DIST: Docket File NRC PDR LPDR
NSIC ORB#2 Rdg DEisenhut OELD
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Docket No. 50-333

JUN 3 1983

Mr. J. P. Bayne
Executive Vice President,
Nuclear Generation
Power Authority of the State
of New York
123 Main Street
White Plains, NY 10601

Dear Mr. Bayne:

SUBJECT: NUREG-0737, ITEM II.K.3.18, "ADS LOGIC MODIFICATIONS"

Re: James A. FitzPatrick Nuclear Power Plant

In response to the subject item, the BWR Owners Group (BWROG) performed a study of alternatives to the present ADS actuation logic and identified modifications that would eliminate the need for manual actuation to ensure core coverage. We have now completed our evaluation of the BWROG report on that study. Your letters on the subject item refer to the BWROG study for your facility; also, the BWROG report states that the study applies to your facility.

In the BWROG study, seven alternatives to the present ADS logic are identified. In our evaluation of the BWROG study, we conclude that two of the seven alternatives are acceptable (see Enclosure 1), and should be implemented in all facilities to which the study applies (See Enclosure 2).

The acceptable options are (1) elimination of the high drywell pressure ppermissive and addition of a manual inhibit switch, and (2) bypass of the high drywell pressure permissive after a sustained low water level and addition of a manual inhibit switch. For adoption of the second of these two options, the setting of the bypass timer should be justified and a plan for periodic testing of the timer should be proposed. For either of the two options, the use of the manual inhibit switch should be addressed in the emergency procedures, and a surveillance plan for the switch should be included in the Technical Specifications.

We request that you choose one of the two acceptable options for modification of your facility, and, within 45 days after receipt of this letter, provide a schedule for implementing the modification chosen and proposing appropriate Technical Specifications.

Sincerely,

ORIGINAL SIGNED BY

Domenic B. Vassallo, Chief
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Enclosures:
1. Safety Evaluation
2. List of BWROG Participants

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SURNAME				SNorris	JHegner	DVassallo	
DATE				6/2/83	6/2/83	6/3/83	

Mr. J. P. Bayne
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James A. PitzPatrick Nuclear Power Plant

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ENCLOSURE 1

EVALUATION OF BWR OWNERS' GROUP
GENERIC RESPONSE TO NUREG-0737
ITEM II.K.3.18, "MODIFICATION OF AUTOMATIC
DEPRESSURIZATION SYSTEM LOGIC--FEASIBILITY
FOR INCREASED DIVERSITY FOR SOME EVENT SEQUENCES"

Position

The automatic depressurization system (ADS) actuation logic should be modified to eliminate the need for manual actuation to assure adequate core cooling. A feasibility and risk assessment study is required to determine the optimum approach. One possible scheme that should be considered is ADS actuation on low reactor-vessel water level provided no high-pressure coolant injection (HPCI) or high pressure core spray (HPCS) flow exists and a low-pressure emergency core cooling (ECC) system is running. This logic would complement, not replace, the existing ADS actuation logic.

STAFF EVALUATION

The automatic depressurization system (ADS), through selected safety/relief valves, functions as a backup to the operation of the high pressure coolant systems. The ADS depressurizes the vessel so that low pressure systems may inject water into the reactor vessel. The ADS is typically activated automatically upon coincident signals of low water level in the reactor vessel, high drywell pressure, and any low pressure ECCS pump running. A time delay of approximately two minutes after receipt of the coincident signals allows time for the automatic blowdown to be bypassed manually if the operator believes the signals are erroneous or if the water level can be restored.

For transient and accident events which do not directly produce a high drywell pressure signal (e.g., stuck open relief valve or steam line break outside containment) and are degraded by a loss of high pressure coolant systems, manual actuation of the ADS is required to provide adequate core cooling. A reliability and risk assessment was requested so that the optimum approach to eliminate the need for manual actuation could be obtained. A further consideration is that proposed

modifications to the ADS logic should be such that operator actions which may be required during an ATWS should not be complicated by the ADS.

The BWR Owners' Group response provided in Reference(1) does not provide the requested reliability and risk assessment. It does provide a discussion of the advantages and disadvantage of each of several options. A qualitative discussion of risk and reliability is also provided.

Eight ADS logic options are considered in the Owners' Group response: the current design and seven logic modifications. The seven modifications are 1) elimination of the high drywell pressure permissive with the addition of a manual switch to inhibit automatic depressurization; 2) elimination of the high drywell pressure permissive and changing the low reactor pressure vessel (RPV) level trip setpoint to the top of the active fuel (TAF); 3) addition of a manual switch to inhibit automatic blowdown in conjunction with a timer that bypasses the high drywell pressure permissive if the reactor water level is low for a sustained period; 4) addition of a timer that bypasses the high drywell pressure permissive if the reactor water level is low for a sustained period, and changing the low RPV water level trip setpoint to the TAF; 5) addition of a manual switch to inhibit automatic blowdown in conjunction with a suppression pool temperature permissive in parallel with the high drywell pressure permissive; 6) addition of a suppression pool temperature permissive in parallel with the high drywell pressure

permissive and changing the low RPV water level trip setpoint to the TAF; and 7) addition of a manual switch to inhibit automatic blowdown.

