

**Florida
Power**

CORPORATION
Docket No. 50-302
Crystal River Unit 3

December 20, 1990
3F1290-07

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

Subject: Response to NRC Generic Letter 90-06, Resolution of Generic Issue 70, "Power-Operated Relief Valve and Block Valve Reliability," and Generic Issue 94, "Additional Low-Temperature Overpressure Protection for Light-Water Reactors," Pursuant to 10 CFR 50.54(f).

Dear Sir:

Florida Power Corporation (FPC) submits the attached response to Enclosure A of Generic Letter 90-06 as requested in your June 25, 1990 letter. (Enclosure B recommendations of 90-06 are not applicable to B&W-designed plants such as Crystal River Unit 3 (CR-3) and are not addressed in this response). Enclosure A makes specific recommendations intended to result in improved reliability of the Power-Operated Relief Valve (PORV) and its associated block valve. FPC concurs with the majority of the recommendations, but two recommendations are considered inappropriate for CR-3. These are discussed below and detailed in the attachment to this letter.

- o The recommendation for stroke-testing of the PORV in all cases prior to establishing conditions where it is used for low-temperature overpressure protection (LTOP) is unnecessary and results in adverse "side" effects. These effects include the increased potential for PORV leakage and additional thermal cycles applied to the pressurizer surge line. (These effects have been previously addressed by FPC's response to other NRC initiatives). Thus, this testing requirement is not being added.
- o The recommendation for a technical specification shutdown requirement in response to PORV or block valve inoperability is not warranted. The requirement would likely result in a substantial financial burden with little resultant risk reduction. Forced shutdowns of the unit should be limited to situations for which continued operation cannot be permitted in order to ensure the health and safety of the public.

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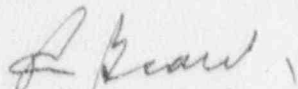
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This is not the case for an inoperable PORV or block valve. In fact, forcing the unit to shutdown creates the potential for additional transients. Probabilistic assessments (which consider risk due to plant operation in the LTOP region with an inoperable PORV) would likely demonstrate an increase in risk (decrease in safety) due to the proposed shutdown requirements. Therefore, FPC does not intend to include additional shutdown requirements for the PORV and block valve in the CR-3 Technical Specifications.

FPC is concerned that Generic Letter 90-06 contains new NRC Staff positions which are inconsistent with FPC's understanding of existing NRC policy. The application of the NRC Interim Policy on Technical Specification Improvement is one example. Generic Letter 90-06 recognizes the PORV may not be the primary means of mitigating any design basis accident, but still applies Criterion 3 of the Interim Policy as justification of the recommendations. This application is contrary to the stated purpose of technical specification improvement and NRC/industry efforts to develop a consistent criteria for the content of technical specifications. The attachment to this letter further discusses this issue.

Sincerely,



P. M. Beard, Jr.
Senior Vice President
Nuclear Operations

PMB:BPW

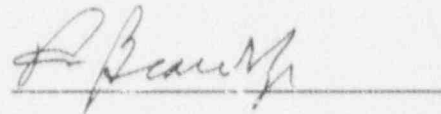
Attachment

xc: Regional Administrator, Region II
Senior Resident Inspector
NRR Project Manager

STATE OF FLORIDA

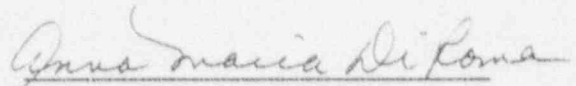
COUNTY OF CITRUS

P. M. Beard, Jr. states that he is the Senior Vice President, Nuclear Operations for Florida Power Corporation; that he is authorized on the part of said company to sign and file with the Nuclear Regulatory Commission the information attached hereto; and that all such statements made and matters set forth therein are true and correct to the best of his knowledge, information, and belief.



P. M. Beard, Jr.
Senior Vice President
Nuclear Operations

Subscribed and sworn to me, a Notary Public in and for the State and County above named, this 20th day of December, 1990.



