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Docket No. 50-237

Mr. Cordell Reed
Assistant Vice President
Commonwealth Edison Company
Post Office Box 767
Chicago, Illinois 60690

Dear Mr. Reed:

RE: TOPIC III-10.C - DRESDEN NUCLEAR POWER STATION, UNIT NO. 2

Enclosed is a copy of our revised safety assessment of Topic III-10.C, Surveillance Requirements on BWR Recirculation Pumps. This revision includes consideration of the comments received on the assessment issued by our letter dated August 17, 1978. Your letter dated October 18, 1978, provided comments on the assessment.

This revision completes our assessment of Topic III-10.C which will be used as input to the integrated review of the Dresden Unit No. 2 Plant.

If there are any errors in the facts of this revised assessment, please supply corrected information within 30 days of the date you receive this letter. If no response is received within that time, we will assume that you have no further comments or corrections.

Sincerely,

Original Signed by:
Dennis L. Ziemann

Dennis L. Ziemann, Chief
Operating Reactors Branch #2
Division of Operating Reactors

Enclosure:
Revised Assessment for
Topic III-10.C

cc w/enclosure:
See next page

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SYSTEMATIC EVALUATION PROGRAM

Topic III-10.C Surveillance Requirements on BWR Recirculation Pump Discharge Valves

Plant: Dresden Unit No. 2

DISCUSSION

In July 1976, all BWR facilities which had completed the Low Pressure Coolant Injection (LPCI) system modification, to remove the LPCI loop selection logic, were sent letters requesting that they apply for a license amendment to incorporate technical specification surveillance requirements on recirculation pump discharge and bypass valves. The recirculation pump discharge and bypass valves are required, for these plants, to close upon initiation of LPCI. The closure of these valves is necessary to prevent the loss of cooling water by reverse flow through the pump or its bypass line and out the break. The failure of the recirculation pump discharge or bypass valve to close can adversely affect core cooling in a manner similar to the failure of a LPCI valve to open.

EVALUATION

This topic applies to LPCI modified BWR facilities. Dresden Unit No. 2 retains LPCI loop selection logic and therefore is not subject to the requirement of this topic. Furthermore, since the unmodified LPCI is susceptible to single failures that can eliminate all LPCI flow, no credit is given for any LPCI flows in the Dresden Unit No. 2 ECCS analysis. The staff's safety evaluation for Dresden Unit No. 2 core reload 2 describes the design basis event as the complete severance of the recirculation suction line assuming a failure of the LPCI injection valve (safety evaluation transmitted to licensee May 23, 1976). An assumed failure of the LPCI valve prevents any LPCI flow from entering the core. An NRC Safety Evaluation dated December 27, 1974, for Dresden Unit No. 2 discusses the acceptability of the ECCS model used for the above assumptions. The May 23, 1976 evaluation concluded that, with appropriate technical specification changes, Dresden Unit No. 2 met the performance requirements of 10 CFR 50.46 (Acceptance Criteria and Emergency Core Cooling Systems for Light Water Nuclear Power Reactors).

The LPCI logic network is designed to direct LPCI flow to the intact recirculation loop in the event of a loss of coolant accident (LOCA). The logic network also was designed to close the suction and discharge valves of the intact loop to prevent LPCI flow from bypassing the core and flowing out the break. The staff review of Topic III-10.C indicates that since the LPCI loop selection logic has not been modified at Dresden

Unit No. 2, the primary concern is not applicable as discussed above. However, a different requirement does apply to Dresden Unit No. 2. The staff has required that all BWR-3's perform a modification to ensure that the recirculation line suction valves remain open when LPCI is initiated on a LOCA signal.

