

MAR 8 1988

MEMORANDUM FOR: J. Nelson Grace, Regional Administrator  
Region II

FROM: Charles E. Rossi, Director  
Division of Operational Events Assessment  
Office of Nuclear Reactor Regulation

SUBJECT: POTENTIAL GENERIC ISSUE - RHR VALVE INTERLOCK  
POWER SUPPLIES

We have reviewed your memorandum dated December 22, 1987, regarding the subject potential generic issue. We concur with your analysis of the design deficiency and the need to notify licensees who may be unaware of the potential problem. However, based on the following information we do not believe an information notice is warranted at this time due to a lack of generic applicability.

As was noted in your draft information notice, Westinghouse is aware of the problem and has issued an operating feedback notice (OFN) to all of its nuclear customers. In addition, two affected Westinghouse plants (Turkey Point and H. B. Robinson) have reported the problem on the INPO's ELECTRONIC NETWORK. The BWR plants are not affected by this particular design problem. NRR (ICSB) has also confirmed by discussion with plant engineers and review of system drawings that the CE plants do not use a similar arrangement of the RHR and HHSI pumps, and are not affected by this problem. NRR has contacted two B&W facilities and has been informed that in one case (ANO-1) the plant does have a similar ECCS arrangement but the pressure transmitters are powered by separate safety grade power supplies. The other facility (SMUD) reported that they do not have the pressure interlocks on the affected valves and are therefore not affected. The remaining four B&W plant sites will be notified by a separate letter and will be requested to have their plants review the information you have provided us for applicability.

Based on the above information, we therefore do not believe an information notice is warranted at this time. If you have any questions, please contact my office.

15.1

Charles E. Rossi, Director  
Division of Operational Events Assessment  
Office of Nuclear Reactor Regulation

CONTACT: Peter Wen, NRR  
492-1172

DISTRIBUTION

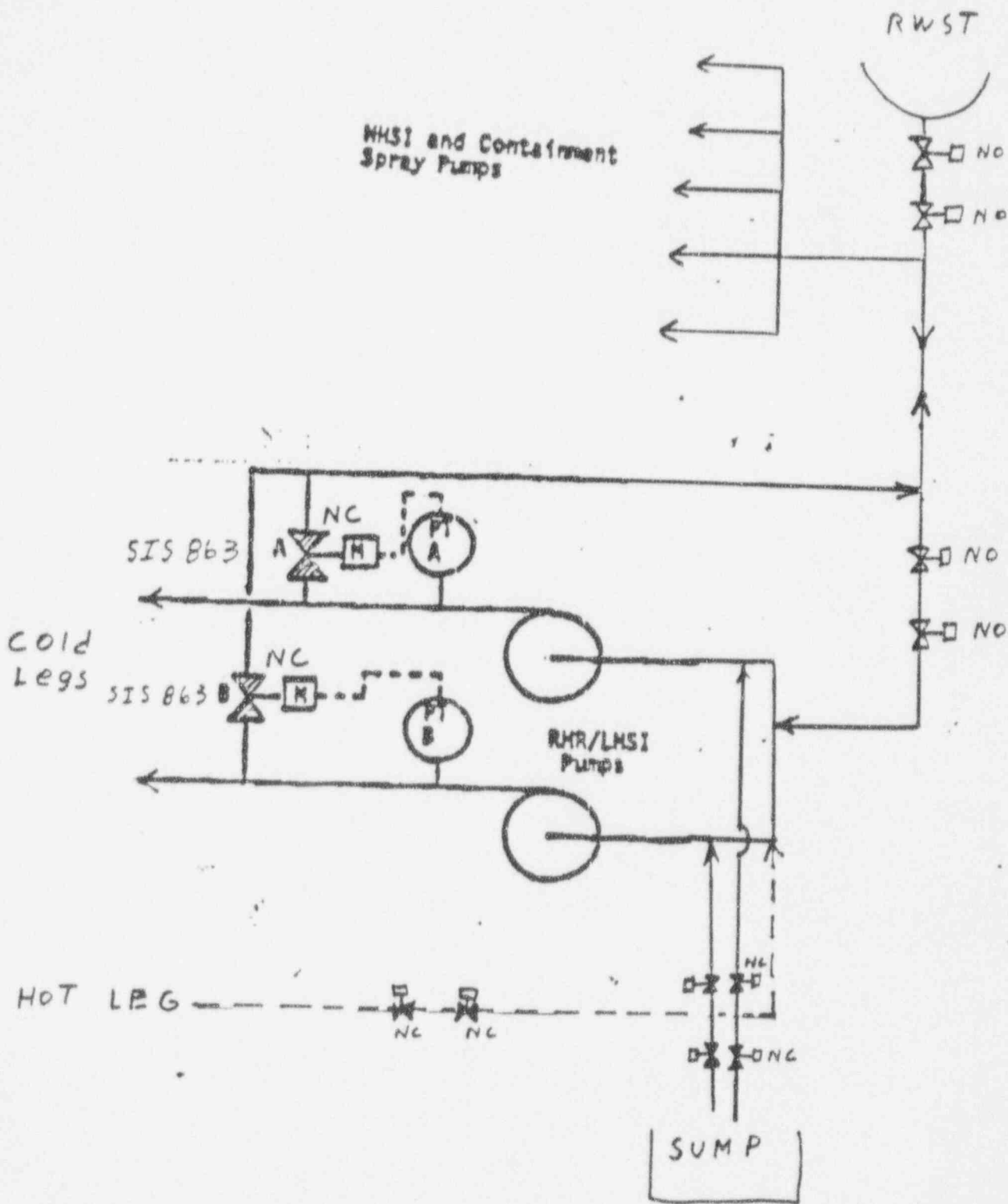
TMartin, NRR  
CHBerlinger, NRR  
EJButcher, NRR  
WTroskoski, EDO  
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DCS  
OGCB R/F

