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ACCESSION NBR:9108220223 DOC.DATE: 91/08/15 NOTARIZED: NO DOCKET #
FACIL:50-397 WPPSS Nuclear Project, Unit 2, Washington Public Powe 05000397
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RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 91-020-00:on 910716,discovered that RHR valve B capability to shutdown in event of fire could be jeopardized due to hot short in control circuits.Caused by design deficiency.Wiring changes implemented.W/undated ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 6
TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

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Docket No. 50-397

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

Subject: NUCLEAR PLANT NO. 2
LICENSEE EVENT REPORT NO. 91-020

Dear Sir:

Transmitted herewith is Licensee Event Report No. 91-020 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,

RT Harold for

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

JWB:ac

Enclosure:
Licensee Event Report No. 91-020

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

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH 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.

# 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 0 5 |

TITLE (4) Residual Heat Removal (RHR) "B" Valves not Operable Under All Fire Protection (Appendix R) 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 NUMBER(S) |
| 0 7 | 2 6 | 9 1 | 9 1 | 0 2 0 | 0 0 | 0 8 | 1 5 | 9 1 | | 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) | 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) | X 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 |
|---|---|
| | AREA CODE |
| C. L. Fies, Compliance Engineer | 5 0 9 3 7 7 - 2 0 3 9 |

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


On July 26, 1991 an engineering review identified an unanalyzed condition existed in the 10CFR50 Appendix R Fire Protection design. The capability to shutdown the plant in the event of a fire in the main control room could be jeopardized due to a "hot short" in the control circuits associated with the "B" Residual Heat Removal (RHR) valves. This "hot short" would have to occur after the start of the postulated fire while plant operators were traveling to the remote shutdown room from the main control room. After this brief period of time, the transfer switches are activated switching control power from circuits that could be damaged in the control room. It is postulated that during this time the valves could be physically damaged due to loss of the protection provided by the limit and torque switches.

The cause of this event was a design deficiency. The root cause was an inadequate design review.

Corrective action is being taken to prepare a design change and implement wiring changes on the impacted valves.

The event posed no threat to the health and safety of either the public or plant personnel.

## Plant Conditions

Power Level - 0 %
Plant Mode - 4 (cold shutdown)

## Event Description

On July 26, 1991 a FSAR update engineering review identified an unanalyzed condition existed in the 10CFR50 Appendix R Fire Protection design. Appendix R safe shutdown criteria require certain specified safe shutdown equipment to be operable from the remote shutdown panel during and after a control room fire. The wiring for fifteen Residual Heat Removal (RHR) "B" loop valves needed to support alternate shutdown capability were found to be arranged in a configuration where a postulated fire in the control room could create a "hot short" that would bypass the position limit and torque switches associated with each valve. This could cause the valve to operate in an uncontrolled manner if the valves were operated in a manner where limit and torque switches were required. This could only occur during the brief time before the transfer switches were activated on the remote shutdown panel. After the transfer switch is activated power to the limit and torque switches associated with this equipment is transferred from the control room to another power supply not impacted by the fire. The following valves and their functions were impacted by this postulated event:

| | |
|---|---|
| RHR-V-3B | B RHR Heat Exchanger Shell Side Outlet |
| RHR-V-4B | B RHR Pump Suction From Suppression Pool |
| RHR-V-6B | B Shutdown Cooling Suction |
| RHR-V-8 | Shutdown Cooling Suction Outboard Isolation |
| RHR-V-9 | Shutdown Cooling Suction Inboard Isolation |
| RHR-V-16B | B Lower Drywell Spray Outboard Isolation |
| RHR-V-24B | B Suppression Pool Cooling Return |
| RHR-V-27B | B Suppression Pool Spray |
| RHR-V-42B | RHR B Low Pressure Coolant Injection (LPCI) |
| RHR-V-47B | RHR B Heat Exchanger Shell Side Inlet |
| RHR-V-48B | RHR B Heat Exchanger Shell Side Bypass |
| RHR-V-49 | RHR B Discharge to Radwaste |
| RHR-V-53B | RHR B Shutdown Cooling Return |
| RHR-FCV-64B | RHR B Minimum Flow Valve |
| RHR-V-68B | RHR B Standby Service Water Discharge |

## Immediate Corrective Action

Immediate corrective action was taken to initiate a design change to rewire the valves. Since the plant was in cold shutdown, no special actions were required in response to this deficiency.

## Further Evaluation and Corrective Action

### A. Further Evaluation

1. This event is being reported per the requirements of 10CFR50.73(a)(2)(ii)(A) as, "Any.....condition.....that resulted in the nuclear power plant being.....in an unanalyzed condition that significantly compromised plant safety....."

