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Docket No. 50-302

RECEIVED AUG 27 1981 U.S. NUCLEAR REGULATORY COMMISSION

Mr. J. A. Hancock
Director, Nuclear Operations
Florida Power Corporation
P. O. Box 14042, Mail Stop C-4
St. Petersburg, Florida 33733

Dear Mr. Hancock:

As part of the NUREG-0737 Implementation Plan for Operating Reactors, the NRC has completed the review of Item II.K.2.20, System Response to Small Break LOCA, for Crystal River Unit No. 3. Your submittal, which included the B&W letter, Reference 1, of the enclosed Safety Evaluation Report, provided sufficient information for us to conclude that small primary system breaks which result in a stuck open PORV, will not result in unanalyzed consequences, even when assuming a concurrent single failure. We conclude Item II.K.2.20 is completed for your plant.

Sincerely,

"ORIGINAL SIGNED BY
JOHN F. STOLTZ"

John F. Stolz, Chief
Operating Reactors Branch #4
Division of Licensing

Enclosure:
SER

cc w/enclosure:
See next page

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TASK ACTION ITEM II.K.2.20 SAFETY EVALUATION REPORT

In a letter from D. F. Ross, dated August 21, 1979, the NRC informed all licensees with Babcock and Wilcox reactors of the ACRS ECCS Subcommittee concern that B&W plants have not been analyzed to withstand postulated small breaks which result in system repressurization to the PORV set point. These analyses would assume that the PORV remained stuck open for the remainder of the transient.

System repressurization may occur during a small break in plants with B&W NSSSs via the following means:

1) Loss of heat sink (i.e., loss of auxiliary feedwater),
2) HPI flow exceeds break flow, and
3) Loss of natural circulation.

In response to the NRC concerns, B&W analyzed a 0.01 ft^2 cold leg break concurrent with loss of auxiliary feedwater. Previous analyses (Reference 1) have demonstrated that break areas greater than 0.01 square feet (concurrent with loss-of-auxiliary-feedwater) will not pressurize the system to the PORV set point. The 0.01 ft^2 break is considered limiting in that it maximizes inventory depletion. The analyses assumed that once actuated, the PORV stuck in the open position. The PORV in the stuck open position was analyzed to have sufficient capacity to depressurize the system. For this bounding analysis, the mixture level within the reactor vessel dropped to a minimum of three feet above the top of the core. Core uncovery was prevented by the two high pressure injection pumps.

Less limiting events which could pressurize the primary system to the PORV setpoint include breaks which do not exceed the HPI capacity. These breaks are typically much less than 0.01 ft^2 area, and are less severe than the one discussed above, due to less inventory loss. Breaks less than 0.01 ft^2 (without assuming a stuck-open PORV) have been analyzed and documented in Reference 1.

In addition to the initiating events described above, repressurization could also occur as a result of interrupting natural circulation. Temporary interruption of natural circulation can occur when the apex of the hot leg "candy-cane" collects a sufficient volume of steam to interrupt flow to the steam generator. The system is predicted to pressurize until the break drains the steam sufficiently to uncover a condensing surface in the steam generators. Once steam can be condensed, the system will depressurize. Based on previous analyses (Reference 1) it is concluded that no break size in the primary system will result in opening of the PORV as long as the auxiliary feedwater is available.

Based on our review of the B&W licensee's submittals, we conclude that small primary system breaks which result in the opening of a PORV (assumed to stick open) will not provide adverse consequences, when assuming a single failure.

As such, we consider Item II.K.2.20 completed by issuance of this SER. Moreover, we do not believe it necessary for Item II.K.2.20 to be addressed by present and future applicants as a licensing condition.

Reference:

Reference 1: Letter J.H. Taylor (B&W) to S. A. Varga (NRC), "Evaluation of Transient Behavior and Small Reactor Coolant System Breaks in the 177-Fuel Assembly Plant," May 7, 1979.