CERossi, NRR  
PCWen, NRR  
WDLanning, NRR  
JCStewart, NRR  
Central Files  
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\*SEE PREVIOUS CONCURRENCE

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XA  
D/DOEA-BRR  
LERossi  
03/17/88



H.B. ROBINSON ECCS

6/2/7



Westinghouse  
Electric Corporation

Power Systems

1110162

Energy Systems  
Service Division  
Box 286  
Pittsburgh, Pennsylvania 15230-0286

10 16680

Mr. R. E. Morgan, General Manager  
Carolina Power and Light Company  
H. B. Robinson, SEG Plant  
P. O. Box 790  
Kartsville, South Carolina 29550

please contact me.

November 3, 1987  
CPL-87-616

Sincerely,

Dear Mr. Morgan:

Carolina Power & Light Company  
H. B. Robinson Unit 2  
Operating Plant Feedback - Non-vital Power  
Supply Used in Valve Interlock Logic

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The purpose of this letter is to make you aware of a safety concern identified at an operating plant which has similar design features to your plant.

The potential problem involves the capability to establish post-LOCA recirculation flow. Please refer to the attached sketch. During certain accidents, a flow path from the containment sump through the Residual Heat Removal/Low Head Safety Injection (RHR/LHSI) pumps, to the High Head Safety Injection (HHSI) pumps is required. To establish this flow path, valves A or B must be opened. However, valves A and B are also interlocked with pressure transmitters A and B, respectively. The interlock logic includes a feature such that these valves cannot be opened when the RHRS pressure is above about 200 psig to 250 psig. The intent of this interlock logic is to insure that valves A and B remain closed during normal RHRS cooldown operation. This precludes the possibility of overpressurizing the lower pressure piping in the suction of the HHSI and Containment Spray Pumps.

For the operating plant, the pressure transmitters A and B were powered from non-vital power. The situation resulted in the potential where valves A and B could be blocked from opening if the non-vital power failed, even though the valves were powered from separate emergency power.

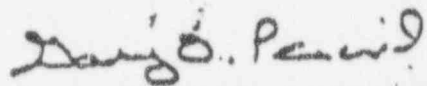
It is recommended that you review the current interlock logic and power arrangements for the subject valves and instrumentation to insure that failure of non-vital power still allows both valves to be opened. It is acceptable for the single failure of emergency power to preclude one valve from being opened.

November 3, 1987  
Page 2

If remote valve operation cannot be assured, several interim changes could be made to allow continued plant operation. These include bypassing the interlock logic or manual operation of the valves using the handwheel. (Note: The corresponding emergency procedure should reflect any changes.) Longer-term solutions include changing power supplies or modifying the interlock logic.

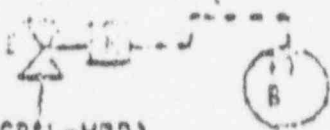
Should you have any questions, please contact me.