Notary Public

NOTARY PUBLIC, STATE OF FLORIDA AT LARGE
COMMISSION EXPIRES OCT. 19, 1992

Notary Public, State of Florida at Large

My Commission Expires: October 19, 1992

Introduction:

Generic Letter 90-06, dated June 25, 1990 contained the NRC Staff positions which resulted in the resolution of Generic Issue 70 "Power-Operated Relief Valve and Block Valve Reliability." The generic letter concluded that improvements in the reliability of the PORV and block valve could have a significant impact on plant safety. This conclusion was based upon the current agency understanding of the PORV's role in accident mitigation. Generic Letter 90-06 also made several recommendations intended to result in improvements in valve reliability. The Florida Power Corporation (FPC) response to the specific recommendations of NRC Generic Letter 90-06 is as follows:

Recommendation 1:

Include PORV and block valve within the scope of an operational quality assurance program that is in compliance with 10 CFR Part 50, Appendix B. This program should include the following elements:

- a. The addition of PORV and block valve to the plant operational Quality Assurance List.
- b. Implementation of a maintenance/refurbishment program for the PORV and block valve that is based on manufacturer's recommendations or guidelines and is implemented by trained plant maintenance personnel.
- c. When replacement parts and spares, as well as complete components, are required for existing non-safety-grade PORVs and block valves (and associated control systems), it is the intent of this generic letter that these items may be procured in accordance with the original construction codes and standards.

FPC Response:

- a. The power-operated relief valve (PORV) and its associated block valve are classified as safety-related components in the CR-3 Configuration Management Information System (CMIS). The CMIS serves as the plant operational quality assurance list for CR-3. Electrical portions of the CR-3 PORV and block valve (power and controls) were not originally designed as safety-related. As a result, control circuitry for the PORV is non-1E and the motor operator for the block valve is non-safety related. The motor operator for the block valve has subsequently been environmentally qualified (EQ). Appropriate levels of the CR-3 quality assurance program are applied to these portions of the valves.
- b. Safety-related valves are only sent to approved vendors for repairs or refurbishment. The manufacturers of the PORV (Dresser Industries Inc.) and the block valve (Velan Engineering) are on the list of FPC-approved vendors for performing these activities. FPC-approved nuclear vendors have approved 10 CFR 50 Appendix B programs and undergo periodic FPC

audits of their programs. FPC also periodically performs an additional step of sending inspectors to the vendor installation to verify critical manufacturing steps are assured in the course of work on these valves. Maintenance activities conducted by FPC personnel on-site are based on the manufacturer's recommendations and guidelines and are implemented through controlled procedures by trained plant personnel.

- c. Replacement parts and spares for the PORV and block valve will be procured in accordance with the original construction codes and design standards.

Recommendation 2:

Include the PORV and block valve within the scope of a program covered by Subsection IWV, "Inservice Testing of Valves in Nuclear Power Plants" of Section XI of the ASME Boiler and Pressure Vessel Code.

- a. Stroke testing of the PORV should only be performed during Mode 3 (HOT STANDBY) or Mode 4 (HOT SHUTDOWN) and in all cases prior to establishing conditions where the PORV is used for low-temperature overpressure protection. Stroke testing of the PORV should not be performed during power operation.
- b. The PORV block valve should be included in the licensee's expanded MOV test program discussed in Generic Letter 89-10 "Safety Related Motor Operated Valve Testing and Surveillance," dated June 28, 1989.

FPC Response:

The PORV and block valve are included in the FPC Inservice Inspection - Pump and Valve Program for CR-3. This program has been developed to implement the requirements of 10 CFR 50.55a(g) and Section XI of the ASME Boiler and Pressure Vessel Code (hereafter referred to as "the Code").

- a. Recommendation 2.a above is an exception to Section XI, Subsection IWV-3411 of the Code. This subsection requires all Category A and B valves be exercised at least once every three months, except as provided by IWV-3412(a), etc. IWV-3412(a) states that valves that cannot be exercised during plant operation shall be full-stroke exercised during cold shutdowns. FPC satisfies the intent of the Code (and the generic letter) by performing a procedurally-required stroke test of the PORV during each plant heatup from cold shutdown. This is performed with the plant in MODE 3 (HOT STANDBY). The recommendation to stroke test the PORV in all cases prior to entering the low-temperature overpressure protection (LTOP) mode is an LTOP-driven recommendation directly related to the need to have the PORV available for LTOP. Applying this recommendation to B&W-designed plants such as CR-3 is somewhat inconsistent with the balance of Generic Letter 90-06. Generic Letter 90-06 specifically states LTOP recommendations of the letter - i.e. the resolution of Generic Issue 94 - are not applicable to B&W-designed

plants. FPC has submitted a CR-3 LTOP Features technical specification to the NRC as part of Technical Specification Change Request 174, dated October 31, 1989. The proposed technical specification contains operability requirements for the PORV while the plant is operated in the LTOP region, and includes appropriate surveillances to verify operability of the valve.

