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SUBJECT: LER 93-015-00:on 930331,unusual event declared as result of inoperability of HPCS sys from low svc water flow through HPSC pump room cooler,coincident w/930318 inoperability of RCIC.Caused by component defect.Flow revised.W/930430 ltr.

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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

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

April 30, 1993
G02-93-101

Docket No. 50-397

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

Subject: **NUCLEAR PLANT WNP-2, OPERATING LICENSE NPF-21**
LICENSEE EVENT REPORT NO. 93-015

Transmitted herewith is Licensee Event Report No. 93-015 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. V. Parrish (Mail Drop 1023)
Assistant Managing Director, Operations

JVP/KBL/cgeh
Enclosure

cc: Mr. J. B. Martin, NRC - Region V
Mr. R. Barr, NRC Resident Inspector (Mail Drop 901A, 2 Copies)
INPO Records Center - Atlanta, GA
Mr. D. L. Williams, BPA (Mail Drop 399)

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Washington Nuclear Plant - Unit 2	0 5 0 0 0 3 9 7	1 OF 7

TITLE (4)

HIGH PRESSURE CORE SPRAY INOPERABILITY CAUSED BY INADEQUATE HPCS PUMP ROOM COOLER FLOW

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	3 1	9 3	9 3	0 1 5	0 0	0 4	3 0	9 3		0 5 0 0 0
										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): 9 7.5

[ ] 20.402(b)	[ ] 20.405(C)	[ ] 50.73(a)(2)(iv)	[ ] 77.71(b)
[ ] 20.405(a)(1)(i)	[ ] 50.36(c)(1)	[X] 50.73(a)(2)(v)	[ ] 73.73(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)	[X] 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	TELEPHONE NUMBER
K. B. Lewis, Licensing Engineer	AREA CODE 5 0 9 3 7 7 - 4 1 4 5

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
[ ] YES (If yes, complete EXPECTED SUBMISSION DATE) [X] NO				

ABSTRACT (16)

At approximately 0714 hours on March 31, 1993, with the plant operating in Mode 1 at 97.5% power, WNP-2 commenced a reactor shutdown and declared an Unusual Event (UE). The reactor shutdown was a result of the High Pressure Core Spray system (HPCS) being inoperable from low Service Water (SW) flow through HPCS pump room cooler RRA-CC-4, coincident with the Reactor Core Isolation Cooling system (RCIC) being inoperable since March 18, 1993. With these two systems inoperable, Technical Specification 3.0.3 was applicable, which forced the shutdown and subsequent declaration of the UE.

Immediate corrective actions for this event included: 1) reperforming and approving an engineering calculation to demonstrate HPCS operability at a lower HPCS pump room cooler flowrate, 2) revising the HPCS-SW flow balancing surveillance to specify the newly calculated, lower flowrate, and 3) rebalancing flow through the HPCS-SW system.

The apparent cause for this event was a system/component deficiency.

There was no safety significance associated with this event. During the time that the HPCS system was considered inoperable, the HPCS system was able to perform its safety function.

Plant Conditions

Power Level - 97.5%
Plant Mode - 1

Event Description

At 0714 hours on March 31, 1993, with the plant operating in Mode 1 at 97.5% power, WNP-2 commenced a reactor shutdown and declared an Unusual Event (UE). The reactor shutdown was a result of the High Pressure Core Spray system (HPCS) being inoperable from low Service Water (SW) flow through HPCS pump room cooler RRA-CC-4, coincident with the Reactor Core Isolation Cooling system (RCIC) being inoperable. With these two systems inoperable, Technical Specification 3.0.3 was applicable, which forced the shutdown and subsequent declaration of the UE.

On March 31, 1993, at 0305 hours, with the plant operating in Mode 1 at 97.5% power, operators began performing surveillance procedure PPM 7.4.7.1.1.3 "HPCS SW Valve Position Verification." This procedure consists of two surveillances. The first surveillance, "Valve Position Verification," is performed monthly to demonstrate HPCS SW system operability per Technical Specification 4.7.1.2.a. This first surveillance was that portion of the procedure scheduled for completion on March 31, 1993. The second surveillance, "Loop Flow Balance", is performed annually to flow balance specific HPCS-SW system loads. This portion of the procedure was not scheduled for performance on March 31, 1993.

An equipment operator completed the required "valve position verification" at 0350 hours. Shortly after completion of this task, the equipment operator observed that the flow of service water flowing through HPCS pump room cooler RRA-CC-4 was reading about 43 gpm. The operator obtained the low reading from flow indicator SW-FI-27. Since this reading was less than the minimum acceptable value specified by the "loop flow balance" portion of the procedure, the operator immediately informed control room management of the situation. Reacting to this information, control room management wrote a PER for immediate disposition to document the problem, initiated an emergency MWR to perform a recalibration of the flow indicator, and apprised the Supervisor, Plant Technical and the Assistant Operations Manager of the low reading.

