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SUBJECT: Forwards addl info supporting LOCA/false LOCA Tech Spec review currently underway, per 900727 ltr.

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MAR 11 1991

Director of Nuclear Reactor Regulation
Attention: Dr. W.R. Butler, Project Director
Project Directorate I-2
Division of Reactor Projects
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUSQUEHANNA STEAM ELECTRIC STATION
LOCA/FALSE LOCA TESTING -
ADDITIONAL INFORMATION FOR
TECHNICAL SPECIFICATION CHANGE REVIEW
PLA-3531 FILE R41-2, A17-2

References: *PP&L's PLA-3416 dated July 27, 1990*
NRC letter to H.W. Keiser dated February 20, 1991

Dear Dr. Butler:

Per request documented in the above referenced letter, please find enclosed the additional information (item by item) to support the LOCA/False LOCA Technical Specification review currently underway.

Should you have any questions or require further information, please contact Mr. A.K. Maron at (215) 774-6536.

Very truly yours,

H. W. Keiser

Attachments

cc: ~~Document Control Desk (original)~~
NRC Region I
Mr. G.S. Barber, NRC Sr. Resident Inspector
Mr. J.J. Raleigh, NRC Project Manager

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**LOCA/FALSE LOCA
ADDITIONAL INFORMATION**

1. LOCA/FALSE LOCA INTERLOCKS:

Upon initiation of a LOCA in one unit, all the RHR and the Core Spray (CS) pumps in that unit start in accordance with Table 8.3-1b (attached). Interlocks, in the form of relays and relay contacts, are provided to prevent the start of the corresponding RHR or CS pumps in the non-affected unit. The reason for using these interlocks is to prevent overloading the 4kV buses, overloading the D/G's, (in case LOOP occurs) and to assure that in case a LOCA occurs in both units, enough cooling capacity is available for both units. Whenever, a LOOP occurs, all the RHR pump motor buses and all the CS pump motor buses, in both units, will be fed by the four diesel generators at the site. Since operation of all these pumps, under the LOOP condition, will overload the D/G's, interlocks are provided between corresponding RHR and CS pumps in both units, to prevent the D/G's overloading. There is no interlock between the D/G's. Therefore, if LOOP is accompanied by LOCA or LOCA/False LOCA, all the RHR pump and the CS pump buses will energize, however, interlocks between the corresponding pumps prevent operation of certain pumps. If LOCA in one unit is followed by a LOCA or false LOCA in the other unit, the interlocks between the two similar RHR and CS pumps will shed 2 RHR and 2 core spray pumps of each unit and sequentially start 2 RHR and 2 CS motors. As shown in Table 8.3-1b, shedding of 2 RHR and 2 CS pumps in each unit is performed in order not to exceed the utilization voltage limitation of connected equipment and to provide at least the minimum core cooling requirement of both units. If LOCA/False LOCA is accompanied by LOOP, these interlocks prevent overloading the D/G's. Overloading the D/G's not only will result in the failure of the D/G's, but also will result in unavailability of the RHR and the CS pumps when they are depending on the D/G's. (Calculation SE-B-NA-027, Rev. 0)

2. DISTINCTION BETWEEN REAL LOCA SIGNAL AND FALSE LOCA SIGNAL:

To the plant initially, both signals are identical. However, a false LOCA signal is an injection of a LOCA signal into the non-accident unit ECCS logic when a LOCA in actuality does not exist. Other plant parameters, such as; actual drywell pressure, vessel water level, vessel pressure level will support or refute the original signal.

3. FSAR SECTIONS:

7.3.1.1a.6.5	Bypasses and Interlocks
8.3.1.3.10	Automatic Loading and Load Shedding
15.6.5	Loss-Of-Coolant Accident - Inside Containment
6.3	Emergency Core Cooling System



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4. FUNCTIONAL DRAWINGS FOR INTERLOCK LOGIC, INCLUDING EXPLANATION:

RHR AND CORE SPRAY INTERLOCKS

The attached diagrams indicate the interlocks and trip logic currently present in the RHR and Core Spray systems. The Unit 1 and Unit 2 pumps within the LPCI system are interlocked such that a Unit 1 and corresponding Unit 2 pump cannot operate at the same time. This part results in the other interlocks present which are indicated by the solid and dotted lines within the corresponding diagrams. For a LOCA in Unit 1, Diagram 1 shows that all operating RHR pumps in Unit 2 are tripped. Diagram 2 indicates that all operating Unit 1 pumps are tripped on LOCA in Unit 2.

