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 RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 93-012-00: on 930311, Sys Engineer learned that fast open function of Main Turbine BPV was not operable. Caused by less that adequate surveillance procedures. No immediate corrective actions were required. W/930409 ltr.

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April 9, 1993  
G02-93-083

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. 93-012

Transmitted herewith is Licensee Event Report No. 93-012 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)

JWB/REF/jd  
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  
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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)

MAIN TURBINE BYPASS VALVES NOT OPERABLE PER TECHNICAL SPECIFICATION REQUIREMENTS

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	1	1	9	3	0	1	2	0	0	0	0
0	3	1	1	9	3	0	1	2	0	0	0	0
THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)												
OPERATING MODE (9)			1									
POWER LEVEL (10)			0 9 6									
20.402(b)			20.405(C)									
20.405(a)(1)(i)			50.36(c)(1)									
20.405(a)(1)(ii)			50.36(c)(2)									
20.405(a)(1)(iii)			X 50.73(a)(2)(i)									
20.405(a)(1)(iv)			50.73(a)(2)(ii)									
20.405(a)(1)(v)			50.73(a)(2)(iii)									
50.73(a)(2)(iv)			50.73(a)(2)(v)									
50.73(a)(2)(v)			50.73(a)(2)(vii)									
50.73(a)(2)(viii)(A)			50.73(a)(2)(viii)(B)									
50.73(a)(2)(x)			50.73(a)(2)(x)									
77.71(b)			77.71(b)									
73.73(c)			73.73(c)									
OTHER (Specify in Abstract below and in Text, NRC Form 366A)			OTHER (Specify in Abstract below and in Text, NRC Form 366A)									

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
R.E. Fuller, Licensing Engineer	
AREA CODE	
5 0 9 3 7 7 - 4 1 4 8	

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)

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

ABSTRACT (16)

On March 11, 1993, a System Engineer learned that the fast open function of the Main Turbine Bypass Valves (BPV) was not operable between 25% and 35% reactor thermal power as required by the Technical Specifications. This condition was the result of an inappropriate setpoint in the Digital-Electro-Hydraulic (DEH) Turbine Control System. The System Engineer was verifying the DEH setpoints when this condition was identified.

No immediate corrective actions were required because the Plant was above 35% power and the BPVs were operable.

The root cause was less than adequate surveillance procedures because they did not comply with the Technical Specifications.

Engineering evaluations will be performed to determine the appropriate actions required to comply with the Technical Specifications.

The safety significance of this event is negligible. The safety limits to prevent fuel failure from critical heat flux under design basis conditions were not violated nor would they have been under accident conditions. This condition posed no threat to the health and safety of Plant personnel or the public.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION											
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		93	01	2	00	2	OF	5			
TITLE (4) MAIN TURBINE BYPASS VALVES NOT OPERABLE PER TECHNICAL SPECIFICATION REQUIREMENTS											

### Plant Conditions

Power Level - 096%

Plant Mode - 1 (Power Operation)

### Event Description

On March 11, 1993, a System Engineer learned that the fast open function of the Main Turbine Bypass Valves (BPV) was not operable between 25% and 35% reactor thermal power as required by the Technical Specifications. The BPV fast open function is provided by the Digital-Electro-Hydraulic (DEH) Control System that controls the Main Turbine. The setpoint that enabled the BPV fast open function corresponded to 25% of rated electrical load instead of 25% of rated thermal power as required by Technical Specification Section 3.7.9. This condition was identified by the System Engineer while verifying all of the setpoints for the DEH System.

### Immediate Corrective Action

No immediate corrective actions were required because the Plant was operating above 35% rated thermal power and the BPV fast open function was enabled.

### Further Evaluation and Corrective Action

#### A. Further Evaluation

1. This event is considered reportable per 10 CFR 50.73(a)(2)(i)(B) as a condition prohibited by the Plant's Technical Specifications.
2. The Technical Specification surveillance procedure that verifies the DEH setpoint for enabling the fast open function of the BPVs is PPM 7.4.7.9.3, Turbine Bypass System Actuation Instrumentation Channel Calibration. A review of this procedure revealed that the DEH BPV actuation instrumentation monitors the generator electrical output.
3. A review of all revisions to PPM 7.4.7.9.3 since Plant startup indicated that the BPV fast open function enable setpoint always corresponded to greater than or equal to 25% of the rated electrical output. As indicated above, this corresponds to a maximum of 35% of rated thermal reactor power. The difference is due in part to steam extraction for house loads, feedwater heater configuration at the low power levels and heat losses. Therefore, whenever reactor power was between 25% and 35% thermal, the BPV System was not operable as required by the Technical Specifications.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION											
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						9   3		0   1   2		0   0	
TITLE (4)		MAIN TURBINE BYPASS VALVES NOT OPERABLE PER TECHNICAL SPECIFICATION REQUIREMENTS									