Motor-operated valves are placed on BWR recirculation suction and discharge lines. Following a loss-of-coolant accident (LOCA), if either of these valves on the unbroken recirculation line closes and if the low pressure coolant injection system (LPCI) supplies ECCS water to that loop, then the LPCI water will flow through the jet pump nozzles into the lower plenum where it will contribute to core reflooding. If neither of the valves closes, the LPCI water could flow backwards through the unbroken loops' recirculation pump, around the downcomer, and out the break, thereby not contributing to core relfooding. To provide redundancy, BWR/3 ECCS designs incorporated automatic closure of both the suction and discharge valves (on the unbroken loop only) upon receipt of a LOCA signal.

However, assumed single failure of the loop selection logic system can result in selection of the wrong loop as the broken loop. This would cause the following two events.

1) All LPCI flow from both LPCI systems would be directed to the broken loop and would be lost out the break. This effect has been considered in BWR/3 ECCS-LOCA analyses; as a result, no credit is assumed for LPCI flow.

2) Both the suction valve and the discharge valve on the broken recirculation line would close. If the break location were between those two valves, the break would be isolated from the reactor vessel. Although this could be advantageous under certain conditions, under other conditions it could introduce undesirable effects which have not been adequately considered in previously performed ECCS-LOCA calculations. That is, for a certain range of break sizes, it is possible that core uncovery could occur with vessel pressure above the LPCI pump shutoff head. If break isolation were to occur at that time, LPCI flow could be delayed and/or reduced, resulting in a later core reflooding and a higher PCT.

With respect to Item 2 above, compensating effects exist that partially or wholly compensate for the above undesirable effects. The High Pressure Coolant Injection (HPCI) and the Automatic Depressurization System (ADS) would complete depressurization to the point where LPCI could function. Although such LPCI operation would be delayed, credit can be assumed for the full complement of ECCS equipment since the required single failure has already been assumed (loop selection logic failure, selection of the wrong loop).

Preliminary calculations indicate that the above described compensating effects would result in PCT's for the worst size isolatable break that are below 2200°F. However, a fully approved model meeting all requirements of Appendix K to 10 CFR 50.46 does not exist which is capable of calculating a postulated break that becomes isolated. Also, the preliminary calculations were not performed for all sizes of BWR/3's. Consequently, it is not possible to categorically state that 10 CFR 50.46 requirements are met for all isolatable breaks for all BWR 3's.

Therefore, General Electric Company recommended, and we require, that the automatic closure feature on the suction valve be disabled. This makes break isolation a non-credible event which does not require analysis: Two independent failures are necessary, i.e., closure of the discharge valve in the broken loop (requiring loop selection logic failure), and closure of the suction valve in the same loop (for example, by operator error).

No credit has been assumed for closure of the suction valve in any safety analyses other than ECCS-LOCA analyses.

For ECCS-LOCA analyses, closure of the suction valve provided a backup function for closure of the discharge valve on the unbroken loop. With the recommended modification (suction valve closure disconnected), single failure to close of the discharge valve on the unbroken loop will now cause failure of the LPCI system. However, this LPCI failure has already been taken into account by the ECCS-LOCA analyses on all BWR/3 plants. No credit is assumed for LPCI operation on BWR/3 plants, since single failure of the loop selection logic can cause complete failure of LPCI. Stated another way, the recommended change merely creates another potential path to a failure that is already accounted for in the ECCS-LOCA analyses, that is failure of LPCI; however, the recommended change precludes possibility of an event which has <u>not</u> been accounted for in the analyses, i.e., break isolation.

By letter dated May 5, 1978, Commonwealth Edison informed the NRC that on April 21, 1978, the breakers for the recirculation system suction valves were racked out with the valves in the open position for their affected facilities (including Dresden Unit No. 2).

As stated above, elimination of the automatic closure feature on BWR/3 plants is a desirable change since it eliminates the potential for an event which involves unreviewed safety concerns. The change does not create any new unreviewed safety concerns. We, therefore, find acceptable Dresden 2 operation with disabled suction valve automatic closure following a LOCA signal.

On the basis of our review, we conclude that Topic III-10.C is acceptably resolved for Dresden Unit No. 2, and no further action is required.