The case of the design basis event LOCA-false LOCA is more complicated. In the case when LOCA signals are present in both units (Diagram 3 Bottom) the dotted lines indicate that Unit 1 C and D RHR pumps and the Unit 2 A and B RHR pumps are tripped (if running) and prevented from re-starting. The solid lines indicate that RHR pumps A and B in Unit 1 and C and D in Unit 2 start and run. The automatic response system cannot detect which unit has the LOCA and which unit has the erroneous signal, therefore, operator action is required to allow the unit to respond more correctly to the LOCA sequence.

The core spray interlocks (Diagram 3 Top) are similar. Any time a LOCA signal is generated in Unit 1, a trip signal is sent to Unit 2 core spray pumps A and C which trips them if they are running. Similarly, if a LOCA signal is generated in Unit 2, core spray pumps B and D in Unit 1 are tripped, if running. These trip signals are generated in the same manner when a LOCA signal is present in both units. (Technical Report No. NPE-84-002)

5. EXISTING SURVEILLANCE PROCEDURES:

Existing surveillance procedures indicating 18 month testing interval is included in each title. *NOTE:* Only the first few pages are included since the remaining volumes are the actual checklist.

TABLE 8.3-1b

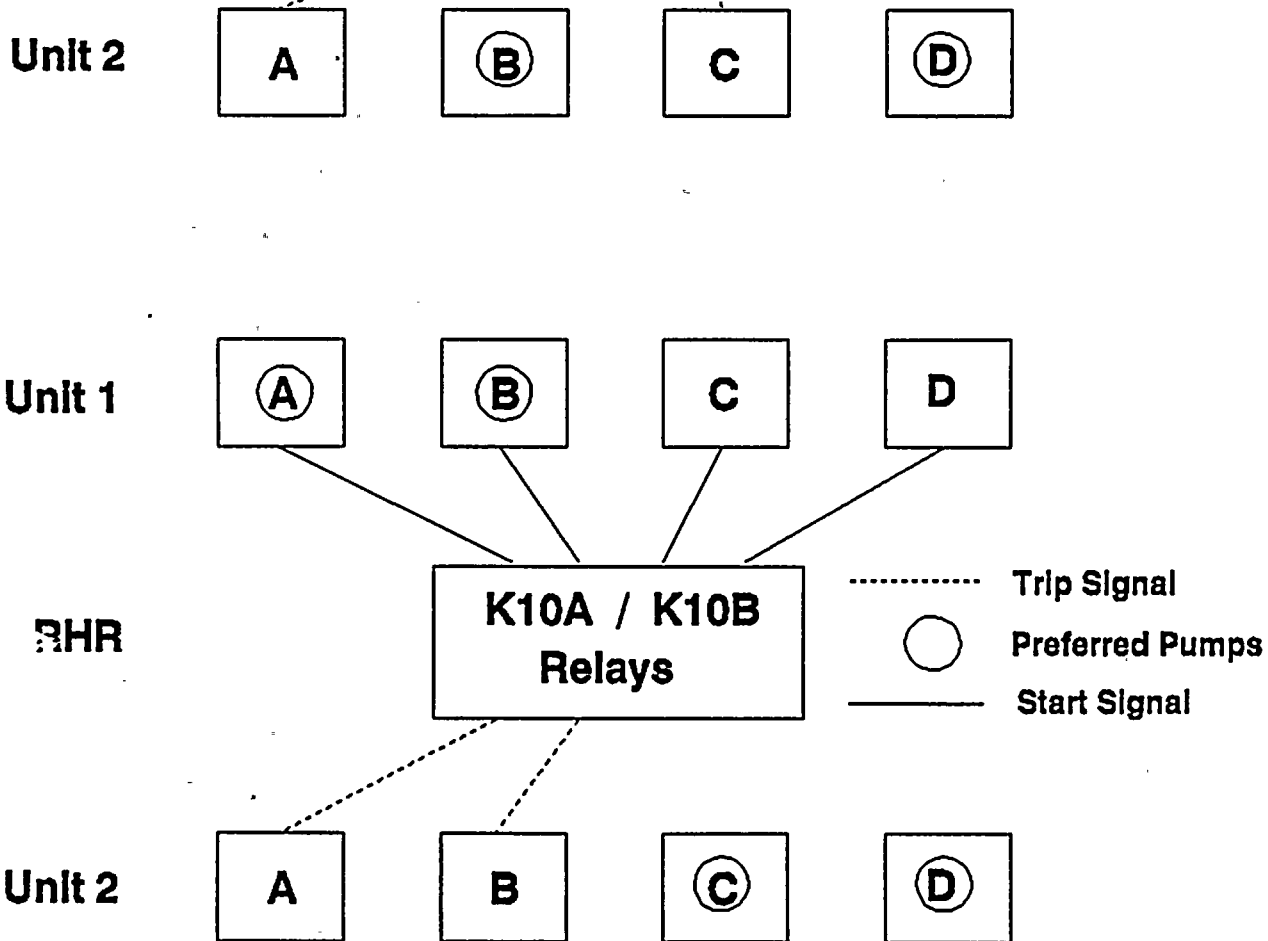
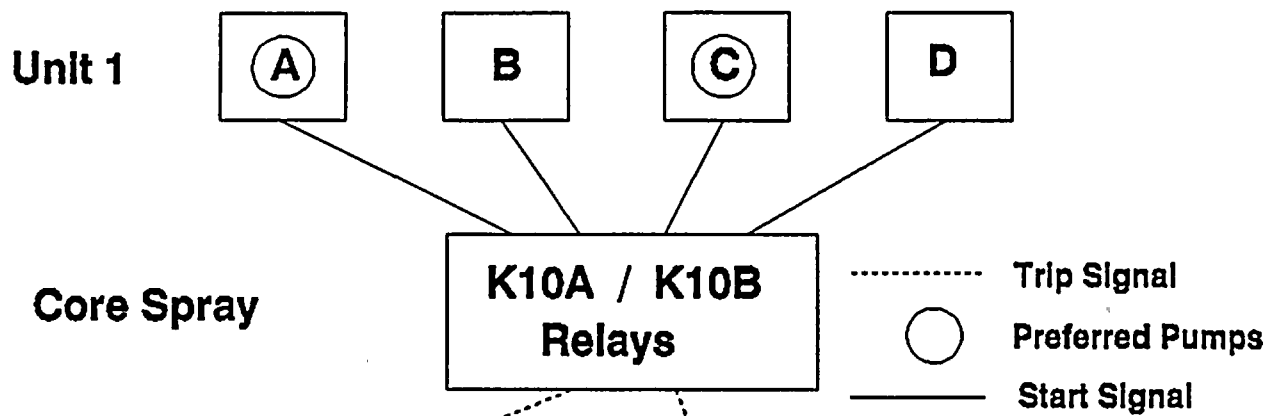
Supplement to Table 8.3-1

EVENT	POWER SUPPLY AVAILABLE								
	2 Offsite Power Supplies			1 Offsite Power Supply			Standby Diesel Generator		
	0 sec	7.5 sec	15 sec	0 sec	7.5 sec	15 sec	0 sec	13 sec	20.5 sec
LOCA in one unit (either unit)	RHR A RHR B	RHR C RHR D	CS A CS B CS C CS D	RHR A RHR B	RHR C RHR D	CS A CS B CS C CS D		RHR A RHR B RHR C RHR D	CS A CS B CS C CS D
LOCA in one unit and false LOCA in other unit	RHR 1A RHR 1B	RHR 2C RHR 2D	CS 1A CS 1C CS 2B CS 2D	RHR 1A RHR 1B	RHR 2C RHR 2D	CS 1A CS 1C CS 2B CS 2D		RHR 1A RHR 1B RHR 2C RHR 2D	CS 1A CS 1C CS 2B CS 2D

