

ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8802260010 DOC.DATE: 88/02/19 NOTARIZED: NO DOCKET #
 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 88-002-00:on 880122,RCIC pump suction line outside plant
 design basis due to design error.

DISTRIBUTION CODE: IE22D COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 7
 TITLE: 50.73 Licensee Event Report (LER), Incident Rpt, etc.

NOTES:

RECIPIENT ID CODE/NAME	COPIES LTTR ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR ENCL
PD5 LA	1 1	PD5 PD	1 1
SAMWORTH,R	1 1		
INTERNAL: ACRS MICHELSON	1 1	ACRS MOELLER	2 2
AEOD/DOA	1 1	AEOD/DSP/NAS	1 1
AEOD/DSP/ROAB	2 2	AEOD/DSP/TPAB	1 1
ARM/DCTS/DAB	1 1	DEDRO	1 1
NRR/DEST/ADS7E4	1 0	NRR/DEST/CEB8H7	1 1
NRR/DEST/ESB 8D	1 1	NRR/DEST/ICSB7A	1 1
NRR/DEST/MEB9H3	1 1	NRR/DEST/MTB 9H	1 1
NRR/DEST/PSB8D1	1 1	NRR/DEST/RSB 8E	1 1
NRR/DEST/SGB 8D	1 1	NRR/DLPQ/HFB10D	1 1
NRR/DLPQ/QAB10A	1 1	NRR/DOEA/EAB11E	1 1
NRR/DREP/RAB10A	1 1	NRR/DREP/RPB10A	2 2
NRR/DRIS/SIB9A1	1 1	NRR/PMAS/ILRB12	1 1
REG FILE 02	1 1	RES TELFORD,J	1 1
RES/DE/EIB	1 1	RES/DRPS DIR	1 1
RGN5 FILE 01	1 1		
EXTERNAL: EG&G GROH,M	5 5	FORD BLDG HOY,A	1 1
H ST LOBBY WARD	1 1	LPDR	1 1
NRC PDR	1 1	NSIC HARRIS,J	1 1
NSIC MAYS,G	1 1		

TOTAL NUMBER OF COPIES REQUIRED: LTTR 46 ENCL 45

R
I
D
S
/
A
D
S
/
A
D
D
S

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Washington Nuclear Plant - Unit 2										DOCKET NUMBER (2) 0 5 0 0 0 3 9 7				PAGE (3) 1 OF 0 6										
TITLE (4) RCIC Pump Suction Line Outside the Plant Design Basis Due to a Design Error By the Plant Architect/Engineer - Cause Unknown.																								
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	1	2	2	8	8	8	0	0	2	0	0	0	2	1	9	8	8	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)																					
POWER LEVEL (10)			20.402(b)				20.405(c)				50.73(a)(2)(iv)				73.71(b)									
0 1 7 6			20.405(a)(1)(i)				50.38(c)(1)				50.73(a)(2)(v)				73.71(c)									
			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)(i)				50.73(a)(2)(viii)(A)				10CFR Part 21									
			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														
Steven L. Washington, Compliance Engineer										5 0 9 3 7 7 - 2 0 8 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								
X YES (If yes, complete EXPECTED SUBMISSION DATE)												NO												

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

On January 22, 1988, during an engineering review of motor-operated valves, a WNP-2 Plant design error was discovered. The Reactor Core Isolation Cooling (RCIC) System pump suction line as installed and operated did not meet containment isolation and single failure design criteria. In addition to being reportable per 10CFR50.73, this condition has also been determined to be reportable per 10CFR, Part 21.

The portion of the RCIC System in question is shown in Figure 1. Failure of the non-seismically qualified portion of the pipe between the condensate supply valve (RCIC-V-10) and the Condensate Storage Tank (CST), coupled with an assumed single failure of RCIC-V-10 to close would result in an unmonitored effluent path to the environment. Thus, the containment isolation and single failure protection requirements of 10CFR50, Appendix A, General Design Criterion (GDC) 54 and Standard Review Plan (SRP), Section 6.2.4 are not satisfied.

The cause of this event is unknown. The condition developed from design changes made to the RCIC System by Burns & Roe Inc. in 1981. It appears that Burns & Roe, in its review of the safety impact of this design change, overlooked the requirements of GDC 54 and the SRP.

IE 2211

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/88

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (8)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
Washington Nuclear Plant - Unit 2	0 5 0 0 0 3 9 7	8 8	- 0 d 2	- 0 0	0 2	OF	0 6

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

Abstract (Continued)

The immediate corrective actions taken were to close the condensate supply valve (RCIC-V-10), de-energize the motor operator of RCIC-V-10, and align the RCIC System to the suppression pool during power operation. This action prevents the postulated event and maintains the RCIC System in an operational condition and in full compliance with WNP-2 Plant Technical Specifications. The permanent corrective action is to install a check valve in the 8" RCIC suction supply line (8" RCIC(10)-1-1) between RCIC-V-10 and the 2" branch line to the RCIC water leg pump (Keep-Fill Pump RCIC-P-3).

