

# ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

## REGULATORY INFORMATION DISTRIBUTION SYSTEM. (RIDS)

ACCESSION NBR:9108090134 DOC.DATE: 91/08/02 NOTARIZED: NO DOCKET #  
 FACIL:50-397 WPPSS Nuclear Project, Unit 2, Washington Public Powe 05000397  
 AUTH.NAME AUTHOR AFFILIATION  
 FIES,C.L. Washington Public Power Supply System  
 BAKER,J.W. Washington Public Power Supply System  
 RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 91-016-00:on 910707,ESF actuation occurred.Caused by  
 blown ruptured disk.Corrective actions taken to replace blown  
 ruptured disk & to test relief valves for proper operating  
 pressure.W/910802 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 7  
 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

### NOTES:

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INTERNAL:	ACNW		2	2		ACRS		2	2
	AEOD/DOA		1	1		AEOD/DSP/TPAB		1	1
	AEOD/ROAB/DSP		2	2		NRR/DET/ECMB 9H		1	1
	NRR/DET/EMEB 7E		1	1		NRR/DLPQ/LHFB10		1	1
	NRR/DLPQ/LPEB10		1	1		NRR/DOEA/OEAB		1	1
	NRR/DREP/PRPB11		2	2		NRR/DST/SELB 8D		1	1
	NRR/DST/SICB8H3		1	1		NRR/DST/SPLB8D1		1	1
	NRR/DST/SRXB 8E		1	1		<del>REG-FILE</del> 02		1	1
	RES/DSIR/EIB		1	1		RGN5 <del>FILE</del> 01		1	1
EXTERNAL:	EG&G BRYCE,J.H		3	3		L ST LOBBY WARD		1	1
	NRC PDR		1	1		NSIC MURPHY,G.A		1	1
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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

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

Docket No. 50-397

August 2, 1991  
G02-91-145

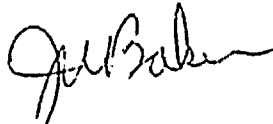
Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Subject: NUCLEAR PLANT NO. 2  
LICENSEE EVENT REPORT NO. 91-016

Dear Sir:

Transmitted herewith is Licensee Event Report No. 91-016 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,



J.W. Baker (M/D 927M)  
WNP-2 Plant Manager

JWB:ac

Enclosure:  
Licensee Event Report No. 91-016

cc: Mr. John B. Martin, NRC - Region V  
Mr. C. Sorensen, NRC Resident Inspector (M/D 901A)  
INPO Records Center - Atlanta, GA  
Ms. Dottie Sherman, ANI  
Mr. D. L. Williams, BPA (M/D 399)  
NRC Resident Inspector - walk over copy

*Cent No*  
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*TE22*  
*11*

## LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-630), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)  
Washington Nuclear Plant - Unit 2

DOCKET NUMBER (2)  
0 5 0 0 0 3 9 17

PAGE (3)  
1 OF 0 6

TITLE (4)  
ESF Actuation (Containment Instrument Air) Caused by a Blown Rupture Disk

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	07	9	1	0	1	6	0	0	0	0	
0	7	07	9	1	0	1	6	0	0	0	0	
THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)												
OPERATING MODE (9) 4			20.402(b)			20.405(c)			X 50.73(a)(2)(iv)			73.71(b)
POWER LEVEL (10) 0 10 10			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)(vi)			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)(vii)(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)(ix)			

LICENSEE CONTACT FOR THIS LER (12)

NAME  
C. L. Fies, Compliance Engineer

TELEPHONE NUMBER  
AREA CODE  
5 10 19 3 17 171-1215 10 1

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)											
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDs		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDs	
B	L K	R P D I	C1519 H	No							

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) ☐ NO ☒

EXPECTED SUBMISSION DATE (15)

MONTH DAY YEAR

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

At 1448 hours on July 7, 1991 an ESF actuation occurred when the safety related portion of the Containment Instrument Air (CIA) System was actuated. Valves CIA-V-39A and CIA-V-39B closed automatically on decreasing nitrogen pressure and Stepping Programmers (CIA-PROG-1A and CIA-PROG-1B) associated with the bottled nitrogen supply were initiated. The ESF actuation occurred when a Rupture Disk (CN-RD-1B) on the normal nitrogen supply Storage Tank (CN-TK-1) blew resulting in a pressure decrease in the system.

At 1448 hours Plant Operators took immediate corrective action to line up the "A" Rupture Disk (CN-RD-1A) and Relief Valve (CN-RV-1A) which isolated the blowdown of the CN system. Action was also taken to manually valve in one of the nitrogen bottles to maintain the "A" header above 150 psig.

Corrective actions were also taken to replace the blown rupture disk and to test the relief valves for proper operating pressure. In addition an Engineering evaluation will be performed to identify methods of eliminating rupture disk failures.

The root cause of the event is indeterminate.

The event posed no threat to the health and safety of either the public or plant personnel.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 60.0 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.

