

## 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 4																													
TITLE (4) High Pressure Core Spray (HPCS) System Three-Quarter-Inch Line Break During Surveillance Testing While Plant was Shutdown - Component Failure																																																	
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 5			1 2			8 9			8 9			0 1			5			0 0			0 6			0 8			8 9													0 5 0 0 0									
OPERATING MODE (9) 5						THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)																																											
POWER LEVEL (10) 0 0 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)(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)										TELEPHONE NUMBER									
NAME J.D. Arbuckle, Compliance Engineer										AREA CODE 5 0 9 3 7 7 - 2 1 1 5									

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)											
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS		

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 or approximately fifteen single space typewritten lines) (16)

On May 12, 1989 during the performance of the High Pressure Core Spray (HPCS) System operability procedure, a three-quarter-inch high point vent line failed approximately one-half inch above the fillet weld. The vent line is on the 12-inch HPCS test return line to the suppression pool and is located on approximately the 466' elevation of the Reactor Building. At the time of the event the Plant was shutdown for the annual maintenance and refueling outage.

The procedure was being performed as part of normal surveillance testing. During the course of the surveillance, Plant Operators noted vibration on the test line while the Full-Flow Suppression Pool Test Return Valve (HPCS-V-23) was open. At 0315 hours the high point vent line failed, spraying water on two Equipment Operators and a Health Physics Technician. However, none of the personnel were contaminated. At 0330 hours, Plant Operators secured and partially drained the HPCS System to stop the leak.

The cause of the HPCS vent line failure was due to reverse bending fatigue caused by vibration. The vibration was due to turbulence caused by high flow rates in the 12-inch test return line. Although primary containment was open for refueling activities, an HPCS high point vent line failure during operation would have been considered to be a breach of containment (open to the submerged portion of the suppression pool). However, had this occurred during operation, the line failure would only have affected the HPCS test mode. The normal injection mode would not have been affected.

Corrective actions consisted of 1) implementing a design change to strengthen the high point vent piping, and 2) performing an Engineering evaluation of similar (vents and drains) piping failures at the Plant.

## 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)

This event did not effect the health and safety of either the public or Plant personnel.

Plant Conditions

- a) Power Level - 0%
- b) Plant Mode - 5 (Refueling)

Event Description

On May 12, 1989 during the performance of Plant Procedure (PPM) 7.4.5.1.11, "High Pressure Core Spray (HPCS) System Operability Test," a three-quarter-inch high point vent line [HPCS (55-1-7): containing valves HPCS-V-83/84] failed approximately one-half inch above the fillet weld. The vent line is on the HPCS test return line to the suppression pool and is located on approximately the 466' elevation of the Reactor Building (in the HPCS pump room). At the time of the event, the Plant was shutdown for the annual maintenance and refueling outage.

The procedure was being performed as part of normal surveillance testing. In accordance with the procedure, Plant Operators had aligned the system, properly vented and filled the piping and started the HPCS pump (HPCS-P-1). During the course of the surveillance they noted vibration on the test line while the Full-Flow Suppression Pool Test Return Valve (HPCS-V-23) was open. At 0315 hours the high point vent line failed, spraying water on two Equipment Operators and a Health Physics Technician. However, none of the personnel were contaminated.

At 0326 hours, Plant Operators tripped pump HPCS-P-1. The control fuses for the pump were removed at 0330 hours and the system was secured and partially drained to stop the leak.

Immediate Corrective Action

Plant Operators secured HPCS-P-1 and isolated the HPCS System to stop the leakage.

Further Evaluation and Corrective ActionA. Further Evaluation

1. This event is being reported per the requirements of 10CFR50.73(a)(2)(ii) as an event or condition that resulted in the condition of the nuclear power plant, including its principle safety barriers, being seriously degraded. Although primary containment was open for refueling activities, an HPCS high point vent line failure during operation would have been considered to be a breach of primary containment (open to the submerged portion of the Suppression Pool).
2. With the exception of the line break, there were no structures, systems or components that were inoperable at the start of this event that contributed to the event.

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3. On May 15, 1989 a field examination of the failed HPCS vent line was performed. As previously stated, the line failed one-half inch above the fillet weld. The failure was due to reverse bending fatigue caused by vibration. The vibration was due to turbulence caused by high flow rates in the 12-inch test return line. The line that failed is a three-quarter-inch, Schedule 160, SA105 (Grade B) pipe (Carbon steel: ASME III/2).

**B. Further Corrective Action**

1. A design change has been implemented to strengthen the high point vent piping. Specifically, one-inch butt weld piping was used (coming off the 12-inch test return line) and reduced to three-quarter inch to connect to the valves (which have been close-coupled and an elbow deleted), and a gusset plate was installed to rigidly support the vent valves to the 12-inch test return line.
2. Generation Engineering has performed an evaluation of similar (vents and drains) piping failures at WNP-2. Extensive efforts have been ongoing to preclude repetitive failures of similar connections. The Supply System will continue to focus on eliminating the causes of these failures through improved design configuration and minimizing the source of cyclic loading.

**Safety Significance**

There are no unacceptable consequences associated with this event. At the time of the event, the reactor vessel head was removed and reactor water level was greater than 22 feet above the reactor vessel flange. In addition, the Residual Heat Removal (RHR) System was in service for shutdown cooling. Furthermore, the HPCS was not required for Mode 5 (Refueling).

If this event had occurred during operation, the failure of the HPCS high point vent line would have been considered to be a breach of primary containment (between the subsurface of the suppression pool and the outside containment atmosphere). However, had this occurred the line failure would have only affected the HPCS test mode. The normal HPCS injection mode would not have been affected.

Accordingly, this event did not affect the health and safety of either the public or Plant personnel.

**Similar Events**

LERs 85-011-00 and 85-011-01

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

EIIS InformationText ReferenceEIIS Reference

System      Component

High Pressure Core Spray (HPCS) System  
HPCS High Point Vent Line [HPCS (55-1-7): containing  
HPCS-V-83/84]  
Pump HPCS-P-1  
Valve HPCS-V-23  
Residual Heat Removal (RHR) System  
Primary Containment

BG      ---  
BG      ---  
BG      P  
BG      TV  
BO      ---  
NH      ---