Apart from the applicability issue of this recommendation, FPC has additional concerns with unnecessarily cycling the PORV. Operating history has shown a limited number of PORV cycles are available before valve seat leakage begins to develop. Thus, the proposed increased exercising may actually result in a decrease in PORV availability, since dependent upon the amount of the leakage, valve isolation or refurbishment becomes necessary. Further, cycling the valve is inconsistent with NRC Bulletin 88-11 "Pressurizer Surge Line Thermal Stratification." Each time the PORV is opened, there is an insurge of reactor coolant into the pressurizer. The more frequently the valve is cycled, the greater the number of thermal cycles applied to the surge line. Based upon the reasons given, FPC will not add the requirement for stroke testing the PORV in all cases prior to establishing conditions for LTOP.

- b. The block valve has been included in the motor-operated valve test program developed in response to Generic Letter 89-10. Actual testing of the block valve will be performed in accordance with the schedule contained in FPC's Generic Letter 89-10 response.

Recommendation 3:

For operating PWR plants, modify the limiting conditions of operation of the PORV and block valve in the technical specifications for MODES 1,2, and 3 to incorporate the position adopted by the staff in recent licensing actions.

FPC Response:

Recommendation number 3 proposes several significant changes to the content of the CR-3 Technical Specification for the PORV and block valve. These changes would require:

- a. a revision to the required action end-state (the plant conditions the operator is directed to in the event of a technical specification-required shutdown),
- b. addition of a surveillance requirement to exercise the PORV through one complete cycle every 18 months,
- c. maintenance of power to the block valve when it is used to isolate an inoperable PORV, and
- d. additional shutdown requirements for the PORV and block valve.

Current CR-3 Technical Specifications contain limiting conditions of operation (LCOs) for the PORV and its associated block valve. The CR-3 specification is identical to the corresponding B&W Standard Technical Specification (STS) as it appears in NUREG 0103 Revision 4, with the exception of a surveillance requirement which is not applicable to the CR-3 design. The CR-3 specification is also very similar to the B&W Revised STS version being developed for the Technical Specification Improvement Program (TSIP). The specification, which contains no shutdown requirements for an inoperable PORV or block valve, has been reviewed by the NRC Staff as part of TSIP, with no discrepancies or open items yet identified.

Proposed changes a through c above are considered to be general improvements to the specification and will be incorporated into the CR-3 specification as part of TSIP. CR-3 is the lead plant for the B&W Owner's Group technical specification improvement effort with implementation tentatively scheduled for the Cycle 8 refueling outage (October 1992). This schedule is consistent with the requested schedule for implementing changes to the technical specifications as a result of the generic letter.

Proposed change "d" regarding additional shutdown requirements for the PORV and block valve has been reviewed and is considered inappropriate for CR-3. This conclusion is based upon the following:

- o The proposed shutdown requirements may result in a decrease in the level of reactor safety. The proposed requirements mandate the plant be placed in MODE 4 (hot Shutdown) due to an inoperable PORV or block valve. This action is in response to safety concerns due to a Steam Generator Tube Rupture (SGTR) or an event requiring feed-and-bleed cooling but creates the potential for another transient. In this region of plant operation, the PORV is relied upon to provide low-temperature overpressure protection (LTOP) for the reactor coolant system. Industry experience has shown the probability of an LTOP event is greater than that of a SGTR or an event requiring feed-and-bleed cooling. Thus, a plant in this degraded condition (inoperable PORV or block valve) is placed in a region where the probability of a safety-related challenge to the PORV is increased.
- o Applying the NRC Interim Policy Statement on Technical Specification Improvement (hereafter referred to as "the Policy") on a plant-specific basis does not support the proposed shutdown requirements. Two PORV accident mitigation "functions" were considered: the secondary role of the PORV in SGTR mitigation and the use of the PORV as part of High Pressure Injection/ PORV cooling capability (feed-and-bleed). Our assessment focusses primarily on feed-and-bleed cooling. This is due to the importance the NRC placed on this capability to justify the recommendations of the generic letter. NUREG 1316 (page xi) acknowledged that without consideration of this capability, the recommendations of Generic Letter 90-06 were not justified by regulatory analysis.

