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SUBJECT: LER 91-014-00:on 910510,RHR shutdown cooling isolation occurred due to less than adequate design drawing info. Affected drawings revised & tagging sys to indicate sys interrelationship updated.W/910610 ltr.

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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

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

G02-91-118

Docket No. 50-397

June 10, 1991

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

Subject: NUCLEAR PLANT NO. 2
LICENSFE EVENT REPORT NO. 91-014

Dear Sir:

Transmitted herewith is Licensee Event Report No. 91-014 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.

Very truly yours,

J. W. Baker (M/D 927M)
WNP-2 Plant Manager

JWB:ac

Enclosure:
Licensee Event Report No. 91-014

cc: Mr. John B. Martin, NRC - Region V
Mr. C. Sorensen, NRC Resident Inspector (M/D 901A)
INPO Records Center - Atlanta, GA
Ms. Dottie Sherman, ANI
Mr. D. L. Williams, BPA (M/D 399)
NRC Resident Inspector - walk over copy

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NRC FORM 366 (6-89) | U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92
ESTIMATED BURDEN PER RESPONSE TO COMPLY WTH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Washington Nuclear Plant - Unit 2	0 5 0 0 0 3 9 7	1 OF 0 4

TITLE (4) RESIDUAL HEAT REMOVAL SHUTDOWN COOLING CONTAMINMENT ISOLATION ACTUATION DUE TO LESS THAN ADEQUATE DESIGN DRAWING INFORMATION

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 NUMBER(S)
0 5	1 0	9 1	9 1	— 0 1 4	— 0 0	0 6	1 0	9 1		0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9): 5

POWER LEVEL (10): 0 0 0

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

20.402(b)	20.405(c)	X 50.73(a)(2)(iv)	73.71(b)
20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(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)	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
R. Latorre, Manager, Corporate Licensing	AREA CODE 5 0 9 3 7 2 - 5 1 4 2

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

CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)

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

ABSTRACT *(Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines)* (16)

On May 10, 1991 at 2126 hours while the Plant was in Operational Mode 5 (Refueling) with Residual Heat Removal (RHR) Loop B operating in the shutdown cooling mode, an RHR shutdown cooling isolation occurred. This event occurred when a Reactor Protection System (RPS) circuit breaker was opened as part of a clearance order and de-energized relays in the Nuclear Steam Supply Shutoff System (NSSSS). This led to the closure of the RHR shutdown cooling suction line isolation valves. This shutdown cooling isolation was an unplanned automatic actuation of an Engineered Safety Feature (ESF) system.

As immediate corrective actions, Plant Licensed Control Room Operators reestablished shutdown cooling by 2133 hours. The root cause of this event was a less than adequate design drawing. Further corrective action will be to revise the affected drawings and to update the tagging system to indicate this system interrelationship.

There was minimal safety significance associated with the event. At the time of the event the reactor water level was sufficient to provide adequate core cooling for an extended period of time. RHR shutdown cooling was fully restored in seven minutes.

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

Plant Conditions

Power Level - 0%
Plant Mode - 5 (Refueling)

Event Description

On May 10, 1991 at 2126 hours, Control Room Operators received a Residual Heat Removal System (RHR) shutdown cooling isolation. This event occurred when a Reactor Protection System (RPS) circuit breaker was opened de-energizing relays in the Nuclear Steam Supply Shutoff System (NSSSS) logic which led to the closure of the RHR suction isolation valves. The RHR shutdown cooling isolation was an unplanned automatic actuation of an Energized Safety Function (ESF) system.

Plant configuration at the time of the event was such that RHR Loop B was in the shutdown cooling mode with RHR-P-2B pump in service and RHR- V-8 and RHR-V-9 valves open, the normal system lineup. Clearance order implementation was in progress to support planned Control Rod Drive (CRD) system outage work. The clearance order specified opening RPS circuit breakers RPS-CB-2A and RPS-CB-2B as a personnel safety measure to preclude re-energization of the Control Rod Drive Hydraulic Control Unit scram pilot valve solenoids that were to be worked on. RPS drawing 15E047 had been reviewed to verify that RPS circuit breakers CB-2A and CB-2B were associated only with the RPS trip system, and that they would not impact circuit breakers CB-5A and CB-5B associated with the NSSSS isolation logic.

Opening of circuit breaker RPS-CB-2A as specified in the clearance order did not produce any unplanned equipment actuation. However, when circuit breaker RPS-CB-2B on panel C72-P001 was opened, it resulted in the de-energization of manual isolation relays 81B and 81D and a portion of the NSSSS logic system. After the isolation occurred, this design feature was verified on drawings 1E044 and 1E045, continuation drawings of drawing 15E047. Drawing 15E047 shows the logic containing circuit breaker RPS-CB-2B. As confirmed on a fourth drawing, CVI 02- 02B22-05, 13 Sheet 6A, when relay 81B was de-energized the energize-to- close contacts opened which caused RHR-V-8 to close, and when relay 81D was de-energized the energize-to-close contacts opened which caused RHR-V-9 to close.

