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AUTH.NAME AUTHOR AFFILIATION
UTLEY,E.E. Carolina Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
SCHWENCER,A. Operating Reactors Branch 1

SUBJECT: Forwards suppl to 790306 request for amend to License DPR-23, in response to NRC 791003 request for addl info re safety injection block switch. Westinghouse performed analysis stating generic nature of issue & applicability.

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CP&L
Carolina Power & Light Company

February 1, 1980

FILE: NG 3514(R) SERIAL: NO-80-166

Office of Nuclear Reactor Regulation
ATTENTION: Mr. A. Schwencer, Chief
Operating Reactors Branch No. 1
United States Nuclear Regulatory Commission
Washington, D. C. 20555

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261
LICENSE NO. DPR-23
SUPPLEMENT TO REQUEST FOR LICENSE AMENDMENT - SAFETY INJECTION BLOCK SWITCH

Dear Mr. Schwencer:

This supplement to our March 6, 1979, request for License Amendment is submitted in response to the NRC staff's request of October 3, 1979, for additional information concerning the Safety Injection Block Switch.

The H. B. Robinson Technical Specifications presently allow the automatic initiation of safety injection on Pressurizer Low Pressure to be manually blocked when the plant is <2000 psi. When the block for Pressurizer Low Pressure is initiated, the switch also blocks SI initiation on High Differential Pressure between any Steam Line and the Steam Line Header. On March 6, 1979, CP&L submitted a Technical Specification change request to address the blocking of the Steam Line ΔP signal.

The NRC staff telephoned CP&L on October 3, 1979, expressing concerns and requesting additional information on the subject Block Switch. The concerns and responses to the concerns are as follows:

Concern No. 1 Protection for a steam line break is afforded by safeguards initiation from Containment Pressure, Steam Line ΔP, or High Steam Flow/Low Steam Pressure or Low Tavg. Is there an analysis that shows that in all cases, protection is provided if the steam line ΔP protection is removed below 2000 PSIG?

CP&L Response Westinghouse Electric Corporation performed an analysis for the Beaver Valley Power Station Unit No. 1 because of similar concerns expressed by the NRC on their request for amendment to their operating license. Please reference their Docket No. 50-334 submittal: "Response to Request for Additional Information Concerning Technical Specification Change Request No. 35." The enclosed Westinghouse letter

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states the generic nature of this issue and supports the applicability of the analysis to H. B. Robinson Unit No. 2. This referenced Beaver Valley analysis demonstrates that if the steam line ΔP signal is blocked, protection is provided in all cases for a steam line break below 2000 PSIG; core cooling capability is maintained and the reactor coolant system remains subcooled. However, the Westinghouse letter states that H. B. Robinson must meet the same criteria as Beaver Valley to qualify the Steam Line Break Protection as being adequate. The criteria and the HBR assurances for meeting the criteria are as follows:

Criterion No. 1: Following a steam line break during heatup or cooldown, while all automatic SI signals are blocked, criticality is precluded assuming the best reactive RCCA stuck in the fully withdrawn position.

This criterion is met at H. B. Robinson in the following manner:

H. B. Robinson Plant Operating Manual Volume No. 4, General Procedure GP-6, meets this requirement. It requires boration to cold shutdown conditions below 547°F, which requires the RCS pressure to be greater than 2000 PSIG (the point of permissible block of SI).

Criterion No. 2: Sufficient indications are available to the operators to diagnose and correct the loss of charging flow during a postulated steamline break accident when automatic SI signals are blocked.

This criterion is met at H. B. Robinson in the following manner:

The H. B. Robinson RTGB gage and alarm indications, for assuring that operators can adequately diagnose loss of charging flow, are as follows:

RTGB Indication	RTGB Alarms
Charging Pump Flow	Charging Pump high/low speed
Charging Pump Discharge Pressure	
Pressurizer level	Charging Pump motor overload/trip
Pressurizer pressure	Pressurizer low level
RC system pressure	LP letdown line high temperature

Criterion No. 3: Demonstrate that a significant amount of time is available before the RCS reaches saturation for the existing steamline break assuming no charging flow is available throughout the transient.