Sincerely,



G. O. Percival, Project Manager  
Carolina Area

Attachment  
HT/3520G



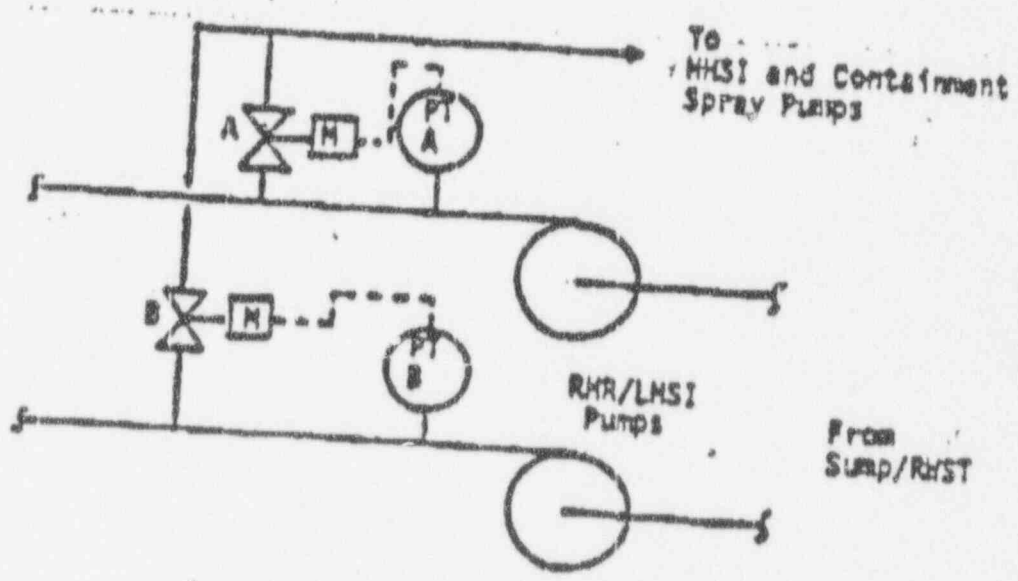
- cc: ✓ R. E. Morgan (CP&L-HBR)
- B. G. Rieck (CP&L-HBR)
- G. P. Boatty (CP&L-HBR)
- J. M. Curley (CP&L-HBR)
- V. E. Frazier (CP&L-HBR)
- T. Clements (CP&L)
- M. G. Zealouk (CP&L)

- B. M. Stone (CP&L-HBR)
- A. R. Wallace (CP&L-HBR)
- S. R. Zimmerman (CP&L)
- R. J. Muth (W-HBR)
- R. S. Pollock (W-Raleigh)
- E. J. Wagner (CP&L)

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TYPICAL ARRANGEMENT

Reportable Event Number 10849

Facility : ROBINSON

Unit : 2

Vendor : W, WEST

Operations Officer : James Brown

NRC Notified By : DAVID CROOK

Rad Release : No

Cause :

Component :

Date Notified : 12/02/87

Time Notified : 16:05

Time of Event : 12:30

Classification : 10 CFR 50.72

Category 1 :

Category 2 :

Category 3 :

Category 4 :

UNIT AT 100% PWR. AS A RESULT OF A WESTINGHOUSE NOTICE "OPERATING PLANT FEEDBACK REPORT SERIAL #CPL-87-616" WHICH INVOLVES THE SHIFTING OF THE SAFETY INJECTION SYSTEM FROM THE INJECTION PHASE TO THE RECIRCULATION PHASE W/IN 3 MINUTES FOLLOWING A LOCA W/ LOSS OF OFFSITE POWER, IT WAS DISCOVERED THAT VLVs "SIS863A & SIS863B" COULD FAIL TO OPEN. ONE OF THESE VLVs IS REQUIRED TO OPEN IN ORDER TO SUCCESSFULLY SWITCH FROM THE INJECTION PHASE TO THE RECIRCULATION PHASE. THE FAULT LIES IN THE FACT THAT AN INTERLOCK WHICH IS INTENDED TO PROTECT LOW PRESSURE PORTIONS OF THE RHR AND SI INJECTION SYSTEM PIPING (INCLUDING CONTAINMENT SPRAY) AND PREVENT BACK FLOW TO THE RWST IS SUPPLIED BY A NON-VITAL POWER SUPPLY INSTRUMENT BUS "#4". THUS A SINGLE  
Type a New Line to continue : FP2717FP0016  
FAILURE OF THAT BUS WOULD CAUSE BOTH VLVs TO FAIL AS THE INTERLOCK CIRCUITRY WOULD NOT BE SATISFIED. LICENSEE HAS DETERMINED THAT THE REQUIREMENT TO SWITCH FROM THE INJECTION PHASE TO THE RECIRCULATION PHASE W/IN 3 MINUTES IS SUCH THAT MANUAL OPERATION OF THE VLV COULD NOT BE ASSURED; THEREFORE, AN AUX. OPERATOR HAS BEEN ASSIGNED THIS RESPONSIBILITY. IN ADDITION THIS INTERLOCK HAS BEEN JUMPERED OUT UNTIL SUCH TIME AS A PERMANENT FIX CAN BE ESTABLISHED. RI INFORMED. NOTIFIED RDO (FRANK MCCOY). \*\*\* UPDATE AT APPROX 1000HRS ON 12/3/87 BY D. SAYRE \*\*\* ABOVE JUMPER HAS NOT BEEN INSTALLED BECAUSE THE LICENSEE DOES NOT KNOW HOW THEY WILL TEST IT AFTER INSTALLATION. INVESTIGATION CONTINUES. NOTIFIED R2 (FREDRICKSON).