As indicated initially in the staff position, the present ADS logic design (except on those few plants which do not have the high drywell pressure permissive) does not satisfy the requirement to eliminate the need for operator action. This is because it has not been demonstrated that the high drywell pressure signal would be present for all situations requiring ADS actuation.

The second option, elimination of the high drywell pressure permissive and addition of a manual inhibit switch satisfies the requirement and is simple to implement. Further, the manual inhibit switch permits the operator to override the automatic blowdown logic if necessary. Therefore, the second option is acceptable.

The third option, elimination of the high drywell pressure permissive and changing the low RPV water level trip setpoint to the TAF satisfies the requirement to eliminate the need for manual action to blowdown the vessel but could require repeated operator action (approximately every 2 minutes) to reset the ADS timer for ATWS events where low water level is deliberately maintained to reduce power. Changing the low level trip setpoint may also be very expensive since installation of new water level instrumentation would be required for many plants. This option was therefore not recommended by the Owners Group.

The fourth option, addition of a timer that bypasses the high drywell pressure permissive if the reactor water level is low for a sustained period and addition of a manual inhibit switch also satisfies the requirement and is simple to implement. The time delay used must be justified by analysis if this option is chosen and the technical specifications must be modified to require testing of the timer. The fourth option is acceptable to the staff.

The fifth option, addition of a timer that bypasses the high drywell pressure permissive if the reactor water level is low for a sustained period and changing the low RPV water level trip setpoint was not recommended for same reasons discussed for option(3).

The sixth option, addition of a suppression pool temperature permissive in parallel with the high drywell pressure permissive and a manual inhibit switch would theoretically satisfy the requirements. However, temperature variations within the suppression pool would necessitate the use of many thermocouples connected through averaging circuits. This option was rejected by the Owners' Group because it is relatively impractical.

The seventh option, addition of a suppression pool temperature trip in parallel with the high drywell pressure trip and changing the low RPV water level trip setpoint to the TAF was rejected by the Owners Group for the same reason as the sixth option.

The eighth option, addition of a manual inhibit switch, does not satisfy the requirement since manual action would still be required for breaks which do not pressurize the drywell.

SUMMARY

The second, third, fourth, and fifth options effectively remove the high drywell pressure permissive for ADS actuation. Addition of the manual inhibit switch (options 2,4,8) enables the operator to override the ADS should this be necessary (as for some ATWS events). Suppression pool temperature permissives are judged to be impractical. Changes to the RPV low water level trip setpoint may not be sufficient to provide the operator with the flexibility needed to override the ADS when needed.

It is concluded therefore that two of the eight options proposed are acceptable. They are: option 2, elimination of the high drywell permissive and the addition of manual inhibit switch, and option 4, bypass of the high drywell pressure permissive after sustained low water level and the addition of a manual inhibit switch. Licensees proposing option 4 modifications should include justification for the bypass timer setting and a periodic testing plan for the timer. Licensees proposing either option 2 or option 4 modifications must address the use of the manual inhibit switch in their emergency procedures and include a surveillance plan for the switch.

REFERENCES

1. Letter to Darrell G. Eisenhut (NRC) from T. J. Dente (BWR Owners' Group), BWROG-8260, NUREG-0737 Item II.K.3.18 "Modification of Automatic Depressurization System Logic", October 28, 1982

PARTICIPATING UTILITIES

NUREG-0737 II.K.3.18

This report applies to the following plants, whose Owners participated in the report's development.

Utility	Plant
Boston Edison	Pilgrim 1
Carolina Power & Light	Brunswick 1 & 2
Commonwealth Edison	LaSalle 1 & 2, Dresden 2-3, Quad Cities 1 & 2
Georgia Power	Hatch 1 & 2
Iowa Electric Light & Power	Duane Arnold
Niagara Mohawk Power	Nine Mile Point 1 & 2
Nebraska Public Power District	Cooper
Northern States Power	Monticello
Philadelphia Electric	Peach Bottom 2 & 3, Limerick 1 & 2
Power Authority of the State of New York	FitzPatrick
Detroit Edison	Enrico Fermi 2
Long Island Lighting	Shoreham
Mississippi Power & Light	Grand Gulf 1 & 2
Pennsylvania Power & Light	Susquehanna 1 & 2
Washington Public Power Supply System	Hanford 2
Cleveland Electric Illuminating	Perry 1 & 2
Illinois Power	Clinton Station 1 & 2
Vermont Yankee Nuclear Power	Vermont Yankee
Jersey Central Power and Light	Oyster Creek 1
Tennessee Valley Authority	Browns Ferry 1-3, Hartsville 1 & 2
Gulf States Utilities	River Bend 1 & 2
Cincinnati Gas & Electric	Zimmer 1
Public Service Electric & Gas	Hope Creek 1 & 2
Northeast Energy Services	Skagit 1 & 2
Northeast Utilities	Millstone 1