UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

April 12, 1994

Docket No. 50-302

Mr. Percy M. Beard, Jr.
Senior Vice President,
Nuclear Operations
Florida Power Corporation
ATTN: Manager, Nuclear
Licensing (NA2I)
Crystal River Energy Complex
15760 W Power Line Street
Crystal River, Florida 34428-6708

Dear Mr. Beard:

SUBJECT: VERIFICATION OF SEISMIC ADEQUACY OF MECHANICAL AND ELECTRICAL EQUIPMENT IN OPERATING REACTORS, UNRESOLVED SAFETY ISSUE (USI) A-46, GENERIC LETTER (GL) 87-02, CRYSTAL RIVER UNIT 3 (TAC NO. M69440)

In your letter dated January 7, 1994, you indicated that you plan to apply a plant-specific procedure (PSP) to perform plant walkdowns for the resolution of USI A-46. You consider the PSP to be equivalent to the Generic Implementation Procedure (GIP) on the basis that your plant is located in a low seismic hazard area and, as a result, applying the PSP would satisfy the assumption in the staff's Safety Evaluation of the floor response spectra dated December 16, 1993, that "...the verification of the equipment and anchorages will be in accordance with Supplement 1 to Generic Letter 87-02." Our detailed reviews of your A-46 program are in progress. Upon completion of this review, we will determine the acceptability of your position on the equivalency of the PSP to the GIP.

Although we have not completed our review of your overall USI A-46 implementation program for Crystal River Unit 3 (CR-3), we agree that your facility is located in a region with a potential seismic hazard that is substantially lower than other nuclear sites in the United States, and, as a result, it is not necessary to require that your facility satisfy the same rigorous seismic criteria that would be required for a facility located in a region with a higher seismic hazard (e.g., the full provisions in the GIP, Revision 2). Consequently, the staff has established a general framework of criteria which would satisfy the intent of USI A-46 for facilities located in regions with low seismic hazard. In general, the criteria which should be satisfied are as follows:

(1) Safe Shutdown Systems/Duration

In accordance with GL 87-02, the program scope should include the systems and corresponding equipment necessary to ensure that hot shutdown can be achieved and maintained for 72 hours following a Safe Shutdown Earthquake (SSE).

(2) Electrical Relays

Since the likelihood of encountering an SSE in the range of 0.1g to 0.15g peak ground acceleration during the remaining licensed term of your facility is low, it is unlikely that a potential seismic event would produce vibratory ground motion of sufficient intensity to cause a significant number of relays to experience chatter, especially if it is confirmed that the anchorages for the relays and the equipment housing them are sufficient to withstand a design basis earthquake. For the small number of relays which may experience chatter and cause undesirable effects on safe shutdown equipment, appropriate operator action may be sufficient to cope with the undesirable effects (e.g., reset the relay, work around any affected equipment, etc.) within the time needed to avoid core damage. Thus, a reduced scope of electrical relay evaluation would satisfy the intent of the USI A-46 concern regarding potential seismic-induced relay malfunction subject to the following:

a. Confirmation, by plant walkdowns, that all essential relays in the safe shutdown path are properly installed; i.e., installed per design drawings with adequate anchorages. This may be accomplished by a confirmatory walkdown of a sample population of the safe shutdown relays.

b. A commitment to replace all "Bad Actor Relays" (EPRI NP-7148-SL, Appendix E), which are considered susceptible to chatter at very low vibration levels, during maintenance or modification activities that occur for other reasons for the balance of plant life.

c. A commitment to develop a top-level procedure for coping with the consequences of relay chatter. The purpose of this procedure is to ensure that operator action would be sufficient to cope with the malfunction of the "Bad Actor Relays," or any other relays in the safe shutdown path that may potentially chatter. This procedure should alert operators to the potential for seismically-induced relay chattering, describe the expected effects and diagnostic tools available to the operators, and describe methods for coping with the situation.

(3) Anchorage

Section 4.4 of the PSP indicates that the preferred method to determine the adequacy of anchorage is through inspection and judgment of the Seismic Capability Engineers (SCE). This is not acceptable to the staff. As a minimum, Section 4.4 of the GIP, Revision 2, should be thoroughly implemented, not by the SCE's judgment but by the hardware verification using the procedures provided in Appendix C of the GIP, Revision 2.

(4) Equipment Walkdowns/Evaluations

The PSP indicates that you are implementing the GIP, Revision 2, guidelines for verifying the adequacy of the tanks and heat exchangers. This is acceptable. Special emphasis should be placed on safe shutdown tanks; tanks which do not satisfy the intent of the GIP criteria should be modified to ensure that they do. In addition, with regard to above-ground vertical tanks, if the resolution of USI A-40, "Seismic Design Criteria," is to be achieved through the resolution of USI A-46, then the USI A-46 implementation program must include all tanks in the scope of USI A-40 (i.e., all safety-related, or Category I, above-ground vertical tanks) even if they are not in the safe shutdown path. For the remaining equipment in the USI A-46 scope (e.g., pumps, valves, cabinets, raceways, etc.), perform confirmatory walkdowns and engineering evaluations to demonstrate that the safe shutdown path equipment satisfies the intent of the GL. As warranted, appropriate action should be taken to restore and ensure the functional operability of the equipment, during and following a design basis SSE, in accordance with design requirements.