FP0016

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PRIORITY ATTENTION REQUIRED

MO'NING REPORT - REGION II December 4, 1987

LICENSEE/FACILITY

NOTIFICATION/SUBJECT

APC/Farley 1 and 2

Resident Inspector  
Unit 1 Shutdown for EQ Repairs

Event

Event No. N/A

Unit 1 is planned to be shut down late on December 4 for a nine day maintenance outage to install qualified splices around unqualified instrumentation terminal blocks. A Region II Confirmation of Action letter documented the licensee's commitment to shutdown Unit 1 no later than December 9. Unit 2 tripped from low power on December 4 following a refueling outage. Unit 2 is being returned to operation on December 4 and may delay Unit 1 scheduled shutdown of December 4.

Licensee/Facility

Notification/Subject

P&L/Robinson 2

Resident Inspector/Safety  
Injection Interlock Followup

Event

Event No. 10849

This event, identified and reported by the licensee on December 2 under REN 0849, involved a single failure vulnerability whereby safety injection could possibly fail to transfer from the RWST injection phase to the sump recirculation phase under certain accident scenarios. The potential failure could take place after the RWST reaches its low level set point, approximately one hour after a LOCA. Following identification of this vulnerability, the licensee took compensatory measures by assigning a dedicated auxiliary operator to manually open the affected valves (if needed) until a modification could be installed. On December 3, the licensee implemented a temporary solution by installing and testing pumps which power the interlocks from separate emergency power supplies.

Regional Action: The Resident Inspector continues to follow the licensee actions. Region II is currently reviewing short and long-term corrective action for this problem.



July 23, 1984  
PNS-LI-84-251

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

Gentlemen:

Re: Reportable Event 84-18  
Turkey Point Unit 3  
Date of Event: July 17, 1984  
Design Deficiency in Control Circuitry for MOV 863A and B

The attached Licensee Event Report is being submitted pursuant to the requirements of 10 CFR 21 to provide notification of the subject event.

Very truly yours,

A handwritten signature in cursive script, appearing to read 'J. Williams, Jr.', is written over the typed name.

J. W. Williams, Jr.  
Group Vice President  
Nuclear Energy

JWW/PLP/js

Attachment

cc: J. P. O'Reilly, Region II, USNRC  
Harold F. Reis, Esquire  
File 933.1

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LICENSEE EVENT REPORT (LER)

REGULATORY COMMISSION APPROVAL DATE NO 2180-4188 (L-218) 8/1/84

FACILITY NAME (1) Turkey Point Unit 3 DOCKET NUMBER (2) 0 6 0 0 0 2 5 0 PART 13 1 of 0 2

TITLE (4) Design Deficiency In Control Circuitry for MOV 863A and B

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 NAME (9)	DOCKET NUMBER (2)	PART 13
07	17	84	84	018	00	07	24	84	Turkey Point Unit 3	06000250	1 of 0 2
THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § 43.49 (Check one or more of the following) (11)											

OPERATING MODE (10) N	20 407 (6)	20 408 (6)	20 736 (2) (6)	20 737 (6)
POWER LEVEL (18) 1,0,0	20 409 (1) (6)	20 410 (2) (6)	20 738 (2) (6)	20 739 (6)
	20 411 (1) (6)	20 412 (1) (6)	20 739 (2) (6)	20 740 (6)
	20 413 (1) (6)	20 414 (1) (6)	20 740 (2) (6)	20 741 (6)
	20 415 (1) (6)	20 416 (1) (6)	20 741 (2) (6)	20 742 (6)

LICENSEE CONTACT FOR THIS LER (12) Randy D. Hart, Licensing Engineer TELEPHONE NUMBER 3 0 5 2 4 5 - 2 9 1 0