This criterion is met at H. B. Robinson in the following manner:

Based on the Beaver Valley analysis, Westinghouse estimated a time of ten minutes for H. B. Robinson (without an analysis performed for HBR). This satisfies this requirement. Also, Westinghouse's estimated time is conservative because of their initial conditions. 1120 PSIG and 547°F are assumed for the steamline break initiation while the SI block was in effect; H. B. Robinson's Plant Operating Manual Volume No. 15, "Heatup and Cooldown Curves," limit the Pressure-Temperature relationship beyond that assumed in the Beaver Valley analysis.

Criterion No. 4: Assure that the core is not uncovered as a result of coolant shrinkage during a steamline break while SI is blocked, assuming charging is not available.

This criterion is met at H. B. Robinson in the following manner:

Based on the system volume and operating inventory, H. B. Robinson meets this criterion.

Concern No. 2 Is there only one block switch for both trains of safeguards, and if so, is it single failure proof?

CP&L Response The block switch does affect both trains. However, due to its construction, it is single failure proof. The switch (GEMCO Model No. 404) has a single shaft (non-metalic) which actuates the two trains via separated and isolated sections of the switch. The sections of the switch are well insulated from one another by a physical barrier such that a failure in one section would not affect the other.

Concern No. 3 If there is only one switch, does it influence any other signals used for safeguards initiation?

CP&L Response A circuit diagram and description of the operation of the block is attached (Attachment A). As indicated above, the one switch does initiate two separate block features. However, both blocks are utilized at the same time for the same reason and under no circumstances would either be used independently. Therefore, the fact that two blocks are actuated from one switch is of no consequence.

Carolina Power & Light Company believes that the above information adequately addresses the concerns presented and requests that review and issuance of the License Amendment proceed. If you have further questions on this matter, please contact my staff.

Yours very truly,

E. E. Utley
Executive Vice President
Power Supply and Customer Services

FJH/mf
Enclosures

OPERATION OF MANUAL BLOCK FOR LOW PRESSURIZER PRESSURE AND HIGH STEAM LINE DIFFERENTIAL OF SAFETY INJECTION INITIATION

Sequence:

1. Pressurizer Pressure below 2000 psi causes outputs from comparators PC-455B, PC-456B and PC-457B in the analog control racks.

2. These outputs energize relays PC-455B-X1, PC-456B-X1 and PC-457B-X1 in "A" train and PC-455B-X2, PC-456B-X2 and PC-457B-X2 in "B" train causing their contacts to close.

3. This turns on a status light on the Control Board indicating permissive to block SI initiation from Low Pressurizer Pressure and High Steam Line Differential, which are necessary for a normal shutdown.

4. The operator closes the SI Block switch on the control board. Positive DC voltage is supplied through the permissive logic, the SI unblock switch which remains closed, the block switch to relay SIB1 in train "A" and SIB2 in train "B".