There were no adverse safety consequences as a result of this event. The postulated event did not occur and the RCIC System was operational throughout the event. However, the potential for an unmonitored effluent release did exist from Plant startup to the time corrective action was taken on January 22, 1988.

Plant Conditions

- a) Power Level - 76%
- b) Plant Mode - 1 (Power Operation)

Event Description

On January 22, 1988, during an engineering review of motor-operated valves, a Plant design error was discovered. The Reactor Core Isolation Cooling (RCIC) System pump suction supply line, as designed, installed, and operated, did not meet the containment isolation and single failure design criteria of 10CFR50, Appendix A. The engineering review was being performed as a corrective action identified in LER 87-024, "Missing Limitorque Motor Operator Open-Direction Torque Switch Bypass Jumpers Caused by Personnel Error."

The failure of the non-seismically qualified condensate (to RCIC) supply line, and the assumed single active failure of RCIC-V-10, could result in the establishment of an unmonitored (Plant operators have no direct flow or radiation indication) effluent path from the suppression pool directly to the environment (see Figure 1). The failure of the non-seismic condensate supply line (24" COND(20)-1) would drain the condensate supply line, resulting in a condensate supply low-level trip. A low-level condensate supply trip causes the suppression pool supply/isolation valve (RCIC-V-31) to automatically open and the condensate supply valve (RCIC-V-10) to automatically close. By assuming that the condensate supply valve (RCIC-V-10) does not fully close (a single active failure), a leakage path would be established. The leakage path is from the suppression pool, through the suppression pool supply valve (RCIC-V-31), through the RCIC water leg pump (Keep-Fill Pump RCIC-P-3) suction lines (2" RCIC(10)-1-1 and 2" RCIC(8)-1-2) and, finally, through the condensate supply valve (RCIC-V-10) to the line break.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/88

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
Washington Nuclear Plant - Unit 2	0 5 0 0 0 3 9 7 8 8	-	0 1 0 2	-	0 1 0	3 OF	0 6

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

General Design Criterion (GDC) 54 states that piping systems penetrating primary containment shall be provided with leak detection, isolation, and containment capabilities having redundancy, reliability, and performance capabilities which reflect their importance to safety. Standard Review Plan (SRP), Section 6.2.4, provides guidance in stating that, for the case of a single remote-manual containment isolation valve, the closed system outside containment should be able to accommodate a single active failure. The RCIC System did not meet this requirement.

The WNP-2 design, as described in the FSAR, satisfies the criteria for isolation valve arrangement; however, when the RCIC water leg pump alternate suction path from the suppression pool was added to the design (see the background discussion in the Further Evaluation and Corrective Action section of this report) the potential for an unmonitored effluent release path was created.

Immediate Corrective Action

The condensate storage suction supply valve, RCIC-V-10, was closed and its motor operator de-energized. The RCIC System suction was aligned to the suppression pool by opening RCIC-V-31. This action prevents the postulated event and maintains the RCIC System in an operational condition per the WNP-2 Plant Technical Specifications.

Further Evaluation and Corrective ActionA. Further Evaluation

This event is being reported per the requirements of 10CFR50.73(2)(2)(ii)(B) and 10CFR, Part 21. The event was determined to be reportable per the requirements of 10CFR, Part 21 by the Plant Operating Committee on February 17, 1988 at approximately 1300 hours. Region V of the Nuclear Regulatory Commission was notified on February 18, 1988 at approximately 1100 hours by Chris Powers, WNP-2 Plant Manager. Mr. Powers' address is Washington Public Power Supply System, P.O. Box 968, 3000 George Washington Way, Richland, WA 99352.

In the 1979-to-1980 time frame, the NRC asked a series of questions (31.014, 31.015 and 211.046) concerning the non-seismic I design of the WNP-2 condensate storage tanks and the need for the RCIC and the High Pressure Core Spray (HPCS) System to have either a Seismic Category I supply source or automatic safety-grade transfer to a Seismic Category I supply. General Electric design documents specify that the suction supply to HPCS and RCIC should be designed to ASME, Section III, Class 2, and Seismic Category I requirements. Since the WNP-2 condensate supply line (routed through the Turbine Building) did not meet Seismic Category I requirements, the Supply System, General Electric and Burns & Roe decided in early 1981 to establish design changes to address the NRC concern.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
Washington Nuclear Plant - Unit 2	0 5 0 0 0 3 9 7 8 8	—	0 1 0 2	—	0 1 0	4	OF 0 6

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

In February 1981, the Supply System directed Burns & Roe (Letter WPBR-F-81-19, dated 2/10/81) to provide an automatic suction transfer to the suppression pool for RCIC upon low level in the condensate supply. The design utilizes safety-related level switches mounted on the Seismic Category I condensate supply piping located in the Reactor Building. In a followup letter (WPBR-F-81-64, dated 4/20/81) to this original direction, the Supply System noted that after the RCIC suction transferred to the suppression pool, the RCIC water leg pump lost its suction. To remedy this condition, the Supply System directed Burns & Roe to install an alternate suction supply from the suppression pool to the RCIC water leg pump. Burns & Roe implemented this design change in Project Engineering Directive (PED) 215-M-A510, dated July 7, 1981.

