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 RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 92-014-00: on 920326 & 920414, identified TS violations associated w/flow measurements in HPCS & LPCS sys. Caused by inadequate design & analysis. Changes to setpoints of impacted instrumentation. W/920423 ltr.

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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

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

April 23, 1992
G02-92-104

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. 92-014**

Transmitted herewith is Licensee Event Report No. 92-014 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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Ms. Dottie Sherman, ANI
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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)

HIGH PRESSURE CORE SPRAY (HPCS) AND LOW PRESSURE CORE SPRAY (LPCS) FLOW SETPOINT ERROR

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	3	2	6	9	2	9	2	--	0	1	4	--	0	0	0	0	0	0	0	0	0	0
0	3	2	6	9	2	9	2	--	0	1	4	--	0	0	0	0	0	0	0	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	0	0	20.402(b)	20.405(a)(1)(i)	20.405(a)(1)(ii)	20.405(a)(1)(iii)	20.405(a)(1)(iv)	20.405(a)(1)(v)	20.405(c)	50.36(c)(1)	50.36(c)(2)	50.73(a)(2)(i)	50.73(a)(2)(ii)	50.73(a)(2)(iii)	50.73(a)(2)(iv)	50.73(a)(2)(v)	50.73(a)(2)(vi)	50.73(a)(2)(vii)	50.73(a)(2)(viii)	50.73(a)(2)(ix)	77.71(b)	73.73(c)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
Carl Fies, Compliance Engineer	5 0 9 3 7 7 - 4 1 4 7

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 March 26 and April 14, 1992, contract engineers working in the Setpoint Methodology Program identified Technical Specification violations associated with flow measurements in the High Pressure Core Spray (HPCS) and Low Pressure Core Spray (LPCS) systems, respectively. The violations occurred because the instrumentation associated with the flow measurements assumed a higher water temperature than that present during testing or postulated initial accident conditions. This temperature difference caused the actual flow conditions to be lower than the indicated flow.

The root cause of this event was inadequate design and analysis. There was an analysis deficiency in that the previous setpoint calculations did not adequately address the temperature effects on setpoint accuracy.

Corrective actions included changes to the setpoints of impacted instrumentation, corresponding changes to surveillance test procedures, and reperformance of tests to verify flows.

This event has no safety significance and posed no threat to the health and safety of either the public or Plant personnel.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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TITLE (4) HIGH PRESSURE CORE SPRAY (HPCS) AND LOW PRESSURE CORE SPRAY (LPCS) FLOW SETPOINT ERROR							

Plant Conditions

Power Level - 100%
Plant Mode - 1

Event Description

On March 26 and April 14, 1992, contract engineers working in the Setpoint Methodology Program identified a Technical Specification violation associated with flow measurements in the High Pressure Core Spray (HPCS) and Low Pressure Core Spray (LPCS) systems, respectively. The violation occurred because the instrumentation associated with the flow measurements were calibrated for a higher water temperature than that present during testing or initial postulated accident conditions. This temperature difference caused the actual flow conditions to be lower than the indicated flow.

The HPCS flow orifice (HPCS-FE-007) is sized to provide the design differential pressure for a fluid temperature of 212°F. Actual water temperature could be as low as 60°F. The HPCS flow required by the Technical Specifications is equal to or greater than 6350 gpm (4.5.1.b.3). The minimum flow required is equal to or greater than 1200 gpm (Table 3.3.3-2.C.1.f). The minimum flow value is established to prevent pump damage during low flow operation. For the HPCS system the flow orifice, HPCS-FE-007, transmits a signal to Flow Indicating Switch, HPCS-FIS-6. HPCS-FIS-6, controls the operation of the minimum flow valve, HPCS-V-12. This valve opens as necessary to maintain a minimum flow of 1200 gpm through the pump. With calibration and drift errors taken into account, in addition to temperature, the minimum flow may have been as low as 1150 gpm and system flow could have been as low as 6200 gpm. At 1540 hours on March 26 the HPCS was declared inoperable and Technical Specification Action Statements 3.3.3.a and 3.5.1.C.1 were entered. After additional testing was completed to assure flow was adequate HPCS was declared operable at 0615 hours on March 28. Although declared inoperable the HPCS was maintained in a ready status, fully capable of automatic actuation, throughout the period of technical inoperability.

The LPCS flow orifice (LPCS-FE-002) is sized for a fluid temperature of 170°F. The actual water temperature could be as low as 60°F. The LPCS system flow required by the Technical Specification is 6350 gpm (4.5.1.b.1). With the calibration, drift, and temperature errors the actual system flow could have been as low as 6200 gpm. At 1328 hours on April 14 LPCS was declared inoperable and Technical Specification Action Statement 3.5.1.D.2 was entered. After additional testing to reverify its ability to provide 6,350 gpm LPCS was declared operable at 2130 hours that same day. Although declared inoperable the LPCS was maintained in a ready status, fully capable of automatic actuation, throughout the period of technical inoperability.

**LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION**

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Immediate Corrective Action

On March 27 Instrument Setpoint Change Request (ISCR) 1115 was approved to increase the trip setpoint for the Flow Indicating Switch (HPCS-FIS-6).