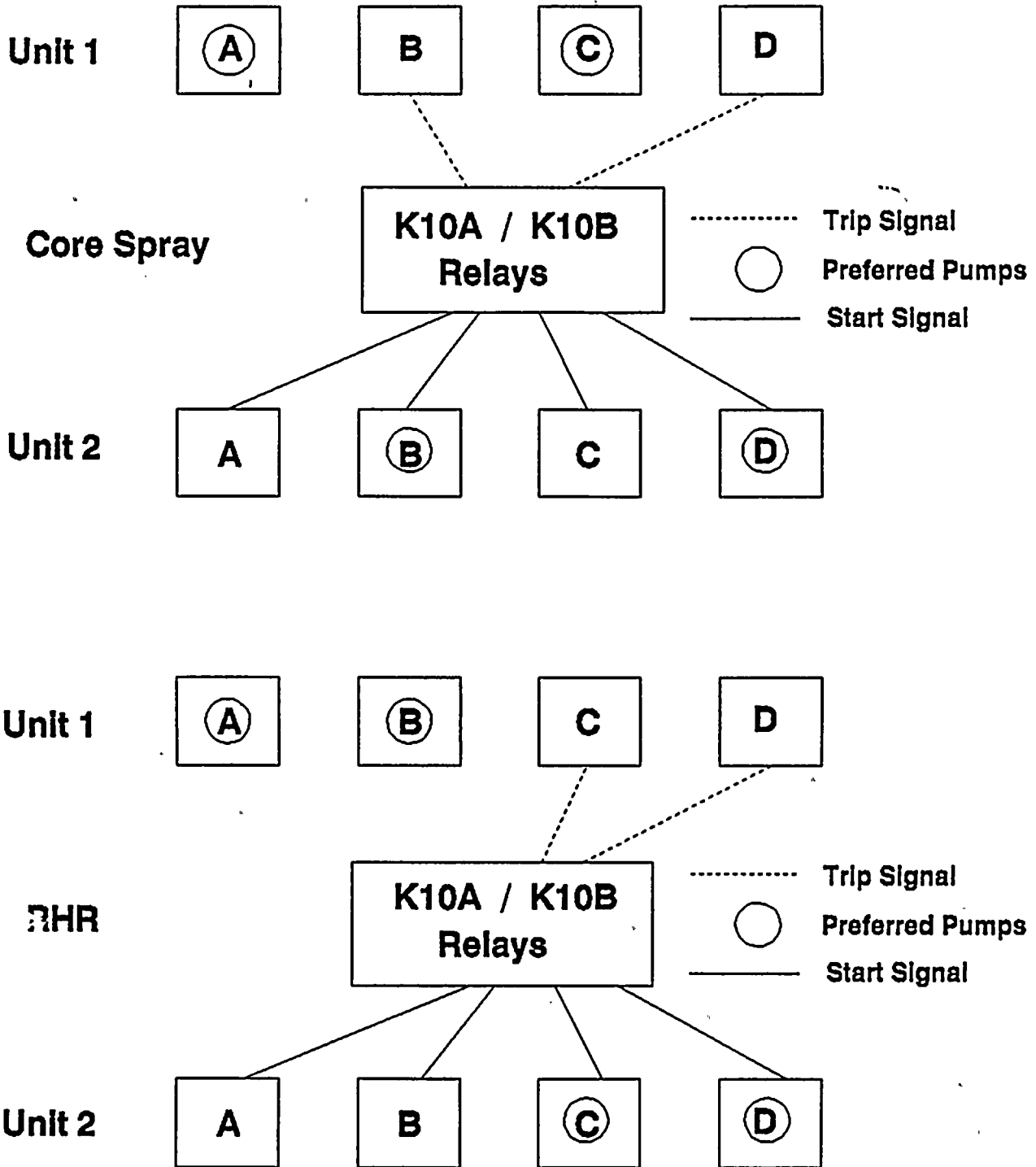
NOTES:

1. Time shown from LOCA (or false LOCA).
2. With 2 offsite power supplies available, Loads A & C are on one supply while B & D are on the other

LOCA Unit 1



LOCA Unit 2



LOCA Unit 1 / False LOCA Unit 2