2. The specific requirement that is not being met is stated in Appendix F, Page F.4-8a of the FSAR. It states that, "For a design basis fire in the Main Control Room the Operator will use the Appendix R remote Shutdown System (as described in F.4.4.3.3). Following a Main Control Room evacuation; before operation of the remote shutdown transfer switches, an analysis indicates that the results of spurious signal failures are limited to loss of power supplies and blown fuses, such failures will be overridden by the transfer switches." A review of the impacted valve circuits provided some assurance that the fuses and thermal overloads that were used would protect the electric motor on the valve operator even when the valve limit and torque switches have been bypassed. This, however, was not adequate to show that the valve's operator would not damage the valve. Bypassed limit and torque switches could cause the valves to back-seat open or slam closed and compromise the valve's integrity.

3. The root cause of the event was a design deficiency that should have been discovered by the Supply System during previous reviews.

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

### B. Further Corrective Action

1. A Design Change (91-0287) was prepared to detail the wiring changes necessary to eliminate the possibility of a "hot short" caused by a fire in the control room prior to transfer switch actuation.

2. Work packages (AR 5224 through AR 5238) are being prepared and implemented for the valves involving wiring in the valve motor operator compartments, the motor control center compartments and the remote shutdown panel.

3. There is no further corrective action identified specific to the design deficiency. This event is considered to be an isolated case that should have been identified previously.

Items 1. and 2. will be completed prior to plant startup from the current extended maintenance and refueling outage.

## Safety Significance

WNP-2 was originally designed with two independent and redundant remote shutdown panels [the Remote Shutdown Panel (C61-P001) and the Alternate Remote Shutdown Panel (E-CP-ARS)] in response to 10CFR50, Appendix A, Criterion 19. When 10CFR50 Appendix R was issued it only required one qualified means of shutdown and the Remote Shutdown Panel was chosen to meet this requirement. As a result, the equipment associated with C61-P001 is the only equipment "analyzed" to the requirements of Appendix R. If the equipment associated with the Remote Shutdown Panel (specifically the "B" RHR loop) were postulated to fail, as is the case for the event described in this LER, other equipment is available to safely shutdown the plant. Although not specifically analyzed, E-CP-ARS would be available in the event of a fire in the control room assuming no other failures are postulated. It provides the equipment (including power transfer switches) necessary to operate the RHR "A" decay heat removal loop and its associated equipment.

In addition to the redundancy, other factors can be cited to show a low safety significance for this event. The probability of a fire in the control room serious enough to cause a "hot short" is low because of the protection provided by the Halon 1301 system. Further, the exposure to the fire is for the limited time that it takes for the plant operator to activate the transfer switches on the remote shutdown panel. Finally, the "hot short" itself on the specific circuits of concern is an event of low probability.

The health and safety of the public and plant personnel was not affected by this event.

## Similar Events

LERs 84-031 (Revisions 0, 1, 2, 3, 4, 5 and 6), 85-043, 88-022, 88-026 and 90-006 have previously been written on this subject. These LERs reported a variety of problems discovered during the review of the Appendix "R" analysis and installation performed by the Architect-Engineer for WNP-2, Burns and Roe. The requirement to review circuits prior to operation of the remote transfer switches was derived from generic letter 86-10 which was issued sometime after Appendix R. The event reported in this LER should have been identified previously in the reviews that were performed by the Supply System.

## EIIS Information

| Text Reference | EIIS Reference System | Component |
|---|---|---|
| Residual Heat Removal (RHR) | BO | - |
| RHR-V-3B, B RHR Heat Exchanger Shell Side Outlet | BO | V |
| RHR-V-4B, B RHR Pump Suction From Suppression Pool | BO | V |
| RHR-V-6B, B Shutdown Cooling Suction | BO | V |
| RHR-V-8, Shutdown Cooling Suction Outboard Isolation | BO | V |
| RHR-V-9, Shutdown Cooling Suction Inboard Isolation | BO | V |
| RHR-V-16B, B Lower Drywell Spray Outboard Isolation | BO | V |
| RHR-V-24B, B Suppression Pool Cooling Return | BO | V |
| RHR-V-27B, B Suppression Pool Spray | BO | V |
| RHR-V-42B, RHR B Low Pressure Coolant Injection (LPCI) | BO | V |
| RHR-V-47B, RHR B Heat Exchanger Shell Side Inlet | BO | V |
| RHR-V-48B, RHR B Heat Exchanger Shell Side Bypass | BO | V |
| RHR-V-49, RHR B Discharge to Radwaste | BO | V |
| RHR-V-53B, RHR B Shutdown Cooling Return | BO | V |
| RHR-FCV-64B, RHR B Minimum Flow Valve | BO | FCV |
| RHR-V-68B, RHR B Standby Service Water Discharge | BO | V |
| Remote Shutdown Panel (C61-P001) | - | PL |
| Alternate Remote Shutdown Panel (E-CP-ARS) | - | PL |