Florida Power
CORPORATION

November 6, 1980

File: 3-0-30

Mr. Darrell G. Eisenhut
Director
Division of Operating Reactors
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Crystal River Unit 3
Docket No. 50-302
Operating License No. DPR-72
IREP Study Recommendation

Dear Mr. Eisenhut:

Florida Power Corporation received and reviewed your letter of September 30, 1980 containing the recommendations and comments submitted as an outgrowth of the Interim Reliability Evaluation Program (IREP). Actions taken or completed by FPC on each of these items are enumerated below:

1. Ensure that the licensee's voluntary action to eliminate the AC power dependency in the steam-driven emergency feedwater train is properly implemented.

   This item is complete and has been verified by NRC I&E Inspectors.

2. Verify the existence of or add to the Technical Specifications a limiting condition for operation that requires prompt shutdown if the steam-driven emergency feedwater pump train and the electric-motor-driven emergency feedwater pump train are both inoperative.

   Technical Specifications LCO 3.7.12 and the applicable paragraph 3.0.3 adequately address this recommendation. Additionally, FPC has implemented further administrative controls.

3. Verify the adequacy of the licensee's procedures regarding the checking of check valve position for those valves whose failure would cause a LOCA that blows down outside containment and require appropriate testing in the Technical Specifications.

   A Pump and Valve Test program was submitted to the NRC on July 25, 1979, and subsequent revisions per NRC request. FPC's proposed program meets Tech Spec 4.0.5 and ASME Section XI requirements.

4. The common DC power dependency between one diesel and the emergency feedwater system turbine admission valve should be eliminated. We note, however, that one of the suggestions made by our contractor (to power the admission valve from both DC trains) may not be desirable since it may compromise DC power redundancy. An EFS turbine steam admission valve that fails open upon loss of DC power may be appropriate.

   As a result of Florida Power Corporation's Nuclear Safety Task Force efforts following the February 26, 1980, incident, an Engineering Study is underway by Gilbert Associates Inc. to add a third EFW pump that would ameliorate this concern. In addition, a Modification Action Request has been written to consider installing a valve in parallel to the EFW turbine emission valve that would be powered from the other DC bus. However, prior to installation, an engineering evaluation would be conducted to evaluate the overall contribution of such a modification.

5. Additional investigation of the diesel-generator failure history is recommended.

   Emergency Diesel Generator (EDG) failure history (unscheduled maintenance) to date is as follows:

   1977 - 21.0 hours
   1978 - 6.0 hours
   1979 - 59.0 hours
   1980 - 110.0 hours
   196.0 hours total to date

   NOTE: These figures include a 96 hour unavailability of EDG-1B reported on LER 80-030 which occurred July 31, 1980. Total unavailability due to unscheduled maintenance during the past 44 months is 00.6%

6. We recommend operator training and procedure review based on the IREP sequences. It is our understanding that this is now underway. The adequacy of this training and procedure review should be ascertained.

   Operator training and procedure review to assure inclusion of the major concerns you expressed in your cover letter have been accomplished. Other procedural changes and operator training will be required to implement the ATOG Program Guidelines when they are completed.

7. The decay heat closed cycle cooling water system (DHCCCS) has two trains which are completely redundant. This system provides component cooling to several engineered safety features. Thus, a single failure would disable not only one train of DHCCCS but also one train of multiple engineered safety features. It may be prudent to modify the DHCCCS to include one or more properly engineered cross-over points to reduce this common coupling of multiple systems.

   The Engineered Safety Features Actuation Systems (ESFAS) consist of redundant trains, each train supplied by a separate train of the Decay Heat Closed Cycle Cooling System (DHCCCS). Failure to achieve an ESFAS function, therefore, requires the failure of two trains, i.e.:

   - both ESFAS trains, or
   - both DHCCCS trains, or
   - one DHCCCS train and the ESFAS train not supplied by the failed DHCCCS train.

   It has been suggested that DHCCCS "crossover points" would eliminate the last double-failure combination, thereby improving plant reliability.

   A reliability analysis was performed to assess the potential benefit to be derived from DHCCCS crossover points. The absolute improvement in plant reliability depends on numerical values assigned to various component failure rates. There is considerable debate within the industry as to appropriate failure rates, particularly in regard to the influence of human errors. However, the calculated analysis provided ranges for the relative improvement in plant reliability.

Assumptions in the analysis were made such that the maximum improvement in reliability would be achieved. A measure of this improvement is the factor F, defined as:

$$F = \frac{\text{unavailability of ESFAS without crossover points}}{\text{unavailability of ESFAS with crossover points}}$$

The maximum value for the calculated "improvement factor" is 2.0. When failure probabilities reported in the IREP study are used as input, the "improvement factor" is only 1.5. The maximum improvement factor of two is relatively insignificant considering typical uncertanties (a factor of ten, or more) in actual data bases used in probabilistic risk assessment analyses. We, therefore, do not feel that the suggested crossover points significantly increase the reliability of Engineered Safety Feature Actuation Systems, which are already designed with large safety margins.

The included analysis is not directly applicable to the High Pressure Injection System (HPI). The HPI System consists of two pumps in two trains with cooling water supplied from the DHCCCS, with a third pump supplied from the Nuclear Services Closed Cycle Cooling System (NSCCCS). Additionally, the two DHCCCS-supplied pumps may be supplied with cooling water from the NSCCCS as the system is presently designed, which would make the addition of DHCCCS crossover points for the HPI system unnecessary.

8. Review the steam line rupture matrix circuitry for actuation or failure modes which might disable both trains of emergency feedwater. It may be appropriate to conduct a risk tradeoff study of these systems to see if they do indeed reduce overall risk.

FPC is aware of the concern expressed. We are actively pursuing the installation of the new B&W Emergency Feedwater Instrument Control System. This new system will modify the steam line rupture matrix and provide for emergency feedwater flow to the unaffected generator. This concern was further addressed by FPC in their request to remove FWV-161 and 162 from the isolation matrix. We are continuing to resolve concerns with NRR. This modification will provide a passive flow path through the steam generators from the emergency feed pumps independent of control action. All concerns should be resolved in the near future.

9. Consider the possibility of further modifications to the Emergency Feedwater System. The Crystal River 3 plant has a two pump EFS arrangement. With action on items 1, 2, 4 and 8 above, the Crystal River 3 EFS is not notably unreliable. However, here, as well as in other EFS studies, we find inherent limitations in the two pump configuration.

   Responses to Items 1, 2, 4 and 8 indicate our concurrence with this recommendation.

If you have any questions, please do not hesitate to ask.

Very truly yours,

FLORIDA POWER CORPORATION

P. Y. Baynard
Manager
Nuclear Support Services Department

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STATE OF FLORIDA

COUNTY OF PINELLAS

P. Y. Baynard states that she is the Manager, Nuclear Support Services Department of Florida Power Corporation; that she 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 her knowledge, information and belief.

Patsy Y. Baynard
P. Y. Baynard

Subscribed and sworn to before me, a Notary Public in and for the State and County above named, this 6th day of November, 1980.

Margaret A. Hansford
Notary Public

Notary Public, State of Florida at Large,

My Commission Expires: June 8, 1984

PYB/MAHNotary(DN-98)