHR-V-9 is being opened or closed. This is performed typically once per hot shutdown (Plant Mode 3) when RHR shutdown cooling is being established. Upon reaching cold shutdown conditions, the primary containment electrical penetrations are not required to be operable leakage barriers and as such, the need for penetration overcurrent protection is eliminated. Degradation of the leakage barrier within the penetration would have required concurrent faulting (short circuit) of the conductors downstream of the penetration with a failure of the primary overcurrent protective device (fuse) to interrupt current flow. The probability of a faulted (short circuit) condition downstream from the electrical penetration conductors supplying power to RHR-MO-9 is estimated as $1E-5$ failures per demand with the probability of fuse failure being $1E-5$ failures per demand (using the guidance in IEEE Standard 500-1977, Appendix D). When these combined probabilities are coupled with the probability of an accident where primary containment would be required to maintain 10 CFR Part 100 limits, the overall probability of these concurrent events is extremely low.

The integrity of E-X-104D as a primary containment leakage barrier was not affected by this condition. The electrical penetration has repeatedly passed applicable 10 CFR 50 Appendix J leak rate tests. Furthermore, the electrical penetration has always been protected by the primary overcurrent protective device (fuse).

Similar Events

There have been no recent similar events.