Florida Power
CORPORATION

October 31, 1989
3F1089-26

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

Subject: Crystal River Unit 3
Docket No. 50-302
Operating License No. DPR-72
HPI Line Break
Justification for Continued Operation

Dear Sir:

In our October 27, 1989 correspondence Florida Power Corporation (FPC) provided a brief followup to the previous day's prompt report on HPI flow instrumentation. This provided a discussion of the concern and our bases for terminating the cooldown in Mode 3. FPC also committed to seek staff concurrence prior to returning to Mode 2.

FPC has evaluated alternate corrective actions and has concluded that improved instrumentation is significantly more straight forward and acceptable than establishing different small break loss of coolant accident (SBLOCA) mitigation strategies. As we reviewed the development of the SBLOCA issue and response to it, several items of relevance were noted.

The first, discussed in detail by Arkansas Power and Light in their March 23, 1989 License Amendment Request, is that the various models used in evaluating B&W 177 FA SBLOCA's are quite conservative. The principal topical (BAW-1976A) was done at 2772 MWt (versus CR-3's licensed power level of 2544 MWt). The model uses conservative decay heat curves and standard licensing codes rather than more current best-estimate modeling, and maintains substantial fuel clad temperature margin (1100°F).

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The mitigation strategy employed from the late 1970's through the reviews done in response to NUREG-0737 rely on balancing HPI flow. Such operator intervention is warranted for breaks in the HPI injection lines regardless of the break geometry (crack, break, pinch, etc.). However, for most if not all breaks in the RCS the injection paths will balance without intervention by the operator. Operator balancing will improve the systems response and will increase the amount of inventory replenished by the HPI system.

The fact that most SBLOCA's do <u>not</u> require operator action contributed to FPC classifying the HPI/MU flow variable a Type D in our evaluation of Reg Guide 1.97 compliance. Variables on which required operator action is based should be classified as Type A. FPC's re-review of Reg Guide 1.97 associated with development of the Post Accident Monitoring Instrumentation Table for a Technical Specification Change Request identified this potential discrepancy. FPC now considers the variable to be Type A. Type A variables should be instrumented with Category 1 equipment. The improved instrumentation is highly reliable and sufficiently accurate but not fully category 1. Therefore, even though sufficient accuracy has been gained, a Justification for Continued Operation (JCO) is warranted to evaluate the incomplete compliance with Reg Guide 1.97.

Attachment 1 is the result of FPC's evaluation of the instrumentation's limitations. FPC considers restart to be well supported by this evaluation. Attachment 2 is a brief description of the modified instrumentation. FPC proposes to operate until Refuel 7 with this modified instrumentation. FPC will either completely eliminate the need for operator action by installing a passive system or further improve the instrumentation to meet Category 1 requirements during the refueling outage.

Sincerely,

W. S. Wilgus, Vice President
Nuclear Operations

WSW/KRW/sdr

Attachment

xc: Regional Administrator, Region II
Senior Resident Inspector

ATTACHMENT 1

JUSTIFICATION FOR CONTINUED OPERATION

FPC considers CR-3 safe to return to 100% full power based on the following:

1. The instrumentation installed is sufficiently accurate to provide the operators with a reliable indication of flow through each HPI line. The new HPI flow instrumentation being installed now will have a flow range of 0-200 gpm. The error associated with that range is approximately ± 10 gpm between 85-200 gpm. This improved accuracy will permit the operator to throttle the control valves such that sufficient HPI flow will be provided to the core.

   The original flow instrumentation installed in each HPI line had a range of 0-500 gpm. For flows at approximately 100 gpm the error associated with that range could have been as much as -100 to +50 gpm. That inaccuracy range could have allowed the operator to throttle the HPI control valves such that insufficient HPI flow would be provided to the core.

2. The HPI throttle valves (MUV-23, -24, -25 and -26) are specifically designed and tested for the severe throttling needed for this application, as well as, other requirements associated with the HPI function.

3. Operations personnel have been instructed in the proper use of this instrumentation to balance HPI flows using the HPI throttle valves.

4. Plant operating procedures have been revised to reflect the installed instrumentation accuracy and conditions for its use.

5. The frequency of a SBLOCA in one of the HPI lines has been calculated by CR-3 PRA methods to be 3.2E-07 per year. Based upon operation from November 1, 1989 to Refuel 7 which is approximately 6 months, the probability of such a SBLOCA is 1.6E-07. The IPE guidelines document, NUREG-1335, does not require accident sequences which have a frequency less than 1.0E-07 per year to be reported. If even marginal credit is given for the operator to recover from such a SBLOCA, then the frequency of a core damage event due to a HPI line SBLOCA would be well below the IPE guidelines. If no credit is given, the accident sequence would be reportable, but not be a significant contributor to the total core damage frequency (1.5E-05 per year). Therefore, restriction of CR-3 operation is not necessary.

ATTACHMENT 2

INSTRUMENTATION DESIGN

The modified system includes two sets of HPI/MU flow instrumentation. Each uses a common flow nozzle in each of four HPI injection lines.

The wide range system (0-500 gpm per leg) has not been modified. It includes Bailey transmitters fed to the main control board and indicated in the immediate vicinity of the throttle valve controls. This same signal is also indicated on the redundent instrument panel located above these controls.

The principle components of what is now the narrow range system has existed for several years but has been modified by replacing four of the transmitters and indicator faces. The new transmitters are now Rosemount Series 1152 scaled from 0 to 200 gpm. These feed through existing Class 1E equipment to the Remote Shutdown Panel (RSP). From there a signal is buffered out to the control room on the redunent instrument panel immediately above the throttle valve controls. The new metering has a 25 gpm main division scale and a 5 gpm minor division scale from 75 to 200 gpm which will provide sufficient resolution for the operator.

The system from the RSP to the control room is not fully qualified but utilizes highly reliable equipment. The most significant attribute not meeting full Class 1E requirements is separation of the circuits to the main control room.