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REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8712220129 DOC.DATE: 87/12/17 NOTARIZED: NO DOCKET #
FACIL:50-261 H.B. Robinson Plant, Unit 2, Carolina Power & Light C 05000261
AUTH.NAME AUTHOR AFFILIATION
CROOK,D. Carolina Power & Light Co.
MORGAN,R.E. Carolina Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 87-030-00:on 871202,nonredundant power supply to redundant vital equipment due to original sys design.

W/8 ltr.

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TITLE: 50.73 Licensee Event Report (LER), Incident Rpt, etc.

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	RGN2 FILE 01	1	1			
EXTERNAL:	EG&G GROH,M	5	5	FORD BLDG HOY,A	1	1
	H ST LOBBY WARD	1	1	LPDR	1	1
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NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2	0 5 0 0 0 2 6 1	1 OF 0 6

TITLE (4)

NON-REDUNDANT POWER SUPPLY TO REDUNDANT VITAL EQUIPMENT DUE TO ORIGINAL SYSTEM DESIGN

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

OPERATING MODE (9)	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)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10) 1 0 0	20.405(a)(1)(i)	50.36(c)(1)	X 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
David Crook, Specialist - Regulatory Compliance	AREA CODE 8 0 3 — 3 8 3 - 1 1 7 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)

ABSTRACT

On December 2, 1987, at 1230 hours, a potential for a common failure was identified whereby the Safety Injection and Residual Heat Removal (SI/RHR) Systems may not be able to be shifted from the injection phase to the recirculation phase within the three minutes required by Emergency Operating Procedures (EOP) to restore post-accident flow to the Reactor Coolant System.

Two redundant valves in the SI/RHR System (SIS-863A and B), of which one is required to be open for recirculation mode, contain interlocks which are supplied power by a single vital power supply, creating a potential single failure that could prevent the valves from remotely opening from the Control Room. It was determined that there was not reasonable assurance that once this condition was recognized, manual operation of one of the valves would be completed within the three minute time frame required by EOPs.

The cause of this condition, which existed since original construction, is attributed to inadequate design of the systems' interlock logic power arrangement.

An Auxiliary Operator was immediately assigned the specific responsibility to manually open the valves if necessary. A temporary modification was installed to jumper the interlock, which is being procedurally controlled, until more permanent corrective action can be implemented. The licensee notified the NRC of this condition on December 2, 1987, at 1605 hours. This report is submitted in accordance with 10CFR50.73(a)(2)(v).

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TEXT *(If more space is required, use additional NRC Form 366A's)* (17)

I. DESCRIPTION OF EVENT

On Wednesday, December 2, 1987, at 1230 hours, with the Plant operating at 100 percent (%) power, the result of an evaluation of an "Operating Plant Feedback Notice" from the NSSS supplier for H. B. Robinson Unit No. 2,[1] determined that a potential existed under certain conditions whereby the Safety Injection/Residual Heat Removal Systems[2] may not be able to be shifted from the injection phase to the recirculation phase within the three minutes required by Emergency Operating Procedures. Specifically, it had been determined that an interlock involving each of two redundant valves between these two systems, although provided with an emergency power supply, was not protected against a single failure of the power source.

In the recirculation mode, the Residual Heat Removal (RHR) pumps take suction from the containment sump and supply the Safety Injection (SI) and Containment Spray (CS) pumps[3] (see Figure 1). In order to set up this arrangement, valves SIS-862A and B[4] must close to prevent backflow to the Refueling Water Storage Tank[5], and valves SIS-863A and B[6] must open to provide water to the SI and CS pumps. A pressure interlock[7] is installed in this system to avoid depressurizing the Reactor Coolant System to the Refueling Water Storage Tank and/or overpressurizing the low pressure portions of the SI System during normal cooldown operation with the RHR system. This interlock is intended to prevent these valves from opening until RHR system pressure is below 210 psig as measured by Pressure Control Instrument PC-600 (for valves SIS-862A and B) and Pressure Control Instrument PC-601 (for valves SIS-863A and B). It should be noted that the interlock does not affect valve closure and that reopening of SIS-862A and B is not required in any credible accident situation. Therefore, the interlock has no effect on the post-accident function of these valves.

It was the lack of an emergency power supply to similar pressure instruments at a separate, licensed plant that prompted the NSSS supplier notification to H. B. Robinson.

[1] H. B. Robinson Unit No. 2 is a Westinghouse Pressurized Water Reactor Nuclear Power Plant in commercial operation since March 1971.
[2] EIIS Codes: System - BP; Component - Not Available, Manufacturer - W120.
[3] EIIS Codes: System - BE; Component - P, Manufacturer - I075
[4] EIIS Codes: System - BE; Component - V, Manufacturer - A391
[5] EIIS Codes: System - BQ; Component - TK, Manufacturer - W120
[6] EIIS Codes: System - BE; Component - V, Manufacturer - A200
[7] EIIS Codes: System - BP, Component - IEL, Manufacturer - Not Available

PC-600 and PC-601 are supplied from Instrument Bus 4, Circuit 18[8]. This instrument bus is normally supplied power from Motor Control Center MCC-6[9] which receives its power from Emergency Bus E2. Therefore, although vital, a single failure to Instrument Bus 4 could potentially prevent valves SIS-863A and B from remotely opening from the Unit No. 2 Control Room as the valve interlocks rely on relays which must be energized for the valves to open.

