Docket No. 50-397

50.55(e) Report

Washington Public Power Supply System

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Docket No. 50-397

November 23, 1982
G02-82-945

Mr. R. H. Engelken
Regional Administrator
U.S. Nuclear Regulatory Commission
1450 Maria Lane, Suite 210
Walnut Creek, California 94596

Subject: NUCLEAR PROJECT NO. 2
10CFR50.55(e) REPORTABLE CONDITIONs #208 - REMOTE SHUTDOWN PANEL AND #209 - PUMP DISCHARGE PRESSURE SWITCH

In accordance with the provisions of 10CFR50.55(e), your office was informed, by telephone, of the above subject conditions on August 19, 1982 and August 20, 1982, respectively. Attachments A and B provide the Project's interim reports on these conditions. We will continue to provide your office with quarterly updates on the subject conditions until such time as they are resolved. The next report will be submitted on or before February 28, ~~1982~~ 1983.

If there are any questions, please contact Roger Johnson, Project QA Manager, WNP-2, at (509) 377-2501, extension 2712.

for R. G. Matlock
Program Director, WNP-2

MER/kd

Attachments: A. Interim Report - 10CFR50.55(e) #208
B. Interim Report - 10CFR50.55(e) #209

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ATTACHMENT A

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
NUCLEAR PROJECT NO. 2
DOCKET NO. 50-397
LICENSE NO. CPPR-93
REMOTE SHUTDOWN PANEL
10CFR50.55(e) #208

INTERIM REPORT

Description of Deficiency

GE design criteria (22A3085, Sec. 4.1) states that "the remote shutdown system shall be designed to control the required shutdown systems from outside the control room irrespective of shorts, opens, or grounds in control circuits (in the control room)" which we have committed to in the FSAR (Sec. 7.4.1.4.b).

The remote shutdown panel controls loop B of the standby service water (SSW). During a Human Factors Engineering Review, it was discovered that there did not exist any controls on the remote shutdown panel to operate valve SW-PCV-38B. During a subsequent review, it was further discovered that the Supervisory Control Panel CS-2, which controls valves SW-V-2B, SW-V-12B and SW-V-69B, received its power from the control room.

Analysis of Safety Implication

If the control room is evacuated and it becomes necessary to bring the reactor to cold shutdown, the spray ponds may not be available. Reactor decay heat would be dumped to the suppression pool which ultimately would lead to overpressurization of the primary containment.

Corrective Action

The design of the remote shutdown panel has been reviewed and no other deficiencies have been identified. Control switches for SW-PCV-38B will be located on the remote shutdown panel and power to the supervisory panel will be supplied from outside the control room. Project Engineering Directives (PED's) will be issued for the required modifications by December 1, 1982.

ATTACHMENT B

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
NUCLEAR PROJECT NO. 2
DOCKET NO. 50-397
LICENSE NO. CPPR-93
RHR PUMP DISCHARGE PRESSURE SWITCH
10CFR50.55(e) CONDITION #209

INTERIM REPORT

Description of Defect

On the discharge side of the Residual Heat Removal (RHR) and Low Pressure Core Spray (LPCS) pumps are redundant pressure switches (RHR-PS-16A, B & C, RHR-PS-19A, B & C, LCS-PS-1 and LPCS-PS-9) with nominal setpoints of 100 psig for RHR 150 psig for LPCS. Their function is to "tell" the Automatic Depressurization System (ADS) that the low pressure ECCS pumps are running. This permissive is needed before the ADS depressurizes the reactor vessel in a post-LOCA situation. On the discharge side of the HPCS pump is pressure switch HPCS-PS-12 with a nominal setpoint of 120 psig. Its function is to "tell" the HPCS minimum flow valve, HPCS-V-12, that the HPCS pump is running. This signal, in series with a low flow signal from HPCS-FIS-6, will open the minimum flow valve. The present installed locations for all these pressure switches may subject them to water hammer and disable them such that they cannot meet their safety function.

These pressure switches all have sensing points upstream of their respective pump discharge check valves at about El. 422'. During normal plant operation, with the ECCS pumps in standby mode (not running), they will "see" the static head of the suppression pool, whose minimum elevation is 466' - 0 3/4". All the pressure switches are located on racks whose elevation is greater than suppression pool water level. They are as follows:

PRESSURE SWITCH	INSTRUMENT RACK	FLOOR ELEVATION OF RACK
RHR-PS-16A	H22-P018	501'
RHR-PS-16B	H22-P021	501'
RHR-PS-16C	H22-P021	501'
RHR-PS-19A	H22-P018	501'
RHR-PS-19B	H22-P021	501'
RHR-PS-19C	H22-P021	501'
HPCS-PS-12	H22-P024	471'
LPCS-PS-1	H22-P001	471'
LPCS-PS-9	H22-P001	471'

For the instrument racks on El. 501', the instrument tubing is approximately 250' long and runs up to El. 516' before hooking into the pressure switch at approximately EL. 505' (see attached sketch). For the instrument racks on El. 471', the instrument tubing is approximately 200' long and runs up to approximately El. 490' before hooking into the pressure switch at approximately El. 475'.

During normal plant operation, the sensing lines cannot be completely filled with water because the suppression pool can only fill it to El. 466'. With an air pocket in the sensing line, the pressure switch will not actuate at the required setpoint if it had been compensated for the static head difference between the sensing point and the pressure switch. This in itself is not a significant safety issue because the switch will trip early, although how early has not been determined. It would be difficult to accurately compensate for the air pocket due to the sensing line's tortuous routing and intermediate high point. However, there is a potential for water hammer in the sensing lines which could damage the pressure switches and not allow the ADS to function or the HPCS minimum flow valve to open.

Analysis of Safety Implications

If water hammer disables the pressure switches, then a substantial safety hazard could be created during a small break LOCA scenario. Using design basis accident assumptions, the HPCS is assumed to fail after a small break. The reactor remains pressurized so that the low pressure systems (RHR and LPCS) cannot inject. At reactor water Level 1 (just above the active fuel), the ADS two-minute timer is started and waits for water level to recover. Because HPCS is assumed to fail, water level continues to drop until the timer times out. The ADS logic then verifies that the RHR and LPCS pumps are running before it depressurizes the reactor. If the pressure switches are disabled at the start of the accident due to water hammer during pump start, no verification will occur and the reactor will not automatically depressurize. Manual depressurization can still occur, but using design basis accident assumptions, it cannot be taken credit for at least 10 minutes. With no automatic depressurization, we would be outside the safety analysis of FSAR Chapter 6 for a small break accident.

Failure of the HPCS pressure switch due to water hammer could cause a significant hazard in a small break scenario in which HPCS maintains reactor water level up to Level 8 trip. At level 8, the HPCS injection valve closes and the pump is supposed to go into minimum flow recirculation. However, with HPCS-PS-12 damaged and unable to verify "pump running," the minimum flow valve will not open. The HPCS pump can damage itself such that no high pressure makeup is available. Now the plant is in the same situation described in the previous paragraph.

Corrective Action

The instrument sensing line root valves will be relocated to points downstream of the ECCS pump discharge line check valves. Those portions of the lines are maintained under pressure by a water-leg pump. Project Engineering Directive (PED) 220-I-0950 was issued on October 27, 1982 to relocate the root valves downstream as stated above.