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 RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 89-043-00: on 891120, inoperability of high pressure core
 spray steam caused by equipment failure.

W/8 ltr.

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 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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	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
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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

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

December 20, 1989

Docket No. 50-397

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

Subject: NUCLEAR PLANT NO. 2
LICENSEE EVENT REPORT NO. 89-043

Dear Sir:

Transmitted herewith is Licensee Event Report No. 89-043 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

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

CMP:lg

Enclosure:

Licensee Event Report No. 89-043

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)

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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.

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Washington Nuclear Plant - Unit 2

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TITLE (4)
INOPERABILITY OF THE HIGH PRESSURE CORE SPRAY SYSTEM CAUSED BY EQUIPMENT 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)	
11	20	89	89	043	001	11	22	89			0 5 0 0 0	
OPERATING MODE (9) 1			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)									
POWER LEVEL (10) 1,000			20.402(b)			20.405(c)			50.73(a)(2)(iv)			73.71(b)
			20.405(a)(1)(i)			50.36(c)(1)			X 50.73(a)(2)(v)			73.71(c)
			20.405(a)(1)(ii)			50.36(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)			
			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
W. S. Davison, Compliance Engineer

TELEPHONE NUMBER
AREA CODE
5 0 9 3 7 7 1 - 2 5 0 1

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

EXT 2726

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC
X	BIG	V A 391		NO					

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)	NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
X					

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

At 0524 hours on November 21, 1989, during performance of the High Pressure Core Spray (HPCS) system operability surveillance test, the HPCS minimum flow valve (HPCS-V-12) apparently would not open properly to maintain minimum flow through the pump when system flow was secured. The HPCS system was immediately declared inoperable and troubleshooting was initiated by the Plant operations staff. Initial troubleshooting showed that HPCS-V-12 was not malfunctioning. The problem was isolated to HPCS-V-23, the test return valve to the suppression pool. It was found to be approximately ten percent open. This allowed sufficient flow to cause HPCS-V-12 to close. The LCO Action requirement of technical specification 3.5.1 was imposed until the return of the HPCS system to operable status.

At 2150 hours that evening, as a result of continued troubleshooting efforts, the test return valve to the Suppression Pool (HPCS-V-23), was found to be approximately 10 percent open, even though it was indicating closed in the control room. After attempts to manually close the valve failed, the manual block valve for the test return line (HPCS-V-64) was closed to isolate the faulty valve. At 2230 hours, after successful completion of the system operability surveillance, the HPCS system was declared operable.

The preliminary cause of this event is equipment failure in that HPCS-V-23, the test return line isolation to the Suppression Pool, was not able to be closed by motor operator or by hand to prevent undesired diversion of system flow from the injection

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)

Abstract (contd.)

path. A failure analysis of HPCS-V-23 will be performed after completion of disassembly and repair of the valve. There is no safety significance associated with this event. Because HPCS is a "single train" system, its inoperability is reportable, even though at all times during the event the requirements of the WNP-2 Technical Specifications were complied with to maintain the plant within its design basis. The actions of the plant operators were prompt and correct. This event posed no threat to the health and safety of the public or plant personnel.

Plant Conditions

- a) Power Level - 100%
- b) Plant Mode - 1

Event Description

At 0524 hours on November 21, 1989, during performance of the High Pressure Core Spray (HPCS) system operability surveillance test, the HPCS minimum flow valve (HPCS-V-12) apparently would not open to properly maintain minimum flow through the HPCS pump (HPCS-P-1) when system flow was secured. The HPCS system was immediately declared inoperable and troubleshooting was initiated by the Plant operations staff. Initial troubleshooting was not able to discover the exact reason for the fault. Observed symptoms suggested that the flow indicating switch (HPCS-FIS-6) for the system flow input to the minimum flow valve control circuit might be faulty. At 0910 hours the NRC Bethesda Operations Center was notified that the HPCS system was inoperable under the requirements of 10CFR50.72(b)(2)(iii) as a non-emergency four hour reportable event.

At approximately 1300 hours, troubleshooting of the HPCS system showed that the minimum flow valve (HPCS-V-12) functioned correctly and that the system was able to meet the design requirements for flow through the Condensate Storage Tank (CST) test return line (CST to CST flowpath). At 2150 hours that evening, as a result of continued troubleshooting efforts, the test return valve to the Suppression Pool (HPCS-V-23), was found to be approximately 10 percent open. The valve, in fact, indicated closed in the control room. After attempts to close the valve with the motor operator and manual operator failed, the manual block valve for the test return line (HPCS-V-64) was closed to isolate the faulty valve from the remainder of the system. At 2230 hours, after successful completion of the system operability surveillance, the HPCS system was declared operable.

