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RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 92-032-01: on 920702, unplanned manual actuation of ESF component due to decrease in reactor water level resulting from voided feedwater piping. Caused by incorrect plant/sys operation. Water level restored. W/920831 ltr.

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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

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August 31, 1992
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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. 92-032-01

Transmitted herewith is Licensee Event Report No. 92-032-01 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. This submittal also fulfills the requirement to provide a Special Report following an ECCS injection, as described in Technical Specifications 3.5.1(f) and 6.9.2.

Sincerely,

AT Harrold for

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

JWB/RJP/cgeh
Enclosure

cc: Mr. J. B. Martin, NRC - Region V
Mr. C. Sorensen, 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)

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TITLE (4)
UNPLANNED MANUAL ACTUATION OF ESF COMPONENT DUE TO DECREASE IN REACTOR WATER LEVEL RESULTING FROM VOIDED FEEDWATER PIPING

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 7	0 2	9 2	9 2	0 3 2	0 1	0 8	3 1	9 2		0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9)	4	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	0 0 0	20.402(b)	20.405(C)	X 50.73(a)(2)(iv)	77.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.73(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	X 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)(x)	Special Report

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
M. P. Reis, Compliance Supervisor	AREA CODE 5 0 9 3 7 7 - 4 1 5 2

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 1312 hours on July 2, 1992, with the plant in Cold Shutdown, reactor water level decreased from normal operating range to +18" when approximately 3400 gallons of Reactor Water Cleanup System (RWCU) return flow was inadvertantly diverted into a voided section of Feedwater System piping. In response, control rod drive cooling flow to the vessel was increased, and RWCU letdown flow was isolated. Vessel water level was recovered and stabilized following manual initiation of injection from the Residual Heat Removal System.

The root cause of this event was incorrect plant/system operation resulting from inaccurate valve position indication that was obtained by implementing a standard practice for throttle valve closure. The event was contributed to by inadequate self-checking of expected equipment response. As corrective action, a caution tag has been placed on the handswitch for the mispositioned valve in order to advise operators, and the limit switches for this valve have been examined and verified to be correctly set. Additionally, limit switches for motor operated valves with long stroke times that do not have a seal-in feature will be evaluated with respect to Operations practices. These valves will be provided with caution tags, as necessary, until the results of this evaluation can be implemented. Also, a description of this event will be incorporated into required reading for licensed operators. The event was not safety significant, and did not involve failure of a plant component or system.

This submittal fulfills the Technical Specification requirement to provide a Special Report following an ECCS injection.

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TITLE (4)
UNPLANNED MANUAL ACTUATION OF ESF COMPONENT DUE TO DECREASE IN REACTOR WATER LEVEL RESULTING FROM VOIDED FEEDWATER PIPING

Plant Conditions

Power Level - 0%
Plant Mode - 4 (Cold Shutdown)

Event Description

At approximately 1312 hours on July 2, 1992, reactor water level decreased from normal operating range to +18" when approximately 3,400 gallons of Reactor Water Cleanup System (RWCU) return flow was inadvertantly diverted into a voided section of Feedwater System piping. Vessel water level was recovered and stabilized following manual initiation of injection from Residual Heat Removal System (RHR) pump, RHR-P-2A. This event is considered a challenge to an ESF component because RHR-P-2A was used to in a manner consistent with its intended ESF function as a Low Pressure Coolant Injection (LPCI) pump.

At the start of the event, an annunciator indicating high differential flow in the RWCU System was received in the Main Control Room. Control Room operators immediately recognized that reactor vessel water level was decreasing, and that receipt of the RWCU high differential flow alarm corresponded with the opening of valve RFW-V-65A (see attached sketch). The RWCU high differential flow alarm was received at 1312 hours, and was the first available indication that RWCU return flow was being diverted.

RFW-V-65A is a 24" motor operated valve located at the inlet to the reactor pressure vessel for Main Feedwater Line "A". RFW-V-65A was in the process of being opened manually in order to support packing ring maintenance when the RWCU high differential flow annunciator was received. It was not possible to operate RFW-V-65A from the Main Control Room because electrical power to the valve operator had been tagged out in order to support maintenance activities.