(5) Cables and Conduit Raceways

Your conclusion that the raceway systems need not be evaluated by any criteria for the resolution of USI A-46 is not acceptable. However, a reduced scope based on original design, prior re-evaluation, and analytical evaluations with appropriate documentation may be acceptable.

(6) Other

With regard to Appendix D to Attachment 2 and Appendix B to Attachment 3, certain of your proposed deviations from the GIP generic caveats for 20 classes of equipment are not consistent with our positions. Specifically, caveats concerning anchorages, relays, and other related aspects (e.g. attached weight, door, base isolation, etc.) should be revised consistent with our positions described in this letter. Please provide detailed technical bases for deviations from other GIP caveats related to items which are not specifically addressed in the criteria stated above. The technical bases for these deviations should be expanded beyond the argument of low seismicity at the site.

We consider the above criteria to constitute a general framework for satisfying the intent of GL 87-02 for facilities such as yours which are located in low seismic hazard areas. Please note that we have not completed our review of the details of your overall USI A-46 implementation programs for CR-3, and that this letter is not our Safety Evaluation.

Based on the current status of our review of your submittals, we have identified the following major areas for which we require additional information.

(A) Your August 27, 1993, letter indicates the specific design features of your facility are such that the required single failure assumption would

require a longer duration than 72 hours to achieve hot shutdown. This is acceptable provided you confirm that adequate water sources and sufficiently redundant features exist to maintain the safe shutdown functions in the event of a single failure during and following an SSE. Also, use of combined water sources from seismically and non-seismically qualified tanks to provide water for maintaining hot shutdown for at least 72 hours, would satisfy the intent of the GL. A reasonable qualitative engineering evaluation would be required to ensure that the "non-seismically" qualified storage tanks and equipment necessary to transfer water from these tanks to the reactor will be functionally operable and available during and following a design basis SSE. You should confirm that vital support systems within seismic and "non-seismic" safe shutdown path would be functional during and following an SSE. Appropriate procedures must be in place to direct plant operators to use the alternative water sources, when necessary, to maintain hot shutdown continuously for at least 72 hours. You should confirm that these actions have been accomplished.

(B) With reference to your August 27, 1993, letter:

1. Attachment 2 (Table 1, item 7) indicates that the evaluation of tanks and heat exchangers will be limited to the adequacy of their anchorages. This is not consistent with Section 7.2 of Attachment 3 which indicates that you plan to utilize the guidance of GIP-2 in its entirety. Please clarify.

2. Appendix B of Attachment 2 explains your position that cable raceways need not undergo a case-by-case review. However, Section 8 of the Plant Specific Procedure (PSP) directs users of the PSP to review Section 8.0 of the GIP. Provide clarification as to how the cable and conduit raceways will be evaluated.

3. The discussion following Figure A1 of Appendix A, Attachment 2, indicates that all CR3 SSEL equipment, except the outliers (that exceed the SQUG Reference Spectrum in Figure A1), will meet the GIP capacity/demand screening guidelines and commitment. Three items of equipment located in the auxiliary building elevation 162 feet are identified outliers. This is not consistent with your letter dated October 6, 1993. The floor response spectra provided in your October 6, 1993, letter for two elevations in the reactor building also exceed the SQUG Reference Spectrum at high frequencies. Please clarify this discrepancy, and identify, if any, additional outliers and discuss the technical basis for their resolution.

4. Figure A2 of Appendix A displays limited amplification data collected from three Japanese reactors subjected to 19, 18, and 14 earthquakes, respectively. You provided this data to demonstrate that the amplification factors in the frequency range of 11 to 19 Hz are low such that SSEL, including where the in-structure response spectra (demand) exceeds the SQUG Reference Spectrum (capacity), would be acceptable without an outlier analyses. We do not concur with your position. The data in your submittal is not representative of the earthquake experience

regard to above ground vertical tanks, if the resolution of USI A-40, "Seismic Design Criteria," is to be achieved through the resolution of USI A-46, then the USI A-46 implementation program must include all tanks in the scope of USI A-40 (i.e., all safety-related, or Category I, above ground vertical tanks) even if they are not in the safe shutdown path.

We consider the above criteria to constitute a minimum framework for satisfying the intent of GL 87-02 for facilities such as CR-3 which are located in low seismic hazard areas. Within 30 days from receipt of this letter, please provide a response to indicate your acceptance of the above criteria, including the requested commitments and confirmations, and schedule for revising your submittals accordingly.

Please note that we have not completed our review of the details of your overall USI A-46 implementation programs for CR-3, and that this letter is not our Safety Evaluation.

This requirement affects fewer than 10 respondents and, therefore, it is not subject to Office of Management and Budget review under P.L. 96-511.

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