Closing valves RHR-V-8 and RHR-V-9 removes the suction path to the RHR shutdown cooling loops. Valves RHR-V-8 and RHR-V-9 are also interlocked to trip the RHR pumps when either of the valves is closed. This event caused RHR shutdown cooling to be interrupted for seven minutes.

Immediate Corrective Action

Licensed Control Room Operators responded in an appropriate and timely manner to restore shutdown cooling. They closed the RPS circuit breaker, re-established the shutdown cooling flow path by reopening valves RHR-V-8 and RHR-V-9, restarted pump RHR-P-2B and restored RHR shutdown cooling loop B to operation by 2133 hours, seven minutes after the isolation.

Further Evaluation and Corrective Action

A. Further Evaluation

1. This event is reportable under 10CFR50.72(b)(2)(ii) and 10CFR50.73(a)(2)(iv) as an event or condition that resulted in an unplanned automatic actuation of an Engineered Safety Feature. Reporting of this event to the NRC via the Emergency Notification System was made within four hours as required by Part 50.72.

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

3. The Nuclear Steam Supply Shutoff System is designed to automatically isolate the RHR system to prevent a loss of reactor coolant through a leakage path in the RHR system or in response to a manual isolation signal. This isolation occurred due to the inadvertent de-energization of the 81B and 81D manual isolation relays. The system functioned as designed.

4. The root cause of the event was a less than adequate design drawing in that drawing 15E047, which shows circuit breaker RPS-CB-2B, does not provide adequate information to clearly determine that there is a connection between RPS-CB-2B and the NSSSS logic power. Drawings 1E044 and 1E045, continuation drawings of 15E047, show the isolation relays 81B and 81D effected by RPS-CB-2B but provide no information or references to help determine equipment impacted by these relays. Plant procedures were not the cause of this event.

B. Further Corrective Action

1. Information will be added to the computerized tagging system to indicate that opening of circuit breaker RPS-CB-2B will result in a RHR shutdown cooling isolation due to loss of power to the NSSSS relays 81B and 81D.

2. Drawing 15E047 will be revised to indicate the interrelationship between RPS-CB-2B and the NSSSS. Continuation drawings for RPS-CB-2B from 15E047 will be revised to provide information on equipment effected by NSSSS manual isolation relays 81B and 81D.

Safety Significance

There is minimal safety significance associated with this event. At the time of the event the reactor head was removed and the reactor cavity was flooded to a water level of +501 inches, or 23 feet above the reactor vessel flange. This condition provided sufficient water for core cooling and adequate time to restore RHR shutdown cooling or to initiate an alternate method of decay heat removal. Technical Specification 3/4.9.11 allows the removal from operation of the shutdown cooling pump for up to 2 hours per 8 hour period when the cavity water level is at least 22 feet above the reactor vessel flange. Plant Control Room Operators responded by re-establishing RHR shutdown cooling at 2133 hours, or seven minutes after isolation. All systems operated as designed. This event posed no threat to the health and safety of either the public or Plant personnel.

Similar Events

There have been several previous events associated with the loss of shutdown cooling with one related to a misleading plant drawing. LER 88-015 "Nuclear Steam Supply Shutoff System Isolations Caused By The Inadvertent De-energization Of The Reactor Protection System Bus A Power Supply Due To Personnel Error" described an event involving multiple ESF isolations and actuation. A contributing cause to that event was determined to have been misleading plant drawings and an unusual load center configuration which resulted in an inadequate work package. The current event has a root cause attributed to a specific design and drawing feature. The specific nature of this event resulted in the decision to take the planned corrective actions.

EIIS Information

Text Reference	EIIS Reference	
	System	Component
Residual Heat Removal System (RHR) (Shutdown Cooling Mode)	BO	---
Reactor Protection System	JC	---
Reactor Protection System Circuit Breaker (RPS-CB-2A, RPS-CB-2B)	JC	BRK
Nuclear Steam Supply Shutoff System	BD	---
Nuclear Steam Supply Shutoff System Relays (81B & 81D)	BD	94
RHR Shutdown Cooling Suction Line Isolation Valves (RHR-V-8, RHR-V-9)	BO	ISV
Residual Heat Removal Pump (RHR-P-2B)	BO	P
Control Rod Drive System	AA	---
Control Rod Drive Hydraulic Control Unit Scram Pilot Solenoid Valves)	AA	PSV