Following review of this condition along with the procedure requirement to initiate recirculation mode (either SIS-863A or B open) no greater than three minutes after the injection phase is terminated, it was decided that, without prior knowledge of the condition, there was not reasonable assurance that once this condition was recognized manual operation of one of these valves could be completed within the required time frame. The NRC was notified of this condition by the licensee via the Emergency Notification System (ENS) on December 2, 1987, at 1605 hours, persuant to 10CFR50.72(b)(2)(iii).

II. CAUSE OF EVENT

The original design of the SI and RHR systems assumed that all Emergency Core Cooling System pumps could be stopped for up to ten minutes while aligning valves for the switchover from the injection phase to the recirculation phase under Post-LOCA conditions. An evaluation of this configuration by the NSSS supplier on May 12, 1987, determined that the execution of this procedure could not be demonstrated to meet the 10CFR50.46 criteria for Emergency Core Cooling. Based on Plant specific calculations, H. B. Robinson Emergency Operating Procedures were revised June 6, 1987, to limit to a maximum of three minutes the interruption of flow during switchover. At this time it was not recognized that the original design of the system's interlock logic and power arrangement was inadequate in that a failure of one vital power source (Instrument Bus 4) could prevent the valves from being opened from the Control Room. Although 10 minutes could be argued as sufficient time to recognize valve inoperability and successfully manually open one, there was no reasonable assurance that the valves could be manually operated within the three minute time frame.

III. ANALYSIS OF EVENT

The following is an exerpt from the H. B. Robinson Unit No. 2 Final Safety Analysis Report, Section 6.3.1.3, concerning the Emergency Core Cooling System:

> "The System is effective in the event of loss of normal Plant auxiliary power coincident with the loss of coolant, and can accommodate the failure of any single component or instrument channel to respond actively in the system."

[8]EIIS Codes: System - ED; Component - BU; Manufacturer - W120
[9]EIIS Codes: System - ED; Component - MCC; Manufacturer - W120

With Pressure Control Instrument PC-601 supplied from Instrument Bus 4, a loss of that bus would necessitate manual operation to open SIS-863A and B. Therefore, loss of power to or failure of either the relay or the pressure switch in the circuit would prevent remote opening of both valves.

These valves are normally closed as their standby position, and are required to open to align cold leg recirculation. Approximately 30 minutes of injection occurs under worst case conditions prior to the time switchover occurs. In order to meet the criteria of 10CFR50.46 the switchover must be completed and flow reinitiated within three minutes. Without knowledge of the common failure situation, the identification of the valve inoperability upon loss of Instrument Bus 4 and the dispatching of an operator to manually operate one of the valves may have taken more than three minutes. The consequences of such a delay would be dependent on the actual time required; this has not been analyzed.

Based on a review of Unit No. 2 Emergency Operating Procedures, it was determined that the alignment process and the Plant conditions present at the time of alignment would prevent the RHR pumps from developing a discharge pressure above the controlling value of 210 psig. This, in effect, makes the present 210 psig interlock unnecessary for overpressurization concerns at the time of switchover to cold leg recirculation. Therefore, jumpering the interlock under normal operations to assure valve operability under accident conditions will satisfy single failure criteria described in the Final Safety Analysis Report.

IV. CORRECTIVE ACTIONS

Upon determination that there was not reasonable assurance that the failure of the valves to remotely function as required would be recognized, an Auxiliary Operator was immediately assigned the specific responsibility to manually operate the valves if needed under accident conditions. Since approximately 30 minutes transpires prior to switchover, this would assure that at least one valve could be opened within the three minute period during switchover.

In addition, a temporary repair was implemented to place a jumper for valves SIS-863A and B. The jumper will be removed when a more permanent corrective action is implemented. This will be accomplished during an outage of sufficient length once the modification has been developed.

As a precaution, Plant Operating Procedures have been revised to add steps to remove the jumper prior to initiating normal cooldown via the RHR system, and to reinstall the jumper at isolation of the RHR system in the Plant heatup process. This will provide the needed protection for the SI and Containment Spray Systems during these conditions.

Since reopening of SIS-862A and B is not required in any credible accident situation and the interlock has no effect on the post-accident function of these valves, the interlock circuitry for SIS-862A and B is not an immediate design concern. This condition will be corrected, however, when the permanent corrective action for SIS-863A and B is implemented.

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

V. ADDITIONAL INFORMATION

A. Failed Component Identification:

There were no failed components associated with this condition.