The cause of this design error is unknown. It appears that the Burns & Roe review of the safety impact of this design change overlooked the containment isolation and single failure protection requirements of GDC 54 and SRP Section 6.2.4.

The maintenance and operating history of RCIC-V-10 was reviewed to determine whether the valve has operated reliably. The operability of RCIC-V-10 is verified quarterly by a Technical Specification Surveillance performed as part of the WNP-2 ASME Pump and Valve Program. A review of the valve opening and closing time trend data from these surveillances shows no adverse trends. Further, a review of maintenance performed on this valve since Plant startup shows no significant problems.

The error associated with the design of the RCIC suction line is considered a singular event due to the uniqueness of its design. All non-safety related systems automatically isolate upon indication of a Loss of Coolant Accident (LOCA). Only systems important to safety, such as the Emergency Core Cooling Systems (ECCS) and RCIC System, remain available post LOCA. Consequently, only these systems have the potential for this leak path. Furthermore, of these systems, only the suction lines of RCIC and HPCS interface with systems located in areas outside of secondary containment. However, unlike RCIC, the HPCS System has both a motor-operated valve and a check valve in its suction path from its condensate supply. In the event of a single failure of the motor-operated valve, the check valve provides immediate isolation of the suction line and prevents leakage past the system boundary.

B. Further Corrective Action

A check valve will be installed in the 8" RCIC suction supply line between RCIC-V-10 and the 2" branch line to RCIC water leg pump RCIC-P-3.

A letter will be sent to Burns & Roe describing this design error and informing them of our determination that this condition is reportable per 10CFR Part 21. A copy of this notification will also be provided to the General Electric Co.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/88

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
Washington Nuclear Plant - Unit 2	0 5 0 0 0 3 9 7 8 8	—	0 0 2	—	0 0	0 5	OF 0 6

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

Safety Significance

There are no adverse safety consequences as a result of this event. The RCIC System was operable throughout the event period. Further, a review of the maintenance and operating history of RCIC-V-10 confirms that the valve has operated reliably since Plant startup. The HPCS System was operable throughout the event period and is a redundant high pressure water injection system.

If the postulated event had occurred, it is possible that a release of radiological effluents directly to the environment could have occurred. Under normal Plant conditions, the radioactivity in the suppression pool water is maintained at a low level and a release through this leakage path would not be significant; however, under some accident conditions, the activity in the suppression pool water could be greatly increased and a release under these conditions could have been safety significant. The effect of leakage on the suppression pool water supply is not significant since Plant Operators have direct indication of suppression pool level, including low-level suppression pool alarms, and would have taken corrective action to locate and isolate the leakage path. Isolation would have been accomplished by closing the RCIC suppression pool supply/isolation valve (RCIC-V-31).

The current suction alignment of the RCIC System to the Suppression Pool maintains the system operable and in full compliance with Plant Technical Specifications.

Similar Events

None.

EIIS InformationText ReferenceEIIS Reference
System Component

Reactor Core Isolation Cooling (RCIC) System	BN	--
RCIC System Pump Suction Line	BN	PSP
Non-Seismic Condensate Supply Line (20" COND(20)-1)	KA	PSP
Condensate Storage Tank (CST)	KA	
Condensate Supply Valve (RCIC-V-10)	BN	20
Suppression Pool Supply/Isolation Valve (RCIC-V-31)	BN	ISV
Motor Operator for RCIC-V-10	BN	20
8" RCIC Suction Supply Line (8" RCIC(10)-1-1)	BN	PSP
RCIC Water Leg Pump Suction Lines (2" RCIC(10)-1-1) and (2" RCIC(8)-1-2)	BN	PSP
RCIC Water Leg Pump (Keep-Fill Pump RCIC-P-3)	BN	P
RCIC Water Leg Pump Alternate Suction Path (2" RCIC(8)-1-2)	BN	PSP
High Pressure Core Spray (HPCS) System	BG	--
Safety-Related Level Switches	KA	LS
HPCS Condensate Supply Motor Operated Valves	BG	20
HPCS Condensate Supply Check Valve	BG	--
Automatic Depressurization System (ADS)	--	--
Low Pressure Core Spray (LPCS) System	BH	--
Residual Heat Removal (RHR) System	BO	--
Suppression Pool Level Instrumentation	BT	LI

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)

DOCKET NUMBER (2)

LER NUMBER (5)

PAGE (3)

YEAR	SEQUENTIAL NUMBER	REVISION NUMBER
88	002	00

Washington Nuclear Plant - Unit 2

05000319788-002-0006 OF 06

TEXT (If more space is required, use additional NRC Form 308A's) (17)

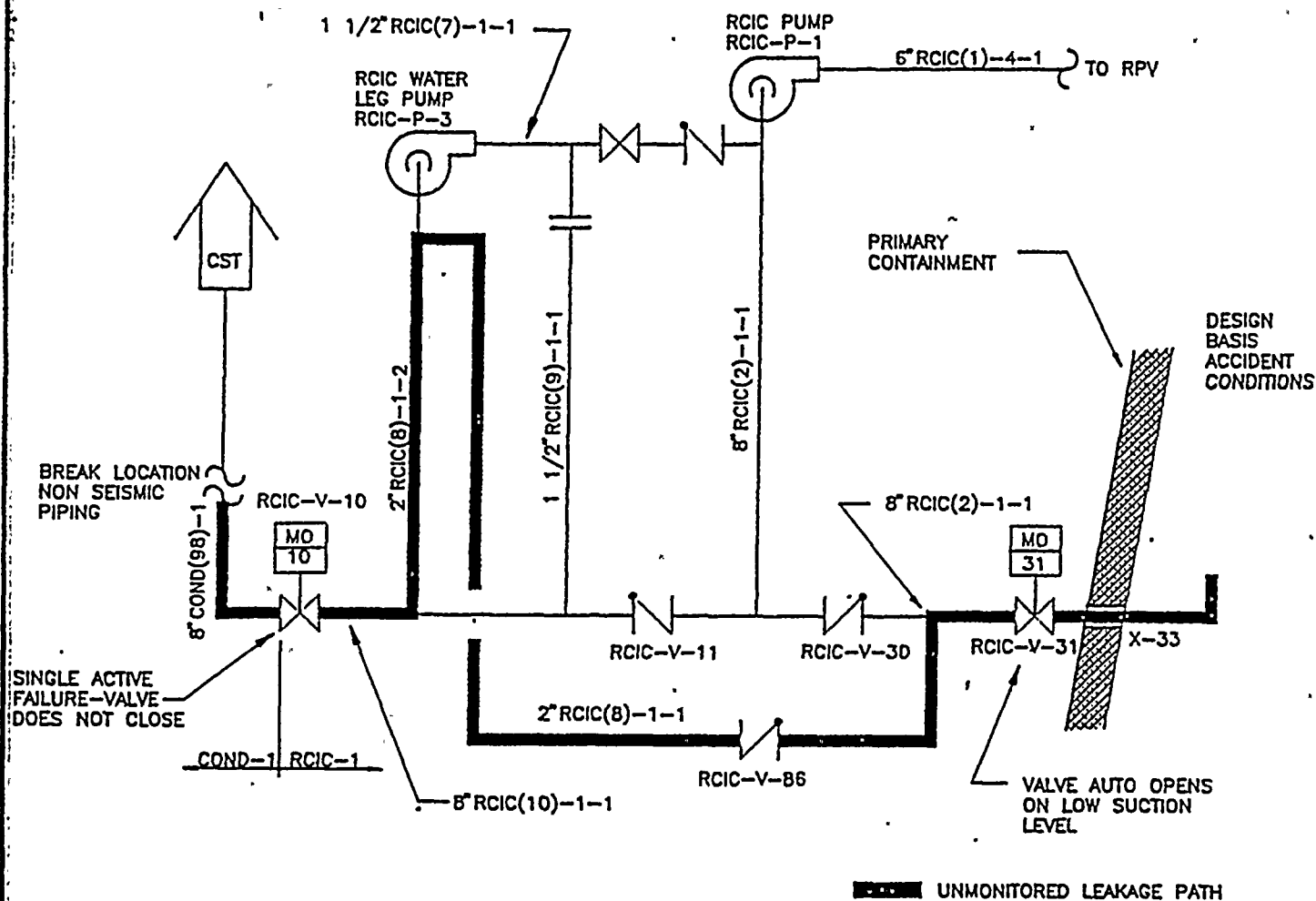


Figure 1

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

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

Docket No. 50-397

February 19, 1988

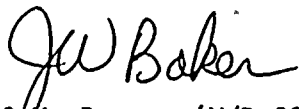
Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: NUCLEAR PLANT NO. 2
LICENSEE EVENT REPORT NO. 88-02

Dear Sir:

Transmitted herewith is Licensee Event Report No. 88-02 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:sm

Enclosure:
Licensee Event Report No. 88-02

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)

IE22
1/1

P 723 058 468