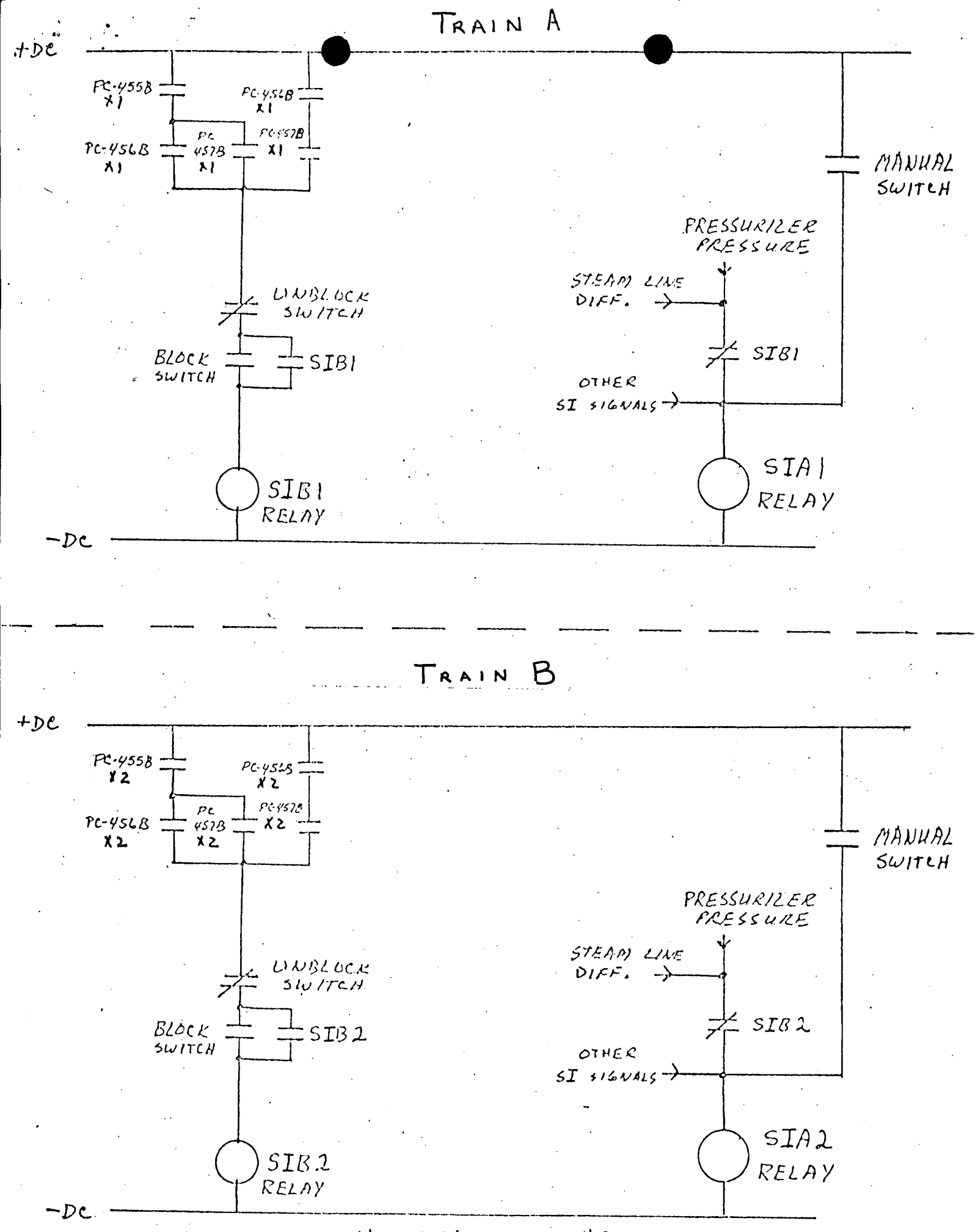
5. These relays energize and a N.O. contact which is now closed is used in parallel with the block switch to seal the blocking relays in the energized position. A N.C. contact from each relay which is wired into the SI actuation relay circuits is now open. This prevents the SI actuation relays from being energized from Low Pressurizer Pressure or High Steam Line Differential signals.

6. Other SI initiation signals, including the manual switch on the control board, are not blocked.

Unblock Sequence:

1. Should the control operator desire to remove the SI block, he turns the control switch to the unblock position. This opens the N.C. contact labeled Unblock and de-energizes the blocking relays by breaking the power circuits. The contacts of the relays SIB1 and SIB2 return to their de-energized position which removes the breaks in the SI actuation circuits of both trains.

2. The normal unblock sequence though would be the automatic unblock when the Pressurizer Pressure reaches 2000 psi. This causes the comparators in the analog control racks to de-energize their outputs which drops out the permissive relays in the safeguard trains. The permissive contacts open and when a 2 out of 3 is reached, the power circuit to the blocking relays is opened and the blocking relays in both trains de-energize. This, as in step 1, removes the block to the SI actuation relay and the seal-in contact around the block switch leaving the circuitry set up properly for power operation.



