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 RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 92-020-00:on 920509,review of plant determined that problems associated w/sys minimum flow control instruments were repetitive & challenge sys operability.Caused by poor plant construction.Plant procedures modified.W/920605 ltr.

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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

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

June 5, 1992
G02-92-137

Docket No. 50-397

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U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

**SUBJECT: NUCLEAR PLANT WNP-2, OPERATING LICENSE NPF-21
LICENSEE EVENT REPORT NO. 92-20**

Transmitted herewith is Licensee Event Report No. 92-20 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.

Sincerely,



J. W. Baker
WNP-2 Plant Manager (Mail Drop 927M)

Enclosure

cc: Mr. John B. Martin, NRC - Region V
Mr. C. Sorensen, NRC Resident Inspector (Mail Drop 901A, 2 Copies)
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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 5

TITLE (4)

FLOW ELEMENT FOR LOW PRESSURE CORE SPRAY (LPCS) MINIMUM FLOW CONTROL NOT PROPERLY INSTALLED

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 NUMBERS (S)								
0	5	0	8	9	2	9	2	0	2	0	0	5	0	0	0			
0	5	0	8	9	2	9	2	0	6	0	4	9	2	0	5	0	0	0

OPERATING MODE (9) 5 THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR §: (Check one or more of the following) (11)

POWER LEVEL (10)	0	0	0	20.402(b)	20.405(a)(1)(i)	20.405(c)	50.73(a)(2)(iv)	77.71(b)
				20.405(a)(1)(ii)	20.405(a)(1)(iii)	50.36(c)(1)	50.73(a)(2)(v)	73.73(c)
				20.405(a)(1)(iv)	20.405(a)(1)(v)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
						X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
						50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
						50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER									
J. D. Imel, Nuclear Engineer										
AREA CODE										
5	0	9	3	7	7	-	2	2	9	5

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPD	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPD

SUPPLEMENTAL REPORT EXPECTED (14)

EXPECTED SUBMISSION DATE (15)

MONTH DAY YEAR

YES (If yes, complete EXPECTED SUBMISSION DATE) X NO

ABSTRACT (16)

On May 5, 1992, it was determined that problems associated with the system minimum flow control instruments were repetitive and challenged system operability. Between December 1991 and April 1992, several instances were identified where the flow indicating switch (which controls the minimum flow valve) read onscale when the system was shutdown. Corrective actions initiated on these occasions had been ineffective in permanently resolving the problem.

The root cause of this event is that the flow element LPCS-FE-002 was not installed properly during Plant construction due to poor work practices. This installation allowed air to be entrained in sensing lines during pump operation, giving erroneously high readings which could have resulted in premature closing or failure to open of the minimum flow valve.

Plant procedures were modified to include a check of the instrument status prior to running the pump. Instrument sensing line taps for LPCS-FE-002 will be modified, prior to returning the system to an operable status, to eliminate trapping gas bubbles in the instrument lines. The details of this event were communicated to all system engineers and Instrumentation and Control technicians and engineers. Walk downs of other safety systems, prior to Plant restart from the current maintenance and refueling outage, will ensure no similar problems exist.

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TITLE (4) FLOW ELEMENT FOR LOW PRESSURE CORE SPRAY (LPCS) MINIMUM FLOW CONTROL NOT PROPERLY INSTALLED					

The LPCS system starts automatically on a low reactor level or high drywell pressure. The pump is designed to run on minimum flow until reactor pressure is low enough that injection can occur. Indication of minimum flow valve position is available to the control room operator. The LPCS pump can be stopped if required due to this condition, and restarted from the control room when reactor pressure is low enough for injection to occur. Multiple other low and high pressure safety related systems are available to supply core cooling. This event had minimal safety significance.

There were no structures, systems, or components inoperable prior to the start of this event that contributed to the event.

Plant Conditions

Power Level - 0%

Plant Mode - 5 (Refueling)

Event Description

On May 5, 1992, it was determined from a review of completed work packages that problems associated with the system minimum flow control instrument, LPCS-FIS-4, were repetitive and challenged system operability. The system was inoperable for maintenance and testing at the time of discovery. Between December 1991 and April 1992, several instances were identified where the flow indicating switch (which controls the minimum flow valve) read onscale when the system was shutdown. Corrective actions, refilling the instrument lines and verifying instrument calibration, initiated on these occasions had been ineffective in permanently resolving the problem. A Problem Evaluation Request (PER) was initiated to resolve this repetitive problem.

Immediate Corrective Action

The immediate corrective action was to change the surveillance procedure, PPM 7.4.5.1.7, and the system operating procedure, PPM 2.4.3, to check LPCS-FIS-004 and verify proper indication after each operation of the LPCS pump. This action will remain in effect until completion of the final corrective action.

Further Evaluation and Corrective Action

A. Further Evaluation

It has been determined that, due to the physical installation of the instrument sensing line taps, air enters the instrument low pressure sensing line when the pump is operated. LPCS-FIS-4 sends its signal to the minimum flow valve, LPCS-FCV-11, to close it when system flow is ≥ 770 gpm and to reopen it on low flow conditions. This protects the pump from potential damage due to extended

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TITLE (4) FLOW ELEMENT FOR LOW PRESSURE CORE SPRAY (LPCS) MINIMUM FLOW CONTROL NOT PROPERLY INSTALLED														

operation at low flow conditions. Table 3.3.3-2 of the Plant Technical Specifications specifies the trip set point for the LPCS Pump Discharge Flow-Low (Minimum Flow) be ≥ 770 gpm with an allowable value of ≤ 900 gpm.