Operators immediately responded to the decreasing vessel water level condition by increasing control rod drive (CRD) cooling flow to the reactor from CRD pumps. Concurrently, efforts were initiated to contact personnel working on RHR-V-65A in order to effect closure of this valve, and RWCU letdown flow was isolated from the control room in order to limit further inventory loss. Inventory loss, which was approximately 400 gpm, exceeded CRD pump cooling flow, and vessel water level continued to decrease.

At 1317 hours, RHR-P-2A was started in preparation for injection from the suppression pool, and controlled injection was initiated at 1319 hours. Reactor vessel water level had dropped to approximately +18" by this time, but increased immediately following initiation of injection to between +30" and +45". Electrical power to the motor operator for valve RHR-V-65A was restored at 1324 hours. Efforts to manually close the valve were terminated at this time and the valve was subsequently closed from the Main Control Room.

Reactor vessel water level was stabilized at +38" at 1324 hours, and injection from RHR-P-2A was secured at 1325 hours. RHR-P-2A was returned to the shutdown cooling mode at 1325 hours, and CRD cooling flow and RWCU letdown flow were returned to normal values.

In accordance with 10CFR50.72(b)(2)(ii), this event was reported as an unplanned, manual ESF actuation to the NRC Operations Center via the Emergency Notification System at 1450 hours.

Immediate Corrective Actions

As immediate corrective action, reactor vessel water level was restored within normal operating parameters.

Further Evaluation and Corrective Action

Further Evaluation

This event is reportable under 10CFR50.73(a)(2)(iv) as an unplanned manual actuation of an ESF component. RHR pump RHR-P-2A was manually started from the Main Control Room during this event, and did not receive an initiation signal from either the manual or automatic ESF actuation logic. However, this event is considered to be reportable as a challenge to an ESF component because the pump was used in a manner that would normally be associated with its intended ESF design function. This event is also reportable as an ECCS injection under the Special Report requirement described in Technical Specifications 3.5.1(f) and 6.9.2.

An Incident Review Board was convened on July 2, 1992, to investigate the cause of this event. The Board concluded that vessel water loss most probably resulted when flow from the RWCU return line that is connected to Main Feedwater System line "A" was diverted into a voided section of feedwater piping. This conclusion is supported by the rate of vessel water loss, which coincides with the approximately 400 gpm flow rate for the RWCU system, and plant evolutions that were in progress at the time the event was initiated.

At the time of the event, a boundary had been established for work being performed on valve RFW-V-65A by closing valves located on the suction side of the feedwater pumps (COND-V-146A, COND-V-146B, COND-V-144). The boundary had been previously established at valves located closer to RFW-V-65A (RFW-V-112A, RFW-V-112B, RFW-V-109), but was expanded approximately 13 hours prior to the event as a result of unexpected, small reactor water level increases that were noted when RFW-V-65A was opened during the previous control room shift.

Level changes observed by the previous control room shift were caused by flow from the Condensate System, which was operating in the long-cycle cleanup mode, that was leaking through RFW-V-109. Although an opportunity to identify that RFW-V-109 was not fully closed was missed when further investigation of the vessel level increases was not immediately pursued, operators acted within proper constraints when they expanded the boundary for work on valve RFW-V-65A. Information regarding the observed vessel level increases was communicated to the next shift of control room operators.

With the plant in the configuration previously described, it was possible for water trapped between RFW-V-65A and boundary valves located on the suction side of the feedwater pumps to drain into the condensate system via a flow path that existed through RFW-V-109, the feedwater pump discharge check valves (RFW-V-101A, and RFW-V-101B), and the feedwater pump seals.

The decrease in reactor vessel water level that occurred during this event was initiated when valve RFW-V-65A was opened. Opening RFW-V-65A caused RWCU return flow to be diverted from the reactor and into the voided section of feedwater piping. This resulted in annunciation of the RWCU high differential flow alarm, and caused reactor vessel level to decrease because RWCU letdown was still in progress.