H. B. Robinson Unit #2

Low Pressurizer Pressure / Steam Line Δp — Block Switch

Westinghouse
Electric Corporation

January 9, 1980

CPL-80-505

Mr. R. B. Starkey, Jr., General Manager
H. B. Robinson SES Plant
Carolina Power & Light Company
P. O. Box 790
Hartsville, South Carolina 29550

Dear Mr. Starkey:

CAROLINA POWER & LIGHT COMPANY
H. B. ROBINSON UNIT 2
CPL STEAMLINE BREAK PROTECTION

In response to your letter reference RSEP79/1395 dated December 19, 1979 we offer the following information:

A comparison between the Beaver Valley proposed system modification and the present H. B. Robinson steamline break protection logic reveals that for both systems during heatup and cooldown operations, only steamline isolation is available to mitigate the consequences of a main steamline break. Table 1 gives a function by function comparison of signals available during heatup and cooldown for the H. B. Robinson plant and proposed system for Beaver Valley Unit No. 1.

The change was shown to be acceptable for the Beaver Valley Unit provided the following criteria were met:

1. Following a steamline break during heatup or cooldown while all automatic SI signals are blocked, criticality is precluded assuming the most reactive RCCA stuck in the fully withdrawn position.

2. Sufficient indications are available to the operators to diagnose and correct the loss of charging flow during a postulated steamline break accident when automatic SI signals are blocked.

3. Demonstrate that a significant amount of time is available before the RCS reaches saturation for the existing steamline break assuming no charging flow is available throughout the transient.

4. Assure that the core is not uncovered as a result of coolant shrinkage during a steamline break while SI is blocked, assuming charging is not available.

H. B. Robinson must provide the same assurances in order for the NRC to approve the acceptability of the existing protection logic. We feel that this can be accomplished in the following manner, as was done for Beaver Valley:

1. Provide a Technical Specification which requires boration to the cold shutdown concentration prior to blocking SI on any of the following:

   a. Hi steam flow and low steam pressure or low Tavg.

   b. Steamline differential pressure.

   c. Low pressurizer pressure.

   This will assure that the analysis presented in the H. B. Robinson FSAR bounds all postulated breaks during heatup and cooldown by assuring a return to criticality.

2. Provide a list of indications available (alarms, annunciators, gages, etc.) to alert the operator that charging was lost while SI was blocked during a postulated excessive cooldown during a heatup or cooldown operation. The information provided by Beaver Valley can serve as a guideline, but H. B. Robinson will be responsible for verifying the applicability of the Beaver Valley Response to their plant.

3. Based upon the relative sensitivity of the high negative steamline pressure rate circuit (Beaver Valley) and the High Steamline Flow circuit (H. B. Robinson), Westinghouse feels that a significant amount of time will also be available before the potential exists to reach saturated conditions for the H. B. Robinson plant. An analysis, however, for the specific time to reach saturation has not been done for Robinson, although it is estimated that it would be approximately 10 minutes for the most severe case using the same assumptions as the Beaver Valley analysis. This time can be extended if H. B. Robinson can demonstrate as Beaver Valley did, that a typical cooldown does not approach saturation conditions as closely as the Westinghouse analysis assumes (approximately 450F margin to saturation at the time the break is assumed to occur).

4. Westinghouse can, based upon the relative system volumes and operating inventories of the Beaver Valley and H. B. Robinson plants, substantiate that the core will remain covered allowing a complete cooldown from no-load conditions assuming that neither charging nor SI is available.

January 9, 1980

CPL-80-505

Should you have any questions or need any further information, please do not hesitate to contact this office.

Very truly yours,

R. S. Longdon

R. S. Longdon, Manager
Southern Service Region
Nuclear Service Division

RSL/D. J. Richards

attachment

cc: R. M. Coats
E. G. Holloway
B. H. Webster
B. J. Furr
J. F. Halifax

TABLE 1

COMPARISON OF AVAILABLE PROTECTION FUNCTIONS
FOR STEAMLINE BREAK DURING HEATUP AND COOLDOWN

FUNCTION	PROVIDED BY:	
	BEAVER VALLEY	H. B. ROBINSON
Safety Injection	HI-1 Containment Pressure	HI Containment Pressure
Steamline Isolation	HI-2 Containment pressure	HI-HI Containment Pressure
	High Negative Steam pressure Rate	High Steamline Flow