B. Previous Similar Events:

There are no known prior LERs associated with RHR/SI valve interlock logic power supplies.

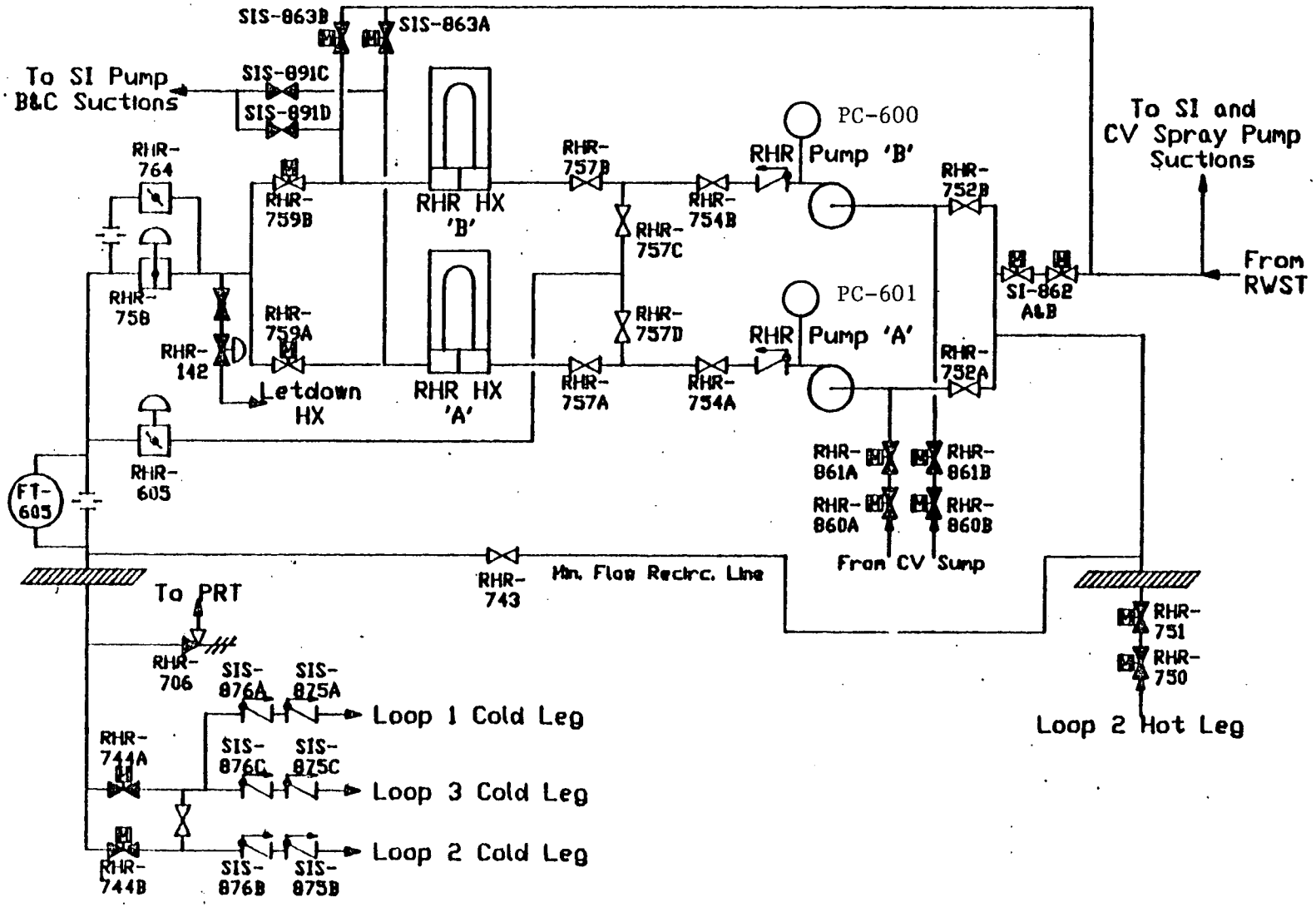

FIGURE 1

Residual Heat Removal System
Standby Lineup

CP&L
Carolina Power & Light Company

ROBINSON NUCLEAR PROJECT DEPARTMENT
POST OFFICE BOX 790
HARTSVILLE, SOUTH CAROLINA 29550

DEC. 17 1987

Robinson File No: 13510C

Serial: RNPD/87-5941
(10 CFR 50.73)

United States Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261
LICENSE NO. DPR-23
LICENSEE EVENT REPORT 87-030-00

Gentlemen:

The enclosed Licensee Event Report (LER) is submitted in accordance with the Licensee Event Report System of 10 CFR 50.73 and the recommendations of NUREG-1022 and Supplements No. 1 and 2.

Very truly yours,

R. E. Morgan
General Manager
H. B. Robinson S. E. Plant

RDC:lko

Enclosure

cc: Dr. J. Nelson Grace
Mr. R. Latta
INPO

IE22
1/1