4. The basis for the Technical Specification Section 3.7.9, Main Turbine Bypass System, is that the BPV fast open function is required to be operable consistent with the assumptions of the Feedwater Controller (FWC) failure analysis of the cycle specific analysis. The FWC failure event results in a maximum flow demand causing Reactor Pressure Vessel (RPV) water level to rise. This eventually results in a trip of the Reactor Feedwater Pumps (RFPs) and the Main Turbine. Based on Technical Specification Section 3.3.1, a reactor scram occurs from a Main Turbine trip when the reactor thermal power is above 30% of rated thermal power. The fast closing action of the Main Turbine stop and control valves results in increased RPV pressure. The increased feedwater flow cools the RPV inventory. Also, the increased RPV pressure collapses the coolant voids increasing the average density of the coolant. Both effects increase reactivity. The increase in reactivity occurs before the control rods are able to reduce reactivity, which results in increased fuel power. The Main Turbine Bypass System provides pressure relief to reduce reactivity during the FWC failure event to ensure the safety limit Minimum Critical Power Ratio (MCPR) is not violated. The MCPR safety limit assures the burnout heat flux, which causes fuel failure, does not occur under postulated worst case accident conditions of low coolant flow and high fuel power.

B. Root Cause

The root cause of this condition was less than adequate procedures. The surveillance procedure did not ensure compliance with the Technical Specifications.

C. Corrective Action Taken

1. The MCPR operating limits have been increased to ensure the MCPR safety limits are not violated.
2. A project team is currently performing a technical and compliance review of the WNP-2 Surveillance Testing Program. This review will ensure that procedures used to satisfy Technical Specification Surveillance Requirements are technically accurate, and that each Surveillance Requirement is satisfied within Plant procedures. LER 93-010 provides a more detailed description of this project.
3. The normal shutdown procedures, PPM 3.2.1, Normal Shutdown to Cold Shutdown, and PPM 3.2.2, Normal Shutdown to Hot Shutdown, have been changed to limit the time between 25% to 35% thermal power operation to within the Technical Specifications allowed outage time.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION														
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TITLE (4) MAIN TURBINE BYPASS VALVES NOT OPERABLE PER TECHNICAL SPECIFICATION REQUIREMENTS														

#### D. Further Corrective Action

1. A plan will be developed by May 15, 1993, to determine the appropriate actions required to comply with Technical Specification Section 3.7.9.
2. The identified corrective actions required to comply with the Technical Specifications will be implemented prior to the end of the 1993 Refueling and Maintenance Outage.
3. The surveillance procedure, PPM 7.4.7.9.3, will be changed prior to the end of the 1993 Refueling and Maintenance Outage to comply with the Technical Specifications.

#### Safety Significance

The safety significance of this event is negligible. The safety limits to prevent fuel failure from critical heat flux under design basis conditions were not violated.

A review determined the safety analysis for calculating MCPR assumed the BPV fast open function was operable at and above 25% of rated thermal power instead of the actual 35%. Also, LER 93-010 indicated the End-of-Cycle Reactor Recirculation Pump Trip (EOC-RPT) was inoperable due to inadequate component surveillance.

Further evaluation showed the reduced power MCPR limits between 25 and 30 percent thermal power in the WNP-2 Cycle 8 Core Operating Limits Report (COLR 92-8) are based on an incorrect analysis. For reduced power, the FWC failure can be the limiting transient. The FWC failure analysis assumes a scram occurs from turbine throttle valve closure to mitigate the transient at greater than or equal to 25% of rated thermal power. Technical Specification Section 3.3.1, however, states that the Reactor Protection System (RPS) scram signals from turbine throttle valve closure and turbine governor valve fast closure are automatically bypassed when core power is below 30%. Because the scram signal is bypassed below 30% thermal power, the FWC failure analysis assumptions do not apply below 30% thermal power.

The Cycle 9 licensing analysis for the COLR 93-9 shall yield values for the MCPR operating limit which are applicable from 25 to 35 percent of rated thermal power under the operating conditions expected for Cycle 9.

Evaluation of these combined deficiencies indicated the MCPR safety limit would not have been exceeded during postulated worst case accident conditions when operating at the MCPR operating limits. However, the MCPR operating limits referred to in Technical Specification Section 3.2.3, Minimum Critical Power Ratio, were increased to ensure the MCPR safety limits would not be violated. Further review of the operating history of the current fuel cycle, Cycle 8, revealed that for the increased MCPR operating limit the Technical Specification Section 3.2.3 operating limits were not violated. This condition posed no threat to the health and safety of Plant personnel or the public.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION																			
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TITLE (4)		MAIN TURBINE BYPASS VALVES NOT OPERABLE PER TECHNICAL SPECIFICATION REQUIREMENTS																	

### Similar Events

Previous instances involving procedures that were not adequate to satisfy Surveillance Requirements have recently been reported in LERs 91-13, 91-18, 91-19, 91-28, 91-36, 92-02, 92-35, 93-08, and 93-10. Corrective actions have been initiated in response to these previous events in order to resolve programmatic deficiencies involving procedural implementation of Technical Specification Surveillance Requirements.

### EIIS Information

#### Text Reference

Turbine Supervisory Control System  
 Main Turbine Control Fluid System  
 Main Steam System  
 Turbine Bypass System  
 Reactor Protection System  
 Main Turbine System  
 Main Generator System

#### EIIS Reference

<u>System</u>	<u>Component</u>
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JJ  
 TG  
 SB  
 SO  
 JC  
 TA  
 TB