Immediate Corrective Action

Plant operators responded in a timely manner to follow the requirements of plant procedures and technical specifications. They initially identified the condition, applied the restrictions of the LCO Action requirement of technical specification 3.5.1 and then followed up with appropriate action to obtain resolution. Initially, the problem manifested itself as failure of the minimum flow valve to open when system flow was apparently secured. In fact, flow through the pump was just above

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the required value for minimum flow, most probably due to the pathway provided by HPCS-V-23 not being completely closed. Flow was just sufficient to pick up flow switch HPCS-FIS-6, thus preventing the minimum flow valve from opening. Subsequent troubleshooting verified that the minimum flow valve, HPCS-V-12, and its associated flow indicating switch and controls were operating correctly. The problem was then localized to the failure of HPCS-V-23 to completely close after it was discovered that the motor operator had stopped at the 90 percent closed position as a result of torque switch actuation.

Further Evaluation and Corrective Action

A. Further Evaluation

1. This event is being reported per the requirement of 10CFR50.73(a)(2)(v) as a "condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to: (A) Shut down the reactor and maintain it in a safe shutdown condition; (B) Remove residual heat; (C) Control the release of radioactive material; or (D) Mitigate the consequences of an accident." The inoperability of the HPCS system is a unique event at WNP-2. Unlike the other Emergency Core Cooling Systems, HPCS system inoperability is reportable even though all requirements of technical specification LCO action statements are being complied with. This is so because it is a "single train" Emergency Core Cooling System and, as such, is reportable any time it is unable to perform its safety function when it is required to be able to do so by plant conditions.
2. The preliminary cause of this event is equipment failure in that HPCS-V-23, the test return line isolation to the Suppression Pool, was not able to be closed to prevent undesired diversion of system flow. The valve was initially unable to be closed either with the motor operator or by hand. The root cause of this event has not yet been determined due to the need to disassemble HPCS-V-23 in order to complete the investigation.

Technical evaluation by plant staff and communication with the valve manufacturer, Anchor-Darling Company, indicate that the cause of the failure could be vibration induced loosening of the disk nut. This type of failure would allow the valve disk to become misaligned with the disk guides/valve seat area and possibly result in the failure of the valve to attain the completely closed position. Similar failures of this type of valve have apparently occurred at other plants which exhibited the same types of symptoms. Any new substantive information which develops as a result of completion of the failure analysis and root cause effort will be reported in a supplemental LER.

B. Further Corrective Action

1. The failure analysis and determination of the root cause of the HPCS-V-23 failure will be performed after completion of disassembly and repair of the valve.

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Safety Significance

There is no safety significance associated with this event. Preliminary evaluation of the failure shows that, with HPCS-V-23 in approximately the 90 percent closed position, the HPCS system would have very closely approached its required design minimum flow rate (6350 gpm into the reactor vessel) under accident conditions. Thus, the system, in its slightly degraded condition, would have contributed significantly to the successful response to a small diameter LOCA had it been called upon to do so. Also, failure of the HPCS system is within the bounds of the ECCS single failure criteria assumed in the FSAR safety analyses and does not prevent the ECCS from performing its safety function in response to a DBA.

At all times during the event, the requirements of the WNP-2 Technical Specifications (Section 3.5.1) were complied with. The LCO action for this section requires ensuring the operability of the redundant ECCS Divisions 1 and 2 and the Reactor Core Isolation Cooling system while the HPCS system is inoperable (a maximum of 14 days is allowed). The entire period of inoperability was less than one day. The actions of the plant operators were prompt and correct to ensure the plant was maintained within the bounds of the technical specifications and therefore within the bounds of the operational safety analysis. Since no safety significance is associated with this event, it posed no threat to the health and safety of the public or plant personnel.

Similar Events

There were three instances of HPCS system inoperability that were evaluated as similar to this LER. LER 84-030 "Unscheduled Lockout of the High Pressure Core Spray Diesel Generator (HPCS DG)" documented an event during which a technician inadvertently locked out the HPCS Diesel Generator during surveillance activity by incorrect placement of an electrical jumper. The corrective action consisted of revising the procedure to add a caution note and to designate the proper contacts to be jumpered.

LER 85-022 "HPCS System Inoperable" documented an event during which plant personnel inadvertently disconnected system initiation logic while repairing two sheared off HPCS initiation status lamp sockets. Corrective action consisted of notifying plant operations, maintenance and technical personnel to place additional reliance on electrical wiring diagrams, connection diagrams and approved vendor manuals when appropriate.

LER 89-030 "High Pressure Core Spray System Inoperable Caused by Suppression Pool Pump Suction Valve Failure Due to Motor Operator Manufacturing Error" documented an event during which the HPCS system was declared inoperable due to failure of the suppression pool pump suction valve motor operator during performance of the operability surveillance. The corrective actions associated with this LER consisted of: checking other valve motor operators during the next refueling outage, revising the plant maintenance procedures to add instructions for inspection of the motor operators, adding precautions to plant procedures regarding disposition of valves found difficult to operate, and initiation of a LOCFR21 report.

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EIIS InformationText ReferenceEIIS ReferenceSystem Component

HPCS System
HPCS-V-12
HPCS-V-23
HPCS-P-1
HPCS-FIS-6
Suppression Pool
HPCS-V-64
ECCS Division 1
ECCS Division 2
RCIC System
Condensate Storage Tank

BG	---
BG	V
BG	V
BG	P
BG	FIS
BT	---
BG	V
BM	---
BM	---
BM	---
KA	TK