The Policy gives specific criteria to be used in determining the content of technical specifications. The two criteria which relate indirectly to PORV accident function are Criterion 3 (primary success path for accident mitigation) and the risk-significant provision.

The stated intent of Criterion 3 is to capture into technical specifications, those structures, systems, and components that are part of the primary success path of a safety sequence analysis. PORV operation is not assumed as part of the primary success path for any CR-3 design basis accident. Neither the CR-3 FSAR or the NRC Operating License-stage Safety Evaluation Report (SER) address the need for PORV operation to mitigate a SGTR or for feed-and-bleed cooling.

The risk-significant provision of the Policy requires that structures, systems, and components which operating experience and PRA have shown to be significant contributors to the plant's overall core melt probability and risk be included in technical specifications. The CR-3 Probabilistic Risk Assessment (PRA) demonstrates that the expected improvements in PORV reliability do not have a significant impact on core damage frequency at CR-3. The reduction in risk due to the estimated improvements in PORV and block valve reliability is minimal. The CR-3 PRA indicates, assuming an optimistic 75% increase in PORV and block valve reliability, that the resulting decrease in core damage frequency is approximately 4.5×10^{-7} per year. This is equivalent to a 3% decrease - from approximately 1.5×10^{-5} per year to 1.455×10^{-5} per year, and is due to the role of the PORV in depressurization during a steam generator tube rupture event. Enhancement of feed-and-bleed cooling has no effect on core damage frequency for CR-3.

Since use of the PORV in SGTR mitigation and feed-and-bleed cooling fails to satisfy either Policy selection criteria for CR-3, changes to the current technical specification based upon these capabilities would be inconsistent with TSIP.

- o The use of feed-and-bleed cooling to justify regulatory requirements is inconsistent with other NRC Staff licensing actions. The generic letter recognizes that feed-and-bleed cooling is beyond design basis and is not, strictly speaking, within the scope of this issue. However, this capability has been largely used to justify the recommendations of the generic letter and the resolution of GI-70. An example of other uses of feed-and-bleed cooling in licensing actions is the NRC SER written on the Resolution of GI-124, Auxiliary Feedwater System Reliability for CR-3. The SER stated that "uncertainties about the operator's decisional, procedural, and performance abilities under stress, do not permit crediting feed-and-bleed as a reliable compensatory decay heat removal feature for resolution of GI-124. These uncertainties and concerns regarding intentional release of reactor coolant into the containment, cannot justify this method of removing decay heat as a suitable compensatory feature." This is contradictory to the use of feed-and-bleed capability in the regulatory analysis for Generic Letter 90-06.

- There is a high potential for substantial costs in replacement power due to outages resulting from the proposed shutdown requirements. There have been three failures of the PORV and two failures of the block valve at CR-3 during the period from September 1978 to January 1988. While none of these failures occurred during power operation, had they occurred under the proposed technical specifications, CR-3 would have had to shutdown. In order to restore the valves to operability, the unit would likely have to be placed in cold shutdown (MODE 5) due to the environmental conditions in the general area of the valves. Such an outage would be expected to typically last a minimum of 10 days (costing 7-10 million dollars in terms of replacement power costs). This information has been omitted from the NUREG 1316 cost/benefit analysis performed to justify the proposed recommendations.

Conclusion:

Implementation of Recommendations 1, 2, and 3 a-c, are considered sufficient to result in the reduction in risk potential sought by the NRC in Generic Letter 90-06. Based upon the actions taken and the concerns discussed above, shutdown requirements for the PORV and block valve will not be added to the CR-3 Technical Specifications.