Between 0500 and 0615 hours on March 31, 1993, I&C technicians recalibrated flow indicator SW-FI-27 to within tolerances specified by the applicable Instrument Master Data Sheet. The I&C technicians subsequently informed control room management that the flow indicator was reading 46 gpm after recalibration. This recalibrated value was still below the acceptable range of "48 gpm to 52 gpm" specified by the "loop flow balance" portion of the procedure. Upon receipt of this information, dayshift control room management declared the HPCS system inoperable Technical Specification Action Statement (TSAS) 3.5.1 and entered TSAS 3.0.3 at 0615 hours. With no relief to this situation, TSAS 3.0.3 would require the control room to begin commencing a reactor shutdown within one hour of entering 3.0.3.

Initial engineering activities associated with the low-flow event took place from about 0400 hours to about 0700 hours on March 31, 1993. At 0400 hours, the Nuclear Steam Supply Shutoff (NSSS) Systems Supervisor began analyzing the problem with several members of the engineering staff via telephone. In parallel with this initial activity, the NSSS Supervisor called an engineer to the plant to reperform "maximum temperature for HPCS room" calculation ME-02-52-43. From that recalculation, the assigned engineer determined that 45 gpm of service water flow through RRA-CC-4 would result in a maximum HPCS pump room temperature of 139.3°F.

Since the resultant maximum room temperature was conservatively below the associated "maximum FSAR temperature of 150°F," a Basis For Continued Operation (BCO) was presented to the Plant Operating Committee (POC). As the POC did not agree to the BCO within the one hour time constraint of TSAS 3.0.3, control room management had to begin shutting down the reactor at 0714 hours. In accordance with Emergency Plan Implementing Procedures, a UE was also declared after the TSAS 3.0.3 shutdown activities actually commenced. At 0721 hours, control room management completed initial notifications of the UE, and at 0735 hours, control room management notified the NRC via the Emergency Notification System (ENS) of the shutdown activities and the UE condition.

At 0737 hours, the Operations Manager informed the Shift Manager that a HPCS pump room cooler flow of 45 gpm had been determined to be acceptable. In response to this communication, control room management verbally approved a deviation to procedure 7.4.7.1.1.3 to change the acceptance criteria for RRA-CC-4 flow. The criteria was changed from "48 gpm to 52 gpm" to "45 gpm to 52 gpm." Additionally, a SW system engineer, who had also begun troubleshooting the low-flow event early on the morning of March 31, 1993, reported to cognizant personnel that flow through the HPCS Diesel Engine heat exchanger DCW-HX-1C, the largest load in the HPCS-SW system, was well above its upper-flow limit. The engineer therefore recommended that the HPCS-SW system be rebalanced to correct the flow problem. At 0740 hours, this surveillance was then reperformed to verify acceptable flow through the cooler. During the surveillance, flow through DCW-HX-1C was reduced to within its procedurally specified range, and flow through RRA-CC-4 increased to 49.5 gpm.

At 0827 hours, the surveillance was completed; flow through all HPCS-SW loads were balanced to within the deviated acceptance criteria, the HPCS system was restored to an operable status, and TSAS 3.5.1 and 3.0.3 were exited. At 0836 hours, the UE was terminated, and at 0840 hours, the NRC was notified of the UE termination.

Immediate Corrective Actions

Immediate corrective actions for this event included the following:

1. An engineering calculation was reperformed and approved to show that operation of the HPCS pump room cooler at a lower flowrate of 45 gpm would not challenge the operability of the HPCS system.

2. The flow balance surveillance was revised to specify a broader range of flow required for the HPCS pump room cooler in accordance with the revised engineering calculation.

3. A flow balance was performed to rebalance HPCS-SW flows to within the revised acceptance criteria of procedure PPM 7.4.7.1.1.3.

Further Evaluation, Root Cause, and Corrective Action

A. Further Evaluation

1. This event was reported as an event "that resulted in declaration of an emergency classification specified in the Licensee's Emergency Plan" in accordance with the requirements of 10CFR50.72.(a)(1)(i). With the High Pressure Core Spray system (HPCS) and the Reactor Core Isolation Cooling system (RCIC) being inoperable concurrently, Technical Specification 3.0.3 was applicable, which forced a reactor shutdown to commence and required subsequent declaration of an Unusual Event.

2. This event was also reported under 10CFR50.73 (a)(2)(v) as a single-train (HPCS) system failure.

3. This event was additionally reported under 10CFR50.73 (a)(2)(i)(B) as a Technical Specification prohibited operational condition.