The flow path for water that leaked through the feedwater pump seals and into the condensate system terminates at the main condenser hotwell. The effect on condenser hotwell level due to the approximately 3400 gallons involved in this event would have been minimal since the hotwell volume requires approximately 200,000 gallons to affect level by one inch. The main condenser was in level control mode and condensate pumps were running at the time of this event. Therefore, any increase above normal hotwell level would have been routed to the condensate storage tank.

At the time of the event, operators believed that RFW-V-109 was closed. It is standard practice when closing motor operated throttle valves, such as RFW-V-109, for operators to hold the control switch for an additional 10 seconds after closed indication is received in order to assure the valve is fully seated. In accordance with this policy, when boundaries were initially established for work on RFW-V-65A the operator held the control switch for RFW-V-109 for an additional 10 seconds after the closed indication was received.

During post-event investigation it was observed that RFW-V-109 required approximately 33 seconds to achieve full closure after displaying closed position indication. This is in excess of the 10 seconds assumed under the standard practice for throttle valve closure, and as a result, RFW-V-109 remained partially open when closed in this manner. Post-event examination of positioning for the closed limit switch on RFW-V-109 verified that it was set in accordance with motor operator data sheet specifications.

The root cause of this event was incorrect plant/system operation resulting from inaccurate valve position indication that was obtained by implementing the standard practice for throttle valve closure. Although limit switches for RFW-V-109 were set in accordance with data sheet specifications, the valve remained partially open when closed in accordance with the standard practice. This event was contributed to by inadequate self-checking of expected equipment response by the crew that observed vessel water level increases on the shift prior to this event during operation of RFW-V-65A.

The condition described in this report did not involve any structures, components, or systems that were inoperable at the start of the event, nor did it involve failure of plant equipment.

Further Corrective Action

As further corrective action, the closed limit switch for RFW-V-109 was examined and verified to be set in accordance with data sheet specifications, and a caution tag has been placed on the handswitch for RFW-V-109 in order to advise operators that it requires more than 10 seconds to seat following receipt of closed position indication. Additionally, limit switch positions for motor operated valves with long stroke times that do not have a seal-in feature will be evaluated with respect to Operations practices. These valves will be provided with caution tags, as necessary, until the results of this evaluation can be implemented. Also, a description of this event will be incorporated into required reading for licensed operators. Stroke time evaluations and required reading are scheduled for completion by December 31, 1992.

Safety Significance

Personnel actions and safety system and component response were appropriate during recovery from this event. The reactor vessel level transient described in this report was terminated at +18 inches. This is above the automatic initiation setpoints for RPS and ESF protective features. Consequently, this event was not safety significant since more than adequate reactor coolant inventory was available at all times to assure fuel coverage and core cooling capability. However, even if the reactor vessel water level decrease had been more significant, availability of ESF safety functions such as RWCU isolation, Low Pressure Core Spray (LPCS), and the Low Pressure Coolant Injection (LPCI) mode of Residual Heat Removal (RHR) System operation would have been adequate to ensure the safety of the plant and public.

Similar Events

Previous events involving a decrease in reactor vessel water level due to reactor coolant diversion during plant shutdown have been reported in LERs 84-090, 84-091, 85-030, 86-038, and 88-011. None of these events involved reactor coolant loss into voided piping resulting from valve leakage or reliance on incorrect valve position indication.

EIIS Information

Text Reference	EIIS Reference	
	System	Component
Condensate System/Pump	SD	P
Condensate Storage Tank	SD	TK
Main Condenser/Hotwell	SD	COND
Control Rod Drive (CRD) System/Pump	AA	P
Emergency Core Cooling System (ECCS)	BO	--
Engineered Safety Features (ESF) System	JE	--
Main Feedwater System/Pump Seal	SJ	P, SEAL
High Pressure Core Spray (HPCS) System/Pump	BG	P
Low Pressure Coolant Injection (LPCI)	BO	--
Low Pressure Core Spray (LPCS) System	BM	--
Main Control Room	NA	--
Reactor Protection System (RPS)	JC	--
Reactor Water Cleanup (RWCU) System	CE	--
Residual Heat Removal (RHR) System	BO	--