On March 28 Plant Procedure PPM 7.4.5.1.11, HPCS System Operability Test was performed. It demonstrated HPCS flow complied with the Technical Specification requirements with the temperature corrected flow rate.

On April 14 Plant Procedure PPM 7.4.5.1.7, LPCS System Operability Test, was performed. It verified the LPCS flow met the Technical Specification requirements with the temperature corrected flow rate.

Further Evaluation and Corrective Action

A. Further Evaluation

A four hour verbal notification was made to the NRC at 1730 hours on March 26, 1992, pursuant to the requirements of 10CFR50.72(b)(2)(iii)(A). The inoperability of HPCS (a single train system) resulted in a condition that alone could have prevented the fulfillment of a safety function needed to shut down the reactor and maintain it in a shutdown condition.

This written report is required by 10CFR50.73(a)(2)(i)(B) as the events described herein were a condition prohibited by the plant's Technical Specifications in that minimum and system flows did not meet requirements. It is also required by 10CFR50.73(a)(2)(v) since the inoperability of HPCS (a single train system) resulted in a condition that alone could have prevented the fulfillment of a safety function needed to shut down the reactor and maintain it in a shutdown condition.

Further evaluation was performed on the Technical Specification requirements for LPCS minimum flow. The LPCS minimum flow allowable value required by the Technical Specifications is less than or equal to 900 gpm (Table 3.3.3-2.A.1.c). The minimum flow value is established to prevent pump damage during low flow operation. An allowable value that is "less than or equal" is an error in the Technical Specifications as it would allow minimum flow values as low as zero flow. The trip setpoint value listed in the Technical Specifications is greater than or equal to 770 gpm. For the LPCS system the flow orifice, LPCS-FE-002, transmits a signal to Flow Indicating Switch, LPCS-FIS-4. LPCS-FIS-4, which controls the operation of the minimum flow valve, LPCS-V-11. With the temperature error the actual minimum flow could have been as low as 627.9 gpm. However, this is not a Technical Specification violation as it is less than or equal to 900 gpm.

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The root cause of this event was inadequate design and analysis. There was an analysis deficiency in that the previous setpoint calculations did not adequately address the temperature effects on setpoint accuracy.

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

B. Further Corrective Action

1. Plant Procedure PPM 7.4.3.3.1.63, HPCS Flow Rate Low (Minimum Flow)-Channel Functional Test/Channel Calibration for HPCS-FIS-6 will be modified to the new setpoint value. This action will be completed by June 1, 1992.
2. An Instrument Setpoint Change Request (ISCR) will be written to increase the trip setpoint for LPCS-FIS-4. This action will be completed by June 1, 1992.
3. Plant Procedure PPM 7.4.3.3.1.6, ECCS-LPCI (A) and LPCS Pump Discharge Low (Minimum Flow) - Channel Functional Test - Channel Calibration for LPCS-FIS-4 will be modified to a new setpoint value. This action will be completed by June 1, 1992.
4. An investigation of the temperature conditions associated with flow measurements on the Residual Heat Removal (RHR) Pumps will be performed. This action will be completed by July 1, 1992.

Safety Significance

The HPCS and LPCS pump minimum flow requirements were evaluated against actual flow conditions to assure no pump damage occurred due to the lower than expected flows.

The HPCS minimum flow evaluation by the pump supplier states the minimum flow for short periods (three hours or less) may be as low as 400 gpm. Therefore, pump damage could not have occurred due to this condition since the HPCS flow with 60°F water would be no lower than 1150 gpm.

Likewise, the LPCS minimum flow evaluation by the pump supplier states the minimum flow for short periods is 570 gpm. Therefore, pump damage could not have occurred since the LPCS flow with 60°F water would be no lower than 761 gpm.

The small deviations in system flows are not considered significant when compared to the flows and overall conservatism assumed in LOCA accident analysis. In addition, the small variance in total flow is not significant for heat removal capability.

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Both the HPCS and LPCS remained aligned and available for automatic vessel injection in the event of an accident during the period of technical inoperability.

There was no safety significance associated with this event.

Similar Events

The new setpoints described in this LER are a result of the Supply System efforts to improve the level of confidence in the Technical Specification related setpoints. Other events resulting from the setpoint program may be reported as revisions to this LER.

The Supply System has identified several setpoint problems previously reported in LERs. These include LER 92-002 dealing with the Main Steam Isolation Valve Leakage Control System, and LER 92-006 dealing with the Reactor Building to Suppression Pool Vacuum Breaker valves. Technical Specification setpoints continue to be evaluated as part of the Setpoint Methodology Program to ensure WNP-2 setpoints incorporate the necessary conservatism and modern analytical setpoint calculation techniques.

EIIS Information

Text Reference

EIIS Reference

<u>System</u>	<u>Component</u>
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High Pressure Core Spray (HPCS)	BG	---
Low Pressure Core Spray (LPCS)	BM	---
HPCS Flow Orifice (HPCS-FE-007)	BG	FE
HPCS Flow Indicating Switch (HPCS-FIS-6)	BG	FIS
HPCS Minimum Flow Valve (HPCS-V-12)	BG	V
LPCS Flow Orifice (LPCS-FE-002)	BM	FE
LPCS Flow Indicating Switch (LPCS-FIS-4)	BM	FIS
LPCS Minimum Flow Valve (LPCS-V-11)	BM	V