

ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9005040049 DOC.DATE: 90/04/26 NOTARIZED: NO DOCKET #
 FACIL:50-397 WPPSS Nuclear Project, Unit 2, Washington Public Powe 05000397
 AUTH.NAME AUTHOR AFFILIATION
 MERTENS,R.C. Washington Public Power Supply System
 POWERS,C.M. Washington Public Power Supply System
 RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 88-037-01:on 881130,plant TS initiated shutdown because
 of CSPV air leak due to seal failure.

DISTRIBUTION CODE: IE22T COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 7
 TITLE: 50.73/50.9 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:	ACNW	2 2	ACRS	2 2
	AEOD/DOA	1 1	AEOD/DSP/TPAB	1 1
	AEOD/ROAB/DSP	2 2	DEDRO	1 1
	NRR/DET/ECMB 9H	1 1	NRR/DET/EMEB9H3	1 1
	NRR/DET/ESGB 8D	1 1	NRR/DLPQ/LHFB11	1 1
	NRR/DLPQ/LPEB10	1 1	NRR/DOEA/OEAB11	1 1
	NRR/DREP/PRPB11	2 2	NRR/DST/SELB 8D	1 1
	NRR/DST/SICB 7E	1 1	NRR/DST/SPLB8D1	1 1
	NRR/DST/SRXB 8E	1 1	REG FILE 02	1 1
	RES/DSIR/EIB	1 1	RGNS FILE 01	1 1
EXTERNAL:	EG&G STUART,V.A	4 4	L ST LOBBY WARD	1 1
	LPDR	1 1	NRC PDR	1 1
	NSIC MAYS,G	1 1	NSIC MURPHY,G.A	1 1
	NUDOCS FULL TXT	1 1		

Cont no p08560260

NOTE TO ALL "RIDS" RECIPIENTS:

PLEASE HELP US TO REDUCE WASTE! CONTACT THE DOCUMENT CONTROL DESK,
 ROOM P1-37 (EXT. 20079) TO ELIMINATE YOUR NAME FROM DISTRIBUTION
 LISTS FOR DOCUMENTS YOU DON'T NEED!

A/0-4

FULL TEXT CONVERSION REQUIRED
 TOTAL NUMBER OF COPIES REQUIRED: LTTR 37 ENCL 37

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

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

Docket No. 50-397

April 26, 1990

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

Subject: NUCLEAR PLANT NO. 2
LICENSEE EVENT REPORT NO. 88-037-01

Dear Sir:

Transmitted herewith is Licensee Event Report No. 88-037-01 for the WNP-2 Plant. This supplemental report discusses the results of the root cause analysis and additional corrective actions taken to preclude recurrence.

Very truly yours,

C. M. Powers

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

CMP:lr

Enclosure:
Licensee Event Report No. 88-037-01

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)

9005040049 900426
PDR ADOCK 05000397
S PDC

Cent No 8095602260
JE22
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-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.

FACILITY NAME (1)

Washington Nuclear Plant - Unit 2

DOCKET NUMBER (2)

0 5 0 0 0 3 9 7 1 OF 0 6

PAGE (3)

TITLE (4) Plant Technical Specification-Initiated Shutdown Because of Containment Supply
Purge Valve Air Leak Due to Seal Failure - 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)
11	3	08	88	037	01	04	2	69		0 5 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)			20.402(b)		20.405(c)		50.73(a)(2)(iv)		73.71(b)	
POWER LEVEL (10)			20.405(a)(1)(i)		60.36(c)(1)		50.73(a)(2)(v)		73.71(c)	
			20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vi)		OTHER (Specify in Abstract below and in Text, NRC Form 368A)	
			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

R. C. Mertens, Compliance Engineer

TELEPHONE NUMBER

AREA CODE

5 0 9 3 7 7 - 2 3 1 5 5

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC
B	V, B	P, D, C, V	B, 2, 5, 0	N					

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)

X NO

EXPECTED SUBMISSION DATE (15)

MONTH DAY YEAR

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

On November 30, 1988 at 2335 hours, Reactor Operators initiated a Plant shutdown due to a Containment Supply Purge Valve (CSP-V-9) air volume leak which exceeded Plant Technical Specification limits. The leakage was discovered during trouble shooting efforts associated with Containment Supply Purge Valve CSP-V-10. Both CSP-V-9 and 10 are Reactor Building-to-Wetwell vacuum breakers. The purpose of these valves (one of three pairs) is to prevent a vacuum from developing in the primary containment due to condensing steam.