In the event that LPCS-FIS-004 erroneously reads some high value, say 400 gpm, then the trip point of this switch could be as low as 370 gpm actual flow. This would be a violation of the Technical Specification. This lower setpoint would be conservative in regards to providing flow to the reactor in the case of a design basis event since the minimum flow valve would close sooner, resulting in greater injection flow. However, this could lead to failure of the LPCS pump in the event the pump had to run for an extended period of time before reactor pressure was low enough to allow admission of LPCS flow.

If LPCS-FIS-004 is sensing flow when there is none, the minimum flow valve could close with an actual system flow of less than 770 gpm. Technical Specifications require the valve be open to ensure LPCS pump flow is ≥ 770 gpm. This is a condition prohibited by the Technical Specifications and is reportable pursuant to the requirements of 10CFR50.73(a)(2)(i)(B).

There were no structures, systems, or components inoperable prior to the start of this event that contributed to the event.

The root causes for this event include: 1) flow element LPCS-FE-002 was not installed properly during construction of the Plant due to poor work practices; and 2) The timeliness of resolving this installation weakness was poor in that the policy for ensuring that problems are reported to the appropriate level of management for consideration and correction was not enforced.

This problem is caused by the differential pressure switch sensing lines being connected to the flow element (LPCS-FE-002) in an incorrect configuration. The vendor manual for LPCS-FIS-004 specified the tubing come off the side, instead of the top, of the main piping. This limits air collection in the instrument lines. The first time this condition was identified was November 15, 1983, when it was recorded in the Instrumentation and Control Chronological History Sheet. In 1983, this problem was not brought to managements attention through a startup problem report and was thus not addressed at that time.

When the LPCS pump is run, gas bubbles may gather in the sensing lines to LPCS-FIS-004 and LPCS-FT-003. LPCS-FIS-004 spans 0 to 1100 gpm flow with a change of 10 inches water column differential pressure. The control room indicator transmitter, LPCS-FT-003, spans 0 to 607.5 inches water column differential pressure for 0 to 8500 gpm flow. The effect of an observed 2 inches water column difference is that the control room indicator would read an acceptable value (approximately zero), whereas local LPCS-FIS-004 would indicate a value of approximately 475 gpm.

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TITLE (4) FLOW ELEMENT FOR LOW PRESSURE CORE SPRAY (LPCS) MINIMUM FLOW CONTROL NOT PROPERLY INSTALLED																

The LPCS pump is run quarterly, while the flow indicating switch is checked monthly by surveillance procedure PPM 7.4.3.3.1.6. The LPCS system, including the instrument lines, is filled and vented each time the system is drained. This problem may have previously gone undetected since the calibration and channel functional testing of LPCS-FIS-004 involves isolation of the instrument from the system. The condition would therefore not have been immediately observable to the test personnel.

B. Further Corrective Action

The instrument sensing lines taps on LPCS-FE-002 will be modified to eliminate the problem of trapping gas bubbles in the instrument lines. This action will be completed by 6/15/92.

A memorandum was issued to all system engineers and Instrumentation and Control Technicians on systems containing flow orifices. The memorandum notified them to be alert for potential improper orientation of the flow elements sensing line taps or improper routing or sloping of instrument lines that could cause problems with the flow readings.

System Engineers for the ECCS Systems, will perform walk downs on these systems looking for improper orientation of flow element sensing line taps. This action will be completed by June 22, 1992.

Management expectations regarding use of the problem reporting system were provided in two recent memorandums from the Plant Manager.

Safety Significance

This event resulted in a small chance of damaging the LPCS pump due to low flow during system operation. To have damage a combinations of events would have been necessary. Enough air had to be trapped in the flow sensing line to cause closure of the minimum flow valve when injection flow was still low enough to cause pump damage. Finally, LPCS would have had to start in response to an accident event and reactor pressure remained high enough that LPCS injection did not occur.

This particular problem would not effect the performance of other emergency core cooling systems such as High Pressure Core Spray (HPCS), Reactor Core Isolation Cooling (RCIC), and three divisions of the Low Pressure Core Injection (LPCI) mode of Residual Heat Removal (RHR) operation. These systems are capable of providing emergency core cooling without LPCS. Consequently, the designed system redundancy ensures there was minimal safety significance due to the inaccuracy of LPCS-FIS-004.

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Similar Events

There have been no past events at WNP-2 where improper installation of differential pressure switch sensing lines resulted in air entrainment inoperability of the associated instruments.

EIIS Information

Text Reference

EIIS Reference

	<u>System</u>	<u>Component</u>
Low Pressure Core Spray (LPCS)	BM	--
LPCS Flow Indicating Switch (LPCS-FIS-004)	BM	FIS
LPCS Flow Orifice (LPCS-FE-002)	BM	OR
LPCSS Minimum Flow Valve (LPCS-FCV-11)	BM	V
LPCSS Pump (LPCS-P-1)	BM	P
High Pressure Core Spray (HPCS)	BG	--
Residual Heat Removal (RHR)	BO	--