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

Plant Conditions

Power Level - 0 %  
Plant Mode - 4

Event Description

At 1448 hours on July 7, 1991 an ESF actuation occurred when the safety related portion of the Containment Instrument Air (CIA) System was actuated. Valves CIA-V-39A and CIA-V-39B closed automatically on decreasing nitrogen pressure and Stepping Programmers (CIA-PROG-1A and CIA-PROG-1B) associated with the bottled nitrogen supply were initiated. The ESF actuation occurred when a Rupture Disk (CN-RD-1B) on the normal nitrogen supply Storage Tank (CN-TK-1) blew. The CIA low pressure alarm had activated at 1443 hours when the pressure was approximately 148 psig. Plant Operators took corrective action to line up the "A" Rupture Disk (CN-RD-1A) and Relief Valve (CN-RV-1A) which isolated the blowdown of the CN system.

At WNP-2 the normal nitrogen supply for the CIA system originates from a 11,000 gallon Storage Tank (CN-TK-1) with its associated vaporizers and a pressure/temperature control manifold. In the normal mode of operation the CN system maintains a pressure of 150 psig in the CIA system using Pressure Control Valve (CN-PCV-10). Part of the overpressure protection on CN-TK-1 is a manifold consisting of two rupture disks (CN-RD-1A and CN-RD-1B) and two relief valves (CN-RV-1A and CN-RV-1B). This manifold is fed by a two way valve that allows selection of either the "A" or "B" relief valve and associated rupture disk.

The safety related part of the CIA provides a backup nitrogen supply to operate the seven Main Steam Safety Relief Valves (MSRVs) that are designated as Automatic Depressurization System (ADS) Valves. The ADS valves are required to be operational in modes 1, 2, and 3 with reactor pressure greater than 128 psig. Isolation of the safety related part of CIA takes place when valves CIA-V-39A and CIA-V-39B are automatically closed. This happens when the normal CIA pressure drops to 140 Psig (as measured by pressure switches CIA-PS-39A and CIA-PS-39B) after a three minute time delay. A total of three signals in two channels (A and B) are used to initiate backup nitrogen. The signals for each channel are (1) CIA-PS-22A(B) 135 PSIG, (2) CIA-PS-21A(B) 140 PSIG, and (3) CIA-V-39A(B) closed as described above. These signals feed a two-out-of-three logic circuit in each channel which initiates the stepping programmers for the nitrogen bottles. Programmer "A", CIA-PROG-1A, is initiated by the "A" logic and provides backup nitrogen to three ADS valves. Programmer "B", CIA-PROG-1B, is initiated by the "B" logic and provides backup nitrogen to the four remaining ADS valves.

When the event occurred the backup nitrogen bottles were valved out of service since ADS is not required in Modes 4 and 5. This is normally done during outages to conserve nitrogen. Under this condition if the stepping programmers initiate they are unable to automatically provide any backup nitrogen supply to the safety related header.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 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.

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

At the time of the event the Residual Heat Removal Loop "B" was inoperable and an alternate decay heat removal method was defined as required by Technical Specification 3.4.9.2. The Abnormal Condition Procedure, PPM 4.4.2.1, Loss of RHR Shutdown Cooling Mode Loops, defines the options for alternate shutdown cooling. The method chosen and noted in the shift managers log on July 7, 1991 was Low Pressure Core Spray (LPCS) and Main Steam Safety Relief Valves (MSRVs). The two valves identified for Alternate Shutdown Cooling were MS-RV-4A and MS-RV-4B which are normally supplied with nitrogen from the CN system, or in case of the loss of the normal supply these two MSRVs can be supplied from the ADS backup nitrogen supply. The pressurized nitrogen is needed to open an MSRV in the relief mode. This alternate method of cooling provides decay heat removal by using the LPCS Pump (LPCS-P-1) with flow to the suppression pool through two MSRVs.

Plant Operators were aware of the condition of the backup nitrogen bottles and the requirement to maintain alternate decay heat removal using the MSRVs. At 1630 hours the shift managers log noted that the non-safety related header and ADS "B" header pressure was approximately 125 psig. Plant abnormal condition procedure (PPM 4.820.B1, Window 10-4) states that "IF ADS header pressure (CIA-PS-21B) decays to 135 PSIG, ADS capability is impaired; REFER to Technical Specification 3.5.1." This was not a problem for this event since action was taken to manually valve in one of the nitrogen bottles to maintain the "A" header at approximately 150 psig.

At approximately 2000 hours the two isolation valves CIA-V-39A and CIA-V-39B opened when the pressure in the CN System recovered to 143 psig. This placed the CIA and CN systems back in their normal operating configuration for mode 4 operation.

#### Immediate Corrective Action

At 1448 hours Plant Operators took immediate corrective action to line up the "A" Rupture Disk (CN-RD-1A) and Relief Valve (CN-RV-1A) which isolated the blowdown of the CN system.

Action was also taken to manually control the "A" header at approximately 150 psig by valving in one of the nitrogen bottles.