The shutdown was initiated because it was determined that repairs to CSP-V-9 could not be made under current plant conditions (Mode 1-100% Power). As a result of the shutdown decision, the Shift Manager declared an "Unusual Event". On December 1, 1988 at 0352 hours, Plant Operators manually scrammed the Plant from approximately 23% power to complete the shutdown, entered Mode 3 (Hot Shutdown) and commenced cooldown. At 1130 hours, reactor coolant temperature was less than 200°F and, as a result, Plant Operators entered Mode 4 (Cold Shutdown). At 1144 hours, the Unusual Event classification was terminated.

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.

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

TEXT (If more space is required, use additional NRC Form 365A's) (17)

Abstract (contd.)

The immediate cause of this event was a damaged CSP-V-9 rubber seat. Subsequently, a formal root cause analysis was made to determine the failure mode. The root cause was determined to be design related and two-fold. The specification for the valve seal identified a less than adequate material and the design configuration allowed too much seal at or near the friction surface of the valve seat. Equipment Modification Specifications were implemented to correct these deficiencies.

This event posed 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 30, 1988 at 2335 hours, Reactor Operators initiated a Plant shutdown due to a Containment Supply Purge Valve (CSP-V-9) air volume leak which exceeded Plant Technical Specification limits. The leakage was discovered during trouble shooting efforts associated with Containment Supply Purge Valve CSP-V-10. Both CSP-V-9 and 10 are Reactor Building-to-Wetwell vacuum breakers. The purpose of these valves (one of three pairs) is to prevent a vacuum from developing in the primary containment due to condensing steam.

On November 26, 1988 problems were noted with CSP-V-10 in that it would not indicate full open when cycled. Accordingly, a Maintenance Work Request (MWR) was prepared to trouble shoot and repair the valve. In addition, the appropriate Plant Technical Specification Limiting Condition for operation (14-day LCO) was entered.

On November 29, 1988 Plant Electricians were working the MWR on CSP-V-10 to trouble shoot the indication problem, and noted water in the piping between CSP-V-10 and CSP-V-9. The pipe is a 24-inch Reactor Building-to-Wetwell vacuum breaker relief line that provides air for containment pressure stabilization. Although the line does not carry water, the source was condensation due to temperature differences between the Wetwell (approximately 135°) and the exposed portion of the line in the Reactor Building (approximately 80°) upstream of CSP-V-9. Accordingly, Plant Technical Engineers performed a visual inspection and noted surface disturbance in the water at the base of CSP-V-9. Also at this time a small pressure differential (approximately 2" water gauge) existed between the Wetwell and the Reactor Building. As a result, the engineers suspected that the seal may have not been seating properly to prevent air leakage. They did establish that CSP-V-10 was seating properly and could act as a containment boundary for the line.

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.

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 3 7 -

0 1 1

0 3

OF

0 6

TEXT (If more space is required, use additional NRC Form 368A's) (17)

The following is a chronology for those actions taken on November 30, 1988:

- o 0100 hours: Repairs were completed on CSP-V-10. Plant electricians replaced a proximity switch (Supplier: R. B. Denison Co. Model No. WE74/Ex2).
- o 0730 hours: CSP-V-9 was visually inspected and a small amount of air leakage was observed. The leakage appeared to be minimal and not an indication of gross seal failure.
- o 1029 hours: Plant Management determined that a Local Leak Rate Test (LLRT) was needed to ascertain the potential leak rate from CSP-V-9.
- o 2245 hours: After several attempts to perform the LLRT on CSP-V-9, Plant personnel were unable to establish the required pressure between CSP-V-9 and CSP-V-10. As a result, CSP-V-9 was declared inoperable and the appropriate Technical Specification LCO was entered.
- o 2330 hours: It was determined that repairs to CSP-V-9 could not be made under current Plant Conditions (Mode 1 - 100% Power) and, as a result, Plant shutdown was required in accordance with Plant Technical Specification Action Statement (TSAS) 3.6.1.1, "Primary Containment Integrity."

As a result of the shutdown decision, the Shift Manager declared an "Unusual Event" over the Plant PA system.

- o 2333 hours: The Shift Manager, utilizing the CRASH Network, notified the Emergency Operations Facility Communications Center (EOFCC) of the Unusual Event.
- o 2335 hours: Plant Operators commenced Plant shutdown to bring the Plant into the Cold Shutdown (Mode 4) condition.
- o 2347 hours: The NRC was notified of the Unusual Event declaration and Plant Shutdown.