Additional Information

The ECCS injection that occurred during this event involved the "A" LPCI nozzle. Including this actuation cycle, the accumulated number of ECCS cycles recorded to date is as follows:

HPCS Nozzle - 5 actuation/injection cycles
LPCI Nozzle "A" - 1 actuation/injection cycle
LPCI Nozzle "B" - 1 actuation/injection cycle
LPCI Nozzle "C" - 1 actuation/injection cycle

This event did not significantly affect the usage factor for any ECCS nozzle, or cause the usage factor for any ECCS nozzle to exceed 0.70.

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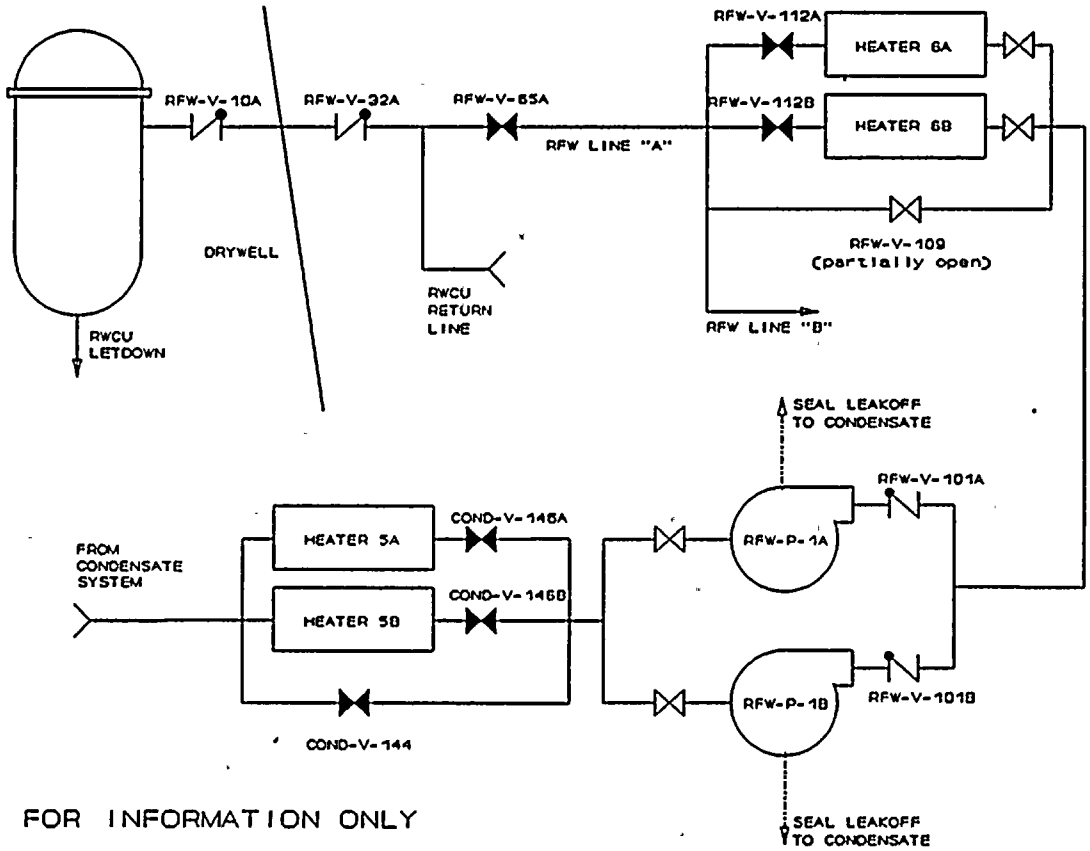
UNPLANNED MANUAL ACTUATION OF ESF COMPONENT DUE TO DECREASE IN REACTOR WATER LEVEL RESULTING FROM VOIDED FEEDWATER PIPING



FOR INFORMATION ONLY

Feedwater System Valve Lineup