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO AFRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO AFRDS

SUPPLEMENTAL REPORT EXPECTED (13) YES (14) NO (15) EXPECTED SUBMISSION DATE (16) MONTH DAY YEAR

ABSTRACT (17) On July 17, 1984, Turkey Point Plant was notified by Bechtel Power Corporation and Power Plant Engineering of a 10 CFR Part 21 deficiency concerning the control circuitry for pressure controllers PC600 and PC601. The control circuitry is powered by a single non-vital source and loss of power will result in de-energizing the interlocking relays to safety related valves MOV-862A, 862B, 863A, and 863B in the residual heat removal (RHR) pump suction and discharge lines resulting in the reactor operators being unable to open the valves from the control room. When in a post-LOCA condition, the switch-over to high head recirculation phase requires that MOV-862A and B be closed and MOV-863A and B be opened. This defect, coincident with a loss of power, will not affect the ability to close MOV-862A and B but it would necessitate the manual opening of MOV-863A and B, if radiological conditions in the area permit such action. The inability to open these valves could hamper the ability to adequately cool the core. Immediate corrective actions include: 1) providing jumpers and tools to bypass the pressure control interlock allowing the valves to be opened from the control room; 2) labeling of the appropriate relay racks and the terminal strips and contacts, per the respective valves, on the inside of the rack doors; 3) training of all Reactor Operators on actions to take via a training brief; and 4) Emergency Procedure E-1 has been revised to include instructions on how and when to install the jumpers. The long term corrective action to be taken is to replace the existing single non-class IE power source with two class IE power sources to meet redundant, channelized power requirements for these safety related components. The health and safety of the public were not affected. Similar occurrences: None.

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IEP

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)

DOCKET NUMBER (2)

LER NUMBER (3)

PAGE (4)

Turkey Point Unit 3

YEAR	Q	MONTH	DAY	MIN	SEC	SEC	MIN	SEC	MIN	SEC	MIN	SEC
84	2	01	8	00	02	02	02	02	02	02	02	02

List of items which are required and additional NRC Form 202s (17)

On July 17, 1984, Turkey Point Plant was notified by Bechtel Power Corporation and Power Plant Engineering of a 10 CFR Part 21 deficiency concerning the control circuitry for pressure controllers PC600 and PC601. Upon loss of power, the deficiency will cause the interlocking contact of control relays PC600X and PC601X to fail open resulting in the Reactor Operators being unable to open safety related valves MOV-862A, 862B, 863A, and 863B located in the residual heat removal (RHR) pump suction and discharge lines from the control room. The function of the interlock is to prevent over-pressurization of the RHR piping. When the RHR system pressure reaches 210 psig, the contacts in PC600 and PC601 will open and de-energize relays PC600X and PC601X. An interlocking contact from PC600X and PC601X will open to prevent the opening of valves MOV-862A, 862B, 863A, and 863B. MOV-863A and B are normally closed to ensure RHR injection flow is via the normal cold leg injection path. To switch from the injection phase to high head recirculation, MOV-863A and/or B must be opened. Opening the valves directs recirculation flow from the outlet of the RHR heat exchangers to the suction of the high head safety injection pumps. However, a loss of a power will cause the interlocking contact from PC600X and PC601X to fail open, which will prevent opening of MOV-863A and B. Therefore, for those postulated accidents where high head recirculation is required to maintain adequate core cooling, the inability to open MOV 863A and B could compromise core cooling capabilities. The design of the control circuitry power supply was originally provided by Westinghouse. The relays PC600X and PC601X are manufactured by Westinghouse.

An interlocking circuit is formed by PC600, PC601, PC600X, and PC601X that was powered by a single feed from the non-vital side of MCC 3C(4C). The non-vital side was separated from its vital side by a tie-breaker which was automatically tripped upon loss of off-site power. This tie-breaker allowed for the manual loading of the pressure controllers onto the emergency diesel generators (EDG) if the diesel loading permitted. Recent auxiliary power modifications included the removal of the tie-breaker connecting the vital and non-vital portions of MCC 3C(4C). This modification precludes the loading of the control circuitry for PC600 and PC601 onto the EDGs. These modifications did not change the original single power feed for the control circuitry.

The other nuclear plants in Florida Power and Light's system have been made aware of the potential problem. An entry will be made in the INPO Network to make other nuclear facilities aware of the potential problem.

The individual informing the Commission is: J.W. Williams, Group Vice-President Nuclear Energy, P. O. Box 029100, Miami, Florida 33102.