On December 1, 1988 at 0352 hours, Plant Operators manually scrambled the Plant from approximately 23% power to complete the shutdown, entered Mode 3 (Hot Shutdown) and commenced cooldown. At 1130 hours, reactor coolant temperature was less than 200°F and, as a result, Plant Operators entered Mode 4 (Cold Shutdown). At 1144 hours, the Unusual Event classification was terminated.

Immediate Corrective Action

As required by the Plant Technical Specifications, Plant Operators successfully maneuvered the Plant to the Cold Shutdown condition.

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.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		08	037	01	04	OF 06

Washington Nuclear Plant - Unit 2

0500039788-037-0104 OF 06

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

Further Evaluation and Corrective ActionA. Further Evaluation

The immediate cause of this event was a damaged CSP-V-9 rubber seat. The Viton seal was supplied by I. B. Moore Co. and manufactured in accordance with ASTM D20002HK715A1-10Z1 (Shore A 75 Hardness). The seal was procured by the Supply System to fit into the butterfly valve which was manufactured by BIF, Co. Preliminary evaluation indicated the failure mode was material related.

B. Further Corrective Action

1. The damaged CSP-V-9 seat was replaced with new seat material and a post-maintenance LLRT was successfully performed in accordance with Plant Procedure (PPM) 7.4.6.1.2.4, "Containment Isolation Valve and Penetration Leak Test program".
2. A visual inspection was performed on CSP-V-5 and CSP-V-6. Although CSP-V-6 showed no signs of deterioration, the CSP-V-5 seal was also damaged. The CSP-V-5 seal was replaced and successfully passed a post-maintenance LLRT. In addition, CSP-V-6 was tested and successfully passed an LLRT.
3. As a precautionary measure, an entry was made into the Operations Department Night Orders such that each time one of the vacuum breaker CSP valves or Wetwell Exhaust Purge (CEP) valves are cycled, an LLRT is to be performed on the cycled valve. The valves are: CSP-V-5, CSP-V-6, CSP-V-9, CEP-V-3A and CEP-V-4A.
4. A formal root cause analysis was performed as a result of the seal damage found in valves CSP-V-5 and CSP-V-9. The analysis showed that the seal design was less than adequate in two areas:
 - a. The use of VITON as the seal material was not a good choice even though it has superior radiation resistance and high temperature aging properties compared to other options. The analysis showed these primary characteristics are offset by poor tear resistance, high coefficient of friction and molding/curing phenomena that could effect seal failure.
 - b. Evaluation of the valve operation revealed that the seal material is displaced as it travels across the valve seat. The cross-sectional shape of the seal allowed a significant amount of material displacement causing bulging out to the rear.

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.

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 3 7	- 0 1	0 5	OF	0 6

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

Equipment Modification Specifications were issued based on a concentrated Equipment Engineering evaluation and test program. The modifications embodied the use of a carboxylated nitrile compound for the seal material and a tapered cross-section for both the seal and clamping ring configurations. The new seal compound has internal and surface lubricity to decrease valve seat friction. The configuration change assures a uniform circumferential seal during the assembly process and negates excess seal bulging and displacement during operation. These modifications were made to valves CSP-V-1 through 6, 9 and CEP-V-1A through 4A during the Spring 1989 refueling outage.

Safety Significance

There are three Reactor Building-to-Wetwell relief lines each containing a 24-inch vacuum breaker (check) valve and an air-operated butterfly valve. The check valves are CSP-V-7, 8 and 10; the butterfly valves are CSP-V-5, 6 and 9 (Reference Figure 1). These valves prevent a vacuum from developing in the primary containment due to condensing steam. Actuation of the butterfly valves is controlled by the differential pressure between the suppression chamber and the Reactor Building. Both types of valves are set to open at 0.5 psid.

Because it was established that CSP-V-10 was seating properly and could act as a containment boundary for the line, and that Plant Operators successfully maneuvered the Plant to a Cold Shutdown condition, this event posed no threat to the health and safety of either the Public or Plant personnel.

Similar Events

None

EIIS InformationText ReferenceEIIS Reference

System	Component
--------	-----------

Butterfly Valves CSP-V-5, 6 and 9

VB PDCV

Vacuum Breaker (Check) Valves CSP-V-7, 8 and 10

VB PDCV

Wetwell Exhaust Purge Valves CEP-V-3A and 4A

VB PDCV

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.

FACILITY NAME (1)

DOCKET NUMBER (2)

LER NUMBER (6)

PAGE (3)

Washington Nuclear Plant - Unit 2

0 5 0 0 0 3 1 9 7 8 1 8 - 0 1 3 7 - 0 1 1 0 1 6 OF 0 1 6

TEXT (If more space is required, use additional NRC Form 368A-1/17)