4. There were no structures, components, or systems inoperable prior to this event which directly contributed to the degraded flow through HPCS pump room cooler RRA-CC-4.

5. On April 22, 1993, an interview was conducted with the equipment operator who initially performed procedure PPM 7.4.7.1.1.3 on March 31, 1993. The equipment operator said that control room management directed him to perform the "valve position verification" portion of the procedure, as well as being directed to ensure flow through each of the HPCS-SW loads was within the criteria of the "loop flow balance" portion of the procedure. The operator checked the flowrates of heat exchanger loads DCW-HX-1C, diesel mixed air cooler DMA-CC-31, and DMA-CC-32, all of which are located in the HPCS diesel engine room. The operator noted that flow through engine cooler DCW-HX-1C was at the high end of the band, but the operator did not perceive the flow to be excessive. The flow instrument that displays this cooler's flowrate fluctuates appreciably, and an "average" reading must be obtained. The operator observed adequate flow through both of the mixed-air coolers.

6. Upon deeming flows through these three coolers to be satisfactory, the operator completed his inspections by verifying flow through HPCS pump room cooler RRA-CC-4. The operator discovered that flow through this cooler was low, so the operator tried to increase its flow by opening HPCS pump room cooler throttle valve SW-V-47 further. However, the operator discovered that the throttle valve was already opened fully, so the operator subsequently informed control room management of the low-flow condition.

B. Root Cause

The apparent cause of this event was of a system/component deficiency. Historically, cognizant personnel have experienced difficulty in interpreting the range of values displayed by the diesel engine heat exchanger's flow instrument. This heat exchanger is the largest load in the HPCS-SW system. If flow through the diesel engine's heat exchanger were increased to compensate for flow interpreted near the low-end of this heat exchanger's flow instrument, then flow through remaining loads could have been inadvertently reduced to unacceptably low values.

C. Further Corrective Action

1. Technical Specification procedure PPM 7.4.7.1.1.3, entitled "HPCS SW Valve Position Verification," has been clarified as follows:

   a. A statement was added to specify the frequency for performing each of the two surveillances within this procedure.

   b. Guidance was added for adjusting flow through the associated HPCS-SW loads.

   c. As a result of an engineering analysis of the low-flow condition, the minimum flow through RRA-CC-4 was changed from 48 gpm to 45 gpm.

2. PPM 7.4.7.1.1.3 will be revised to include only the instructions for performing the "Valve Position Verification" surveillance. This will be completed by June 30, 1993.

3. A separate PPM will be written to include the instructions for performing the "HPCS-SW Flow Balance" surveillance. This will be completed by June 30, 1993.

4. An evaluation will be performed to determine the long term adequacy of existing HPCS-SW flow instrumentation used during performance of the HPCS-SW flow balance surveillance. Results of this evaluation will be implemented in the flow balance surveillance. This will be completed by July 15, 1993.

5. An evaluation will be performed to determine if the HPCS diesel engine heat exchanger's flow

5. An evaluation will be performed to determine if the HPCS diesel engine heat exchanger's flow criteria can be modified to make additional flow available to remaining HPCS-SW loads. Applicable results will be incorporated into the HPCS-SW flow balance surveillance. This will be completed by June 15, 1993.

Safety Significance

There was no safety significance associated with this event. Engineering reperformed "maximum temperature for HPCS room" calculation ME-02-52-43 using a minimum flow of 45 gpm, rather than a value of 48 gpm previously required by the surveillance, as a corrective action for this event. Using a value of 45 gpm, it was determined from the new calculation that the HPCS pump room temperature would increase to a maximum value of 139.3°F. A temperature of 139.3°F is conservative, as the associated Final Safety Analysis Report's (FSAR) maximum temperature value is 150°F. Therefore, during the time that the HPCS system was considered inoperable, the HPCS system could still perform its safety function.

Even if the HPCS pump room had exceeded 150°F and totally incapacitated the HPCS system proper, there would still have been negligible safety significance associated with the event, because the Automatic Depressurization System, Low Pressure Coolant Injection System, and the Low Pressure Core Spray System were able to depressurize the reactor and supply the core with low-pressure emergency coolant during the time HPCS remained inoperable.

Similar Events

There are no other LERs similar to this event.

EIIS Information

Text Reference	EIIS Reference System	EIIS Reference Component
High Pressure Core Spray System	BG	---
Service Water System	BI	---
HPCS Pump Room Cooler	BI	CLR
Reactor Core Isolation Cooling System	BN	---
Flow Indicator	BI	FI
Diesel Engine Heat Exchanger	BI	HX
Diesel Mixed-Air Coolers	BI	CLR
Automatic Depressurization System	JE	---
Low Pressure Coolant Injection System	RHR	---
Low Pressure Core Spray System	BM	---