#### Further Evaluation and Corrective Action

##### A. Further Evaluation

1. This event is being reported per the requirements of 10CFR50.73(a)(2)(iv) as an "event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature (ESF).....".
2. Further evaluation of the Containment Nitrogen (CN) System shows the Relief Valves (CN-RV-1A and CN-RV-1B) have a setpoint pressure of 245 psig. The Rupture Disks (CN-RD-1A and CN-RD-1B) are purchased with a 310 psig rating. The pressure in the Storage Tank (CN-TK-1) is regulated at 210 psig by a Pressure Control Valve (CN-PCV-2).

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 60.0 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.

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

3. Evaluation of the Maintenance Work Request data base showed that thirteen rupture disks involving CN-RD-1A and 1B have failed since plant startup.
4. Further evaluation showed two outstanding Maintenance Work Requests (MWRs) (AR 3614 and AR 4666) associated with the "A" CIA Subsystem. During the refueling outage the Pressure Control Valve (CIA-PCV-2A) was being modified in accordance with AR 3614. When the work was complete the Bypass Valve (CIA-V-733A) around CIA-PCV-2A was leaking and AR 4666 was written to correct this condition. The MWRs were still open at the time of the event and could effect the ability to automatically control pressure.
5. Transient Data Acquisition System (TDAS) and Process Computer (PC) data are normally used to evaluate the system behavior during the event. However, the data available during this event had several problems which made it unreliable for analysis purposes.
6. The root cause of the rupture disk failure is indeterminate at this time. However, the root cause analysis is not complete. If further significant information is discovered it will be reported in a revision to this LER.

B. Further Corrective Action

1. The blown Rupture Disk (CN-RD-1B) was replaced.
2. To aid in the evaluation of the cause of rupture disk failure, the two relief valves (CN-RV-1A and CN-RV-1B) associated with the rupture disks were tested to verify the proper setpoint pressure. CN-RV-1A lifted at 239 psig and CN-RV-1B lifted at 250 psig. Thus, both these valves were within the allowable pressure tolerance and should have actuated before the rupture disc blew.
3. An Engineering evaluation of the system will be performed to determine actions necessary, including design changes, to eliminate frequent rupture disk failures.
4. A review of the CIA inputs to the Process Computer and TDAS will be performed to assure proper alignment.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH 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.

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91	1	0

Washington Nuclear Plant - Unit 2

0500039791-016-00005OF06

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

Safety Significance

There is no safety significance associated with this event. Since the plant was in mode 4 (Cold Shutdown) there are no conditions that require a fast automatic response of the CIA system. Thus in modes 4 and 5 the safety related part of CIA is valved out of service. With this plant configuration the normal source of nitrogen is available from the Containment Nitrogen (CN) system to operate the Main Steam Safety Relief Valves (MSRVs) if they are needed to support alternate shutdown cooling. If the CN system were to fail, each of the eighteen MSRVs has a 10 gallon accumulator and each of the seven ADS valves has a 10 gallon plus a 42 gallon accumulator. This stored nitrogen pressure is available to provide for initial operation of the selected valves. Over the long term the safety related portion of CIA can be placed in service manually. In addition, provision is made in the plant to allow the Control Air System (CAS) and Service Air (SA) Systems to provide a backup to CIA so that all 18 MSRVs could be operated if necessary.

Similar Events

There have been no similar events.

EIIS InformationText ReferenceEIIS Reference

	<u>System</u>	<u>Component</u>
Containment Instrument Air (CIA)	LD	--
CIA Valves 39A and B (CIA-V-39A, B)	LD	V
CIA Programmers 1A and 1B (CIA-PROG-1A, 1B)	LD	PMC
Containment Nitrogen (CN)	LK	--
CN Rupture Disk 1B (CN-RD-1B)	LK	RPD
CN Storage Tank (CN-TK-1)	LK	TK
CN Rupture Disk 1A (CN-RD-1A)	LK	RPD
CN Relief Valve 1A (CN-RV-1A)	LK	RV
CN Pressure Control Valve 10 (CN-PCV-10)	LK	PCV
Main Steam Safety Relief Valves (MSRVs)	SB	RV
Automatic Depressurization System (ADS)	BG	--
CIA Pressure Switches 22A and 22B (CIA-PS-22A, 22B)	LD	PS
CIA Pressure Switches 21A and 21B (CIA-PS-21A, 21B)	LD	PS

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATIONESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS  
INFORMATION COLLECTION REQUEST: 600 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.

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

IIIS InformationText ReferenceIIIS Reference

	<u>System</u>	<u>Component</u>
Residual Heat Removal (RHR) System	SO	--
Low Pressure Core Spray System (LPCS)	SM	--
Main Steam Relief Valve 4A and 4B (MS-RV-4A, 4B)	SB	RV
LPCS Pump 1 (LPCS-P-1)	SM	P
CIA Pressure Control Valve (CIA-PCV-2A)	LD	PCV
CIA-PCV-2A Bypass Valve (CIA-V-733A)	LD	V
Process Computer	--	CPU
Control Air System (CAS)	LD	--
